



PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report Task 13 – Deliverable D58/D59

(for the period October 1 – December 31, 2012)

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PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report

October 1 – December 31, 2012

EXECUTIVE SUMMARY

The Plains CO₂ Reduction (PCOR) Partnership is one of seven Regional Carbon Sequestration Partnerships (RCSPs) competitively awarded by the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) in 2003 as part of a national plan to mitigate greenhouse gas emissions. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota and continues to include stakeholders from the public and private sector in Phase III. The PCOR Partnership region includes all or part of nine U.S. states and four Canadian provinces.

Phase III, the development phase, a 10-year effort (2007–2017), is an extension of the characterization (Phase I) and validation (Phase II) phases. The Phase III efforts of the PCOR Partnership include two large-volume demonstration tests—one in Canada and one in the United States—that focus on injecting carbon dioxide (CO₂) into deep geologic formations for CO₂ storage. Budget Period 4 (Years 3–8 of Phase III) began October 1, 2009.

This progress report presents an update of Phase III PCOR Partnership activities from October 1, 2012, through December 31, 2012.

The 11th International Conference on Greenhouse Gas Control Technologies was held November 18–22, 2012, in Kyoto, Japan. Over 1600 delegates were anticipated, and among those attending were seven PCOR Partnership team members, who prepared papers, gave two oral presentations, presented five posters, and cochaired three sessions. Papers are available online at <https://www4.eventsinteractive.com/iea/rs.esp?id=270035&scriptid=SPPP1>.

This quarter, efforts increased to characterize the third of three target areas within the PCOR Partnership region and included collection of well files containing historical water injection and oil production data. Activities also continued with the Interstate Oil and Gas Compact Commission Carbon Geologic Storage Task Force that is investigating operational and postoperational liability issues.

Activities supporting the Denbury Onshore LLC-owned Bell Creek project continued at a quick pace throughout this reporting quarter. Geologic and geomechanical modeling in addition to well-logging efforts continued. Ten new soil gas profile stations were installed in October 2012, and approval was received to install two new groundwater-monitoring wells. Event 5, the final baseline soil gas- and water-sampling event, was completed in November 2012. Although there was little activity on the Spectra Energy Transmission-owned Fort Nelson Carbon Capture and Storage Project, efforts under all other program-supporting tasks continued at a robust pace.



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

PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report

October 1 – December 31, 2012

INTRODUCTION

The Plains CO₂ Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnership (RCSP) Program. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) in Grand Forks, North Dakota, and includes stakeholders from the public and private sector. The membership as of December 31, 2012, is listed in Table 1. The PCOR Partnership region includes all or part of nine states (Iowa, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Wisconsin, and Wyoming) and four Canadian provinces (Alberta, British Columbia, Manitoba, and Saskatchewan).

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

The 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 (Figure 1)

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

BP3: October 1, 2007 – September 30, 2009

BP4: October 1, 2009 – September 30, 2015

BP5: October 1, 2015 – September 30, 2017

Note: BP1 and BP2 were effective in Phase II.

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

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

The overall mission of the Phase III program is to 1) gather characterization data to verify the ability of the target formations to store carbon dioxide (CO₂), 2) facilitate the development of the infrastructure required to transport CO₂ from sources to the injection sites, 3) facilitate sensible development of the rapidly evolving North American regulatory and permitting framework, 4) develop opportunities for PCOR Partnership partners to capture and store CO₂, 5) facilitate establishment of a technical framework by which carbon credits can be monetized for CO₂ stored in geologic formations, 6) continue collaboration with other RCSPs, and 7) provide outreach and education for CO₂ capture and storage stakeholders and the general public.

In Phase III, the PCOR Partnership is building on the information generated in its characterization (Phase I) and validation (Phase II) phases. The PCOR Partnership plans to fully utilize the infrastructure of its region to maximize CO₂ injection volumes. A programmatic development phase (Phase III) goal is implementation of large-scale field testing involving at least 1 million tons (Mt) of CO₂ per project. Each of the RCSP's large-volume injection tests is

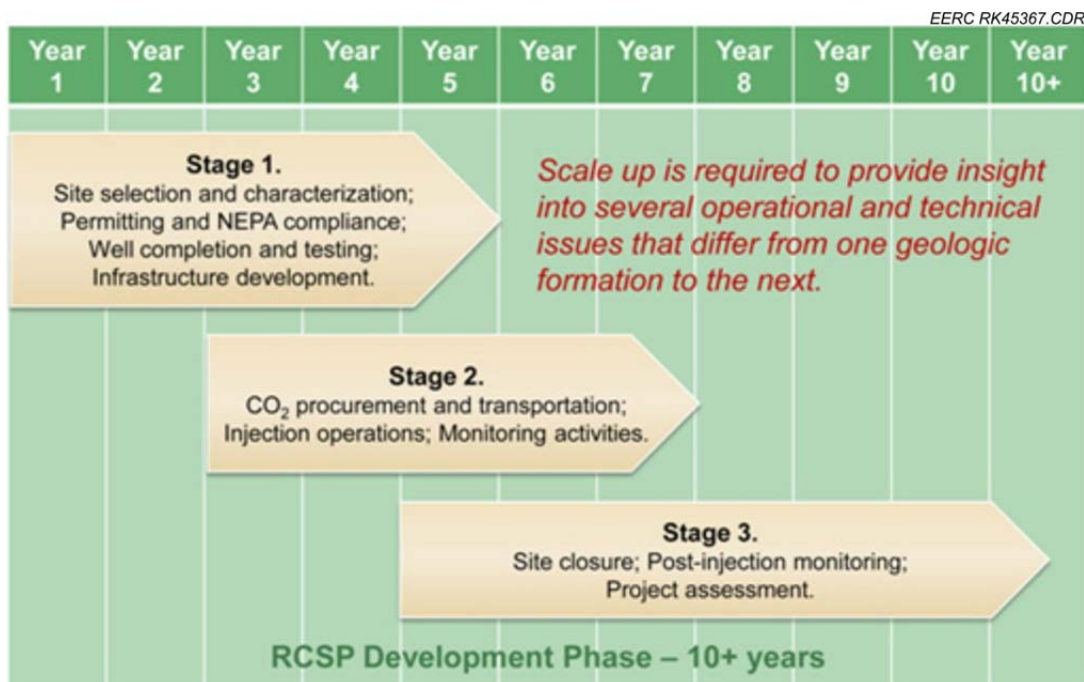


Figure 1. RCSP development phase: scaling up toward commercialization (Source: www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcspiii.html [accessed January 2013]).

designed to demonstrate that the CO₂ storage sites have the potential to store regional CO₂ emissions safely, permanently, and economically for hundreds of years.

The PCOR Partnership is working toward the establishment of two demonstration sites. The sites are located 1) in Denbury Onshore LLC's (Denbury's) 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 (Figure 2).

The PCOR Partnership's objectives for the demonstration projects are as follows: 1) conduct a successful field demonstration to verify that the region's large number of oil fields have the potential to store significant quantities of CO₂ in a safe, economical, and environmentally responsible manner and 2) conduct a successful demonstration to verify the economic feasibility of using the region's carbonate saline formations for safe, long-term CO₂ storage. During Phase III, the PCOR Partnership will continue to refine storage resource estimates and evaluate other factors relevant to regional storage goals.

The PCOR Partnership plans to achieve its Phase III mission through a series of 16 tasks: 1) Regional Characterization; 2) Public Outreach and Education; 3) Permitting and National Environmental Policy Act (NEPA) Compliance; 4) Site Characterization and Modeling; 5) Well Drilling and Completion; 6) Infrastructure Development; 7) CO₂ Procurement; 8) Transportation and Injection Operations; 9) Operational Monitoring and Modeling; 10) Site Closure; 11) Postinjection Monitoring and Modeling; 12) Project Assessment; 13) Project

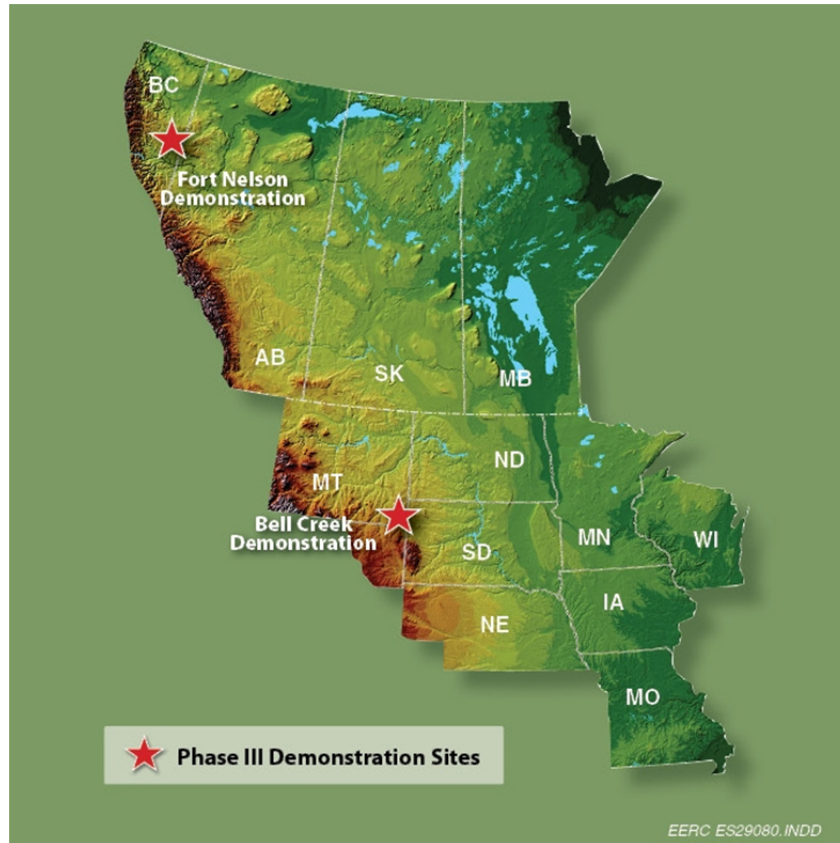


Figure 2. PCOR Partnership Phase III demonstration sites.

Management; 14) RCSP Water Working Group (WWG) Coordination; 15) Further Characterization of the Zama Acid Gas Enhanced Oil Recovery (EOR), CO₂ Storage, and Monitoring Project; and 16) Characterization of the Basal Cambrian System. Table 2 lists the responsibility matrix for these 16 tasks.

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

PROGRESS OF WORK

Task 1 – Regional Characterization

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

- Finalized the 2012 Annual Meeting Web page on the partners-only Decision Support System (DSS, © 2007–2013 EERC Foundation®) located at www2.undeerc.org/website/PCORP/AnnualMeetingWorkshop/2012/.
- Continued updating the databases that ultimately feed the DSS with new oil fields, wells, and gas plants.

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 ¹
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	Dayanand Saini
Task 16 – Characterization of the Basal Cambrian System	Wesley D. Peck

¹ To be announced.

- Received production data from the Nebraska Oil and Gas Conservation Commission and incorporated the information into the newly integrated data set for the U.S. portion of the PCOR Partnership region.
- Continued compiling Nebraska geologic data with regard to saline storage opportunities.
- Received well top data for the Minnelusa Formation in the Wyoming portion of the Powder River Basin to explore saline storage opportunities.
- Rectified storage resource numbers that surfaced in the data submitted to the National Carbon Sequestration Database and Geographic Information System (NATCARB).
- Continued efforts to characterize the third target area (Deliverable [D] 7, due September 2013), including the following:
 - Traveled to the Billings office of the Montana Board of Oil and Gas to collect information on wells in the Pennel and Pine oil fields on October 2–5 and again on October 30 – November 2, 2012.
 - Continued to move historical water injection and oil production data for the Pine and Pennel oil fields from files collected at the Montana Board of Oil and Gas offices to spreadsheets for incorporation into a new database.
 - Corrected data in the PETRA well database. These changes included importing formation top data for the Pine oil field and correcting township and range directions in Montana.
 - Compiled a detailed PowerPoint presentation for in-house use, highlighting what is currently known about the Pine and Pennel oil fields.
- Continued review of updates and corrections to the latest edition of the PCOR Partnership Atlas (D81, update due August 2013).

- Gathered images used in the *PCOR Partnership Atlas*, Fourth Edition, for the Alberta Department of Energy to use in its report on the regulatory framework assessment for CCS.

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

- C12 Energy has not yet provided the characterization report on the Halliday Dome (originally due June 2012) or the accompanying cost-share report.

Task 2 – Public Outreach and Education

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

- EERC employees attended 18 conferences/meetings, exposing external participants to the PCOR Partnership name, messaging, and informational materials. Specifically, the PCOR Partnership outreach activities included 11 oral presentations and five poster presentations. The following quantities of outreach materials were distributed:
 - PCOR Partnership documentary entitled “Nature in the Balance: CO₂ Sequestration” – 135
 - PCOR Partnership documentary entitled “Reducing Our Carbon Footprint: The Role of Carbon Markets” – 135
 - PCOR Partnership documentary entitled “Out of the Air – Into the Soil” – 135
 - PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 166
 - PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 141
 - *PCOR Partnership Atlas*, 3rd Edition, Revised – 0
 - *PCOR Partnership Atlas*, 4th Edition – 257
- During this reporting period, there were 1265 visits to the public Web site (www.undeerc.org/pcor) from 60 countries. Of the 1265 visits, 70% of the Web traffic was domestic, while 30% was international. As depicted in Figure 3, the countries with the highest number of visits included the United States (885), Canada (75), India (34), United Kingdom (28), Australia (24), South Korea (17), Brazil (11), and France (11).
- During this reporting period, a breakdown of how visitors came to the PCOR Partnership Web site, also referred to as traffic sources (Figure 4), is provided below.
 - Direct traffic consists of those visitors who type in or enter the URL www.undeerc.org/pcor. We presume that most of the direct traffic was from EERC staff, while most of the traffic from search engines and referring sites was external.
 - Search engine traffic refers to the use of keywords and accounted for just under half of the traffic. Google Analytics provides the keywords visitors used. About half of the keywords are specific to the EERC and the PCOR Partnership and the other half are general terms such as “CO₂ sequestration.”
 - Referral site traffic is traffic directed to the PCOR Partnership Web page from other sites via links. The top referring sites were the EERC home page, the DOE site, and the Massachusetts Institute of Technology (MIT) site.

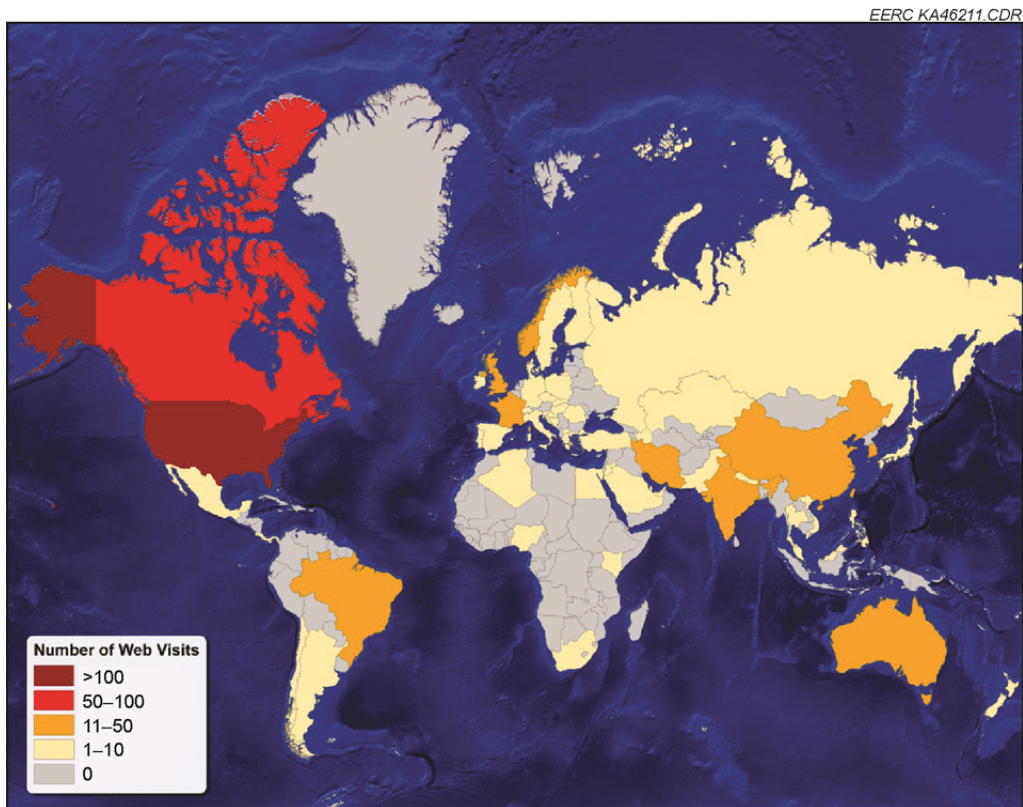
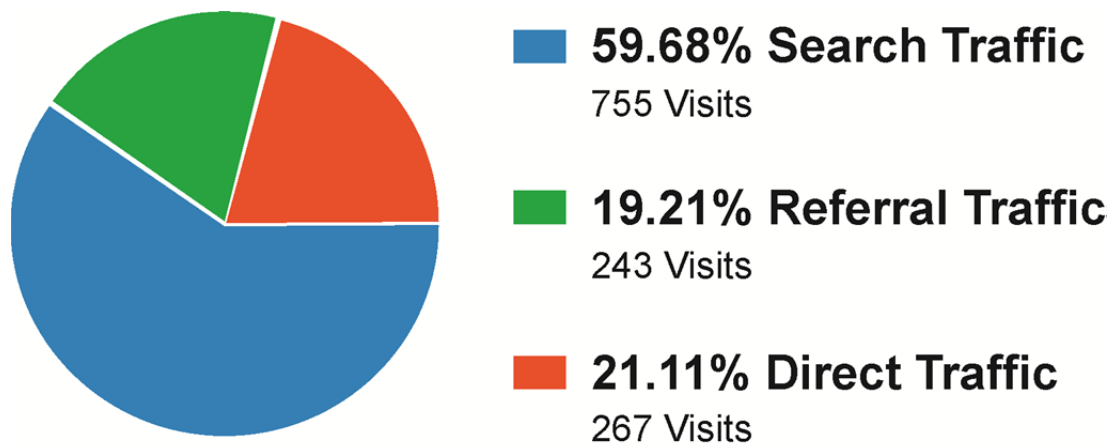


Figure 3. Map of PCOR Partnership global Web traffic (source: Google Analytics).



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Figure 4. PCOR Partnership public Web site traffic (source: Google Analytics).

- Hosted an exhibit booth featuring PCOR Partnership outreach materials on October 3–5, 2012, at the 2012 South Dakota Library Association (SDLA) Annual Meeting in Huron, South Dakota.
- Hosted an exhibit booth and distributed outreach materials at the Mountain Plains Library Association (MPLA)/Nebraska Library Association (NLA)/Nebraska School Library Association (NSLA) 2012 Tri-Conference held on October 17–19, 2012, in LaVista, Nebraska; the meeting involved librarians from eight states (Nebraska, Montana, Kansas, Iowa, New Mexico, Nevada, Texas, and Oklahoma), including three in the PCOR Partnership region (Nebraska, Iowa, and Montana).
- Met with the Prairie Public Broadcasting (PPB) education group in Fargo, North Dakota, to discuss future collaboration on educational activities.
- Contacted Lignite Energy Council (LEC) personnel to discuss potential CCS classroom activities at its upcoming teacher seminar in June 2013.
- Participated in monthly RCSP Outreach Working Group (OWG) conference calls. Topics discussed included the development of new message maps as a basis for informing audiences about the differences between carbon capture, utilization, and storage (CCUS) and hydraulic fracturing as well as issues related to CCUS and drinking water.
- Traveled to Washington, D.C., to participate in OWG focus group sessions related to the use of message maps in developing, organizing, and testing outreach materials in response to stakeholder concerns. Sessions were held on the topics of CCUS and “seismic events.”
- Submitted to the conference coordinator a paper for 11th International Conference on Greenhouse Gas Technologies (GHGT-11) entitled “Message Mapping for CCUS Outreach: Testing Communications through Focus Group Discussion,” prepared in conjunction with Sarah Wade and the OWG.
- Attended GHGT-11 and presented the RCSP OWG’s “Visual Message Mapping for Carbon Capture and Storage (CCS) Outreach” in Session 9D on November 18–22, 2012, in Kyoto, Japan.
- Traveled to Regina and Estevan, Saskatchewan, Canada, with a PPB film crew on October 29 – November 1, 2012, to film activities related to the Aquistore project (installation of CO₂ soil gas samplers, water sampling, water well drilling, and completion of the second Aquistore well) as well as interviews with personnel at the Petroleum Technology Research Centre (PTRC), the International Test Center for CO₂ Capture, and the Saskatchewan Geological Survey.
- Initiated arrangements for filming the installation of permanent downhole geophones at the Bell Creek site.
- Continued preparation of a value-added video short, including a script revision and film edit, focused on smart casing installation or permanent downhole monitoring (PDM) for CCS reservoir monitoring.
- Continued updating the Phase III general fact sheet (D14, due February 2013).
- Continued development of a new Lignite Field validation site fact sheet (value-added).
- Held a discussion with Spectra management on November 29, 2012, regarding its review of D19, the Fort Nelson PowerPoint presentation.
- Continued efforts to populate, test, and refine the outreach tracking database.

- Continued efforts to review and improve the public Web site, including identification and prioritization of areas for update, actions to increase Web traffic, and actions to improve tracking and reporting.
- Participated in a telephone discussion on December 5, 2012, regarding the potential for collaboration on education with the Global CCS Institute in Australia.
- PowerPoint presentations given this reporting period regarding the Bell Creek test site included the following:
 - EERC–Bell Creek Monitoring, Verification, and Accounting (MVA) Overview, presented at the MVA Knowledge-Sharing Workshop on October 2, 2012, in Plano, Texas.
 - “Overview of the Bell Creek Combined CO₂ Storage and CO₂ Enhanced Oil Recovery Project, presented at GHGT-11 on November 14, 2012, in Kyoto, Japan.
 - “PCOR Partnership: CO₂ EOR and MVA Update,” presented at the 2012 Joint CoalFleet for Tomorrow & CO₂ Capture and Storage Technical Meeting on December 11, 2012, in Mobile, Alabama.
 - “Baseline MVA Activities,” presented on November 28, 2012, via WebEx to Denbury technical personnel
- No PowerPoint presentations were given this reporting period regarding the Fort Nelson test site.

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

- PPB canceled the Teacher Training Institute (TTI) on Energy, Climate, and CO₂, scheduled for November 9–10, 2012, in Grand Forks, North Dakota. The materials prepared will be used at a future TTI.
- Requested and obtained extensions for the Aquistore project fact sheet (D94) and the Aquistore project poster (D95) now due September 30, 2013 (original due dates were January 31, 2013, and February 28, 2013, respectively).
- The Fort Nelson test site PowerPoint presentation (D19, originally submitted June 30, 2012, and the revision incorporating Spectra’s comments submitted December 17, 2012) continued to undergo review by Spectra.

Task 3 – Permitting and NEPA Compliance

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

- Attended the MVA Knowledge-Sharing Workshop on October 2, 2012, at Denbury headquarters in Plano, Texas.
- Continued activities associated with the Interstate Oil and Gas Compact Commission (IOGCC) Carbon Geologic Storage (CGS) Task Force, including the following:
 - Hosted a task force kickoff meeting on October 4, 2012, in Denver, Colorado.
 - Identified the operational and postoperational liability subcommittee members.
 - Distributed the meeting summary and materials to the task force members.
 - Planned for and held the first subgroup discussion on November 8, 2012.

- Coordinated CGS Task Force activities with Kevin Bliss Consulting, and continued planning for the December 2012 subgroup meeting/conference call.
- Participated in the working group conference call on December 6, 2012, to discuss findings since the last call (held November 8, 2012).
- Began planning for the next subgroup working group meeting (tentatively February 2013).
- Continued to discuss the report outline and writing assignments.
- Submitted Milestone (M) 37, entitled “IOGCC Task Force Subgroup Meeting 1 Held,” on December 21, 2012.
- Attended the IOGCC 2012 Annual Meeting in San Antonio, Texas, on October 29–31, 2012. Management staff gave a presentation about the IOGCC CGS Task Force.
- Completed review of the EERC’s Bell Creek MVA program in association with the reporting requirements under the U.S. Environmental Protection Agency Mandatory Greenhouse Gas Reporting Rule, Subpart RR – Geologic Sequestration of Carbon Dioxide.
- Hosted a visitor from Denbury on November 13, 2012, and provided an overview of PCOR Partnership activities and a tour of the EERC facilities.
- With regard to the Lignite Site (Phase II) closure:
 - Continued efforts to monitor the site during the reclamation phase, including site visits on October 18; November 1, 15, and 29; and December 13 and 27, 2012.
 - Continued to modify a draft value-added report on closure activities.

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:

- EERC modeling staff attended Schlumberger software training entitled “Techlog Formation Evaluation Course” on October 8–12 and October 28 – November 3, 2012, in Houston, Texas.
- EERC modeling staff attended Schlumberger software training entitled “Petrel Property Modeling” on October 22–24, 2012, in Houston, Texas.
- EERC staff traveled on October 4 to visit the Bell Creek site and download information from the PDM system located on the 0506 OW monitoring well in Bell Creek, Montana.
- On November 4–9, 2012, EERC staff participated in the Society of Petroleum Engineers (SPE) Forum Series on Novel Techniques for Reservoir Modeling held in Santa Fe, New Mexico.

- **Bell Creek** test site activities included the following:
 - On October 1, 2012, participated in a geologic model meeting with Denbury at its headquarters in Plano, Texas.
 - On October 3, 2012, participated in a well log review meeting with Halliburton and Denbury at Denbury's headquarters in Plano, Texas.
 - On October 3, 2012, participated in pulsed-neutron well log planning with Schlumberger and Denbury at Denbury's headquarters in Plano, Texas.
 - Continued work on the fieldwide 3-D geologic model, including the following:
 - ♦ Conducted quality assurance/quality control of the well locations.
 - ♦ Added all Phase 9 boundaries.
 - ♦ Completed the porosity analysis.
 - ♦ Continued the permeability analysis.
 - ♦ Completed final adjustments to the petrophysical properties.
 - Continued work on the facies model, including the following:
 - ♦ Continued the petrophysical analysis of lithofacies and permeability.
 - ♦ Developed a depofacies model using historic and recently acquired core data.
 - Completed a draft of a Bell Creek outcrop/core facies poster for the American Association of Petroleum Geologists (AAPG) Annual Conference & Exhibition to be held May 19–22, 2013, in Pittsburgh, Pennsylvania.
 - Continued work on the geomechanical model, including the following:
 - ♦ Continued analysis of pressure gauge response from the 0506 OW well, including construction of a leakage model (including pressure and temperature models) and a simplified geomechanical model.
 - ♦ Continued work on the fieldwide 3-D geomechanical model.
 - ♦ Continued work on the 3-D mechanical earth model.
 - Prepared an abstract entitled “Geomechanical Modeling and In Situ Stresses Around the Wellbore, Bell Creek Field, Powder River Basin, Montana” for the 2013 American Rock Mechanics Association 47th U.S. Rock Mechanics/Geomechanics Symposium.
 - Continued work on the geomechanical report (D32, due January 31, 2013).
 - Continued work on the proposed SCAL (special core analysis) work plan, including the following:
 - ♦ Participated in a short meeting with Core Labs on December 5, 2012 (during a flight layover) in Houston, Texas.
 - ♦ Participated in a conference call on December 19, 2012, to discuss CT (computed tomography) scan results of core plug samples.
 - ♦ Collected a 25-gallon produced-oil sample from the 05-11 well for use in SCAL testing.
 - ♦ Sent Core Labs' samples from the 0506 OW monitoring well to Wagner Petrographic for thin-section preparation. Two sets will be made from 48 intervals.
 - Continued sensitivity analysis in Petrel.
 - Continued review of the Reservoir Saturation Tool (RST) logs, including the following:
 - ♦ Participated in several RST log review conference calls with Schlumberger Carbon Services and Denbury.

- ◆ On December 4, 2012, participated in a RST log review meeting with Schlumberger Carbon Services and Denbury in Plano, Texas.
 - ◆ Completed pulsed-neutron baseline logging activities on 14 of 54 wells.
- Continued work on the mineralogy assessment for characterization and modeling efforts.
- Prepped samples of the U.S. Geological Survey core to send to Wagner Petrographic for thin-section preparation.
- Discussed experimental permeability measurements with EERC lab personnel.
- **Fort Nelson** test site activities included the following:
 - Participated in a short monthly conference call with Spectra on October 3, 2012. Topics discussed included potential path(s) forward, Spectra’s planned visit to the EERC, and the order of priority for Spectra’s review of previously provided deliverables (D67, D65, D19, and D41).
 - Participated in a conference call with Spectra on November 6, 2012 (held in lieu of a visit to the EERC). Topics discussed again included potential path(s) forward and the order of priority for Spectra’s review of pending deliverables (D67, D65, D19, and D41).
 - Participated in several conference calls with Spectra staff regarding the Fort Nelson CCS Project.
 - Attended and presented a poster entitled “Overview, Status, and Future of the Fort Nelson CCS Project” at GHGT-11 in Kyoto, Japan.
 - Worked on wrapping-up the geomechanical modeling efforts.
 - Submitted a brief update to D41 (Fort Nelson Test Site – Geochemical Observations) on December 14, 2012.

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

- Arranged for Wagner Petrographics to redo the thin-section work from the Bell Creek core samples.
- D65, Fort Nelson Test Site – Site Characterization Report, was provided to Spectra in April 2012 for its review and comment. No comments have been received to date.
- D41/M32, Fort Nelson Test Site – Geochemical Report, was given to Spectra on September 12, 2012, for review and comment. No comments have been received to date.
- Continued to work with Spectra to develop a revised scope of work for 2012–2013 static and dynamic modeling activities.

Task 5 – Well Drilling and Completion

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

- Participated in the MVA Knowledge-Sharing Workshop on October 2, 2012, and several project meetings held on October 1 and 3, 2012, in Plano, Texas.
- Attended and gave a presentation entitled “Overview of the Bell Creek Combined CO₂ Storage and CO₂ Enhanced Oil Recovery Project” at GHGT-11 in Kyoto, Japan.

- Continued evaluation of a tracer flood study at Bell Creek as an MVA technique.
- Continued evaluation of well integrity throughout the Bell Creek Field.
- Continued preparation of a mitigation plan under probable scenarios of vertical CO₂ migration.
- Received approval from Denbury to install ten soil gas profile stations at Bell Creek to supplement the MVA program. The gas profile stations were installed and sampled during the week of October 15–19, 2012.
- Received approval from Denbury for and scheduled installation of two groundwater-monitoring wells into the Fox Hills aquifer (deepest local underground source of drinking water [USDW]) on the 05-04 and 33-12 well pads (estimated drilling date is January 15, 2013).
- EERC staff traveled to the Bell Creek Field to site the location of two groundwater-monitoring wells and received signed landowner agreement(s).
- Began preparation of a SAP (sampling and analysis plan) for the two groundwater-monitoring wells.
- Completed final (Event 5) baseline soil gas- and water-sampling event at Bell Creek on November 2–9, 2012.
- Completed analysis and data integration of final baseline sampling (Event 5) data.
- Continued work on a value-added preinjection surface water, groundwater, and soil gas baseline MVA sampling and analysis report including results. The report consists of three sections: 1) site descriptions, 2) sampling protocol, and 3) field and lab analyses.
- Continued preparation of a technical presentation about the Bell Creek surface and near-surface MVA program to be given to the PCOR Partnership Technical Advisory Board (TAB) on January 3, 2013.
- Attended the Denbury landowner appreciation and new facilities banquet on November 8, 2012.
- Distributed Event 3 (June 2012) landowner water analysis packages.
- Reviewed the draft PDM video.
- Participated in an in-house update meeting on December 14, 2012. Topics discussed included upcoming activities, surface and near-surface MVA activities, pulsed-neutron logging, seismic activities, modeling updates, and upcoming deliverables.

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

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

Task 6 – Infrastructure Development

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

- Received and incorporated EERC management suggestions for improving the interactive capture technology tree (to be housed on the partners-only DSS). A final in-house review was initiated.
- Continued study of a document from Det Norske Veritas entitled “Design and Operation of CO₂ Pipelines.”
- Prepared a paper and poster for GHGT-11 entitled “A Phased Approach to Building a Hypothetical Pipeline Network for CO₂ Transport During CCUS.”
- Attended the American Institute of Chemical Engineers (AIChE) Annual Meeting on October 29 – November 2, 2012, in Pittsburgh, Pennsylvania, and gave a presentation based on the phased approach to building a regional pipeline network report (D84, submitted June 2012).
- Prepared a written version of the presentation given at the AIChE meeting, which was submitted on December 10, 2012, for peer review and subsequent publication in *Energy & Fuels*. Contacted several pipeline experts to be peer reviewers for the paper.
- Continued the biennial update to the report entitled “Opportunities and Challenges Associated with CO₂ Compression and Transport During CCUS Activities” (D85). The first version was submitted in March 2011.
- Updated visitors from Nebraska Public Power District (NPPD) on PCOR Partnership activities on December 21, 2012.

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

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

Task 7 – CO₂ Procurement

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

- Participated in ongoing project discussions with Denbury, including a meeting held on November 1, 2012, in Plano, Texas.

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

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

Task 8 – Transportation and Injection Operations

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

- Continued reviewing information about EOR injection site surface facilities.
- Participated in the in-house Bell Creek project update meetings on October 11 and December 14, 2012.

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:

- Purchased PVTsim software and began learning its capabilities.
- Continued **Bell Creek** site activities, including the following:
 - Participated in the MVA Knowledge-Sharing Workshop on October 2, 2012, and several project meetings held on October 1 and 3, 2012, in Plano, Texas.
 - Worked on upscaling of the geologic model.
 - Worked on the water saturation model.
 - Worked on flow region determination.
 - Checked the production history of several wells to estimate the drainage radius.
 - Continued work on the simulation case with CO₂ solubility in brine.
 - Reviewed Bell Creek literature to find historic reservoir pressure data.
 - Analyzed capillary rise experimental data.
 - Discussed new PVT (pressure–volume–temperature) test data and minimum miscibility pressure (MMP) results.
 - Worked on capillary pressure for OWC (oil–water contact) at various conditions for the model.
 - Continued work on a Bell Creek subnormal pressure mechanism paper and e-poster presentation for the 2013 International Petroleum Technology Conference (IPTC) in Beijing, China.
 - Participated in an in-house modeling update meeting on October 18, 2012.
 - Ran predictive simulations.
 - Ran simulation scenarios of different perforations.
 - Participated in an in-house monthly modeling and simulation meeting on November 28, 2012.
 - Prepared, reviewed, and revised abstracts for the 2013 SPE Annual Technical Conference & Exhibition, to be held September 30 – October 2, 2013, in New Orleans, and for the 2013 SPE Eastern Regional Meeting to be held August 20–22, 2013, in Houston, Texas.
- Continued **Fort Nelson** site activities, including the following:
 - Attended and presented a poster entitled “The Role of Static and Dynamic Modeling in the Fort Nelson CCS Project” at GHGT-11 in Kyoto, Japan.
 - Prepared a scope of work for the next stage of dynamic modeling.

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

- D67, Fort Nelson Test Site – Simulation Report, was provided to Spectra in September 2011 for review and comment. No comments have been received to date.
- Continued making revisions with Spectra on a scope of work for the next stage of dynamic modeling.

Task 10 – Site Closure

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

Task 11 – Postinjection Monitoring and Modeling

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

Task 12 – Project Assessment

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

- Submitted D57, the annual assessment report, on December 28, 2012.

Task 13 – Project Management

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

- Mailed 260 cards (one to each partner contact) with information on how to access the 2012 PCOR Partnership Annual Meeting materials on the DSS.
- Held discussions with PTRC regarding Aquistore, including the upcoming SERC (Scientific and Engineering Research Committee) meeting in February, an upcoming project participant meeting, the scope of work, and the core description.
- Held a task leader meeting on October 25, 2012. Topics discussed included task leader and fund manager changes, updates on the Fort Nelson and Bell Creek projects, status of the TAB WebEx and winter meeting, and new hires.
- Continued work on the updated project management plan.
- Continued efforts planning for upcoming TAB events, including the following:
 - Hosted a WebEx on November 28, 2012, on the Bell Creek baseline soil gas and water analysis for Denbury personnel (for approval to present the information to the TAB).
 - Began preparation of an agenda for the TAB WebEx scheduled for January 3, 2013.
 - Began preparation of a draft agenda for the March 5 and 6, 2013, TAB meeting in Orlando, Florida.
 - On November 23, sent an e-mail reminder and calendar notice for the March 2013 meeting to be held at the Caribe Royale Hotel and Convention Center in Orlando, Florida.
- EERC staff hosted an exhibit booth at the National Advanced Biofuels Conference on November 27–29, 2012, in Houston, Texas, and distributed PCOR Partnership materials (along with other EERC materials).

- Staff traveled to Midland, Texas, to participate in the CO₂ Conference Week workshops held December 3–5, 2012.
- Presented on December 11, 2012, on the Bell Creek project at the Electric Power Research Institute (EPRI) Stakeholder Meeting in Mobile, Alabama.
- Held the task leader meeting on December 7. Topics discussed included a recap of GHGT-11, updates on the Fort Nelson and Bell Creek projects, an update on Aquistore, upcoming TAB meeting dates, an overview of CO₂ Conference Week (Midland, Texas), upcoming deliverables and milestones, and updates from each task leader present.
- Deliverables and milestones completed in October:
 - September monthly update
 - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
 - Task 14: M23 – Monthly WWG conference call held
- Deliverables and milestones completed in November:
 - October monthly update
 - Task 14: M23 – Monthly WWG conference call held
- Deliverables and milestones completed in December:
 - November monthly update
 - Task 12: D57 – Project Assessment Annual Report
 - Task 14: M23 – Monthly WWG conference call held
 - Task 3: M37 – IOGCC Task Force Subgroup Meeting 1 Held

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

- Received an e-mail on September 13, 2012, from Spectra indicating that it will not be conducting 2012–2013 winter activities, i.e., exploratory well-drilling or 3-D seismic activities. This will further delay CO₂ injection at the Fort Nelson test site. Continued discussions with Spectra regarding a path forward.

Task 14 – RCSP WWG Coordination

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

- Discussed topics for the newly required fact sheets (D99), including 1) water resource protection (enumerating applicable regulations), 2) MVA techniques and technologies, and 3) mitigation/remediation techniques.
- Distributed draft tables of water and CCS projects on October 9, 2012, to WWG members for review and comment by members and their colleagues.
- Distributed the notes from the September 27, 2012, conference call on October 19, 2012.
- Distributed on October 22, 2012, an outline for the new water resource protection fact sheet to the WWG for review.
- Held the monthly conference call on October 25, 2012. Topics discussed included the scope of the upcoming fact sheet series and content specific to the first new fact sheet.

- Distributed the notes from the October 25, 2012, conference call on November 15, 2012.
- Held the monthly conference call on November 28, 2012. Topics discussed included development of a WWG research agenda and water resource protection fact sheet draft.
- Received formal approval from DOE NETL to waive the requirement for a December WWG conference call.
- Continued reviewing the WWG white paper in preparation for journal article submission.
- Continued review of background data for the methodologies document.
- Shared information related to WWG outreach activities with the RSCP OWG. The OWG is also working on documents related to water resource protection.
- Participated in the monthly OWG conference calls (held November 15 and December 13, 2012) to discuss the water-related “message map” and other topics.
- Discussed current revisions to the fact sheet and reviewed short- and long-term goals of the WWG task with The CETER Group, Inc., during its visit on December 12–13, 2012.
- Began addressing comments from the WWG review of the water–CCS nexus-related fact sheet (D99).
- Continued preparation and compilation of graphics for the new water resource protection fact sheet with assistance from the OWG.
- Continued preparations for the January WWG conference call.

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

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

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

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

- Dayanand Saini is the new task leader effective October 24, 2012.
- EERC staff presented a poster entitled “A Simulation Study of Simultaneous Acid Gas EOR and CO₂ Storage at Apache’s Zama F Pool” at GHGT-11 in Kyoto, Japan.
- Worked on PVT model development for the pools selected for further characterization.
- Reviewed the drilling and production history of G2G, RRR, and Z3Z pools.
- Worked on building the static geologic model.
 - Participated in an in-house meeting to discuss static model development activities.
 - Worked on problems related to georeferencing the well data in ArcGIS (for the static modeling).
 - Georeferenced Z3Z, G2G, RRR, NNN, and Muskeg L pinnacles in ArcGIS for static geologic modeling.
 - Discussed possible use of CMOST software for dynamic simulation.

- Attended the Midwest Regional Carbon Sequestration Partnership (MRCSP) Partners Meeting, on October 29–30, 2012, in Independence, Ohio.
- Worked on MMP modeling for the Zama G2G pinnacle.
- Continued review of relevant published literature and internal technical reports/presentations on the geologic and reservoir characteristics of the Zama subbasin.
- Checked the well log data inventory for all 13 wells with reference to TGS online well log collection, purchased the missing interval of well ACL (02) HZ ZAMA 8-33-115-6, and imported it into the Petrel project. Also purchased a gamma ray (GR) log for the 263-ft (80-m) interval.
- Held in-house project update meetings to discuss project progress on November 29 and December 17 and 27, 2012.
- Prepared a tentative time line for the project (Gantt chart and staff time).
- Reviewed a published report on geochemical modeling of Zama acid gas injection.

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 16 – Characterization of the Basal Cambrian System

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

- Presented a poster entitled “CO₂ Storage Resource Potential of the Cambro–Ordovician Saline System in the Western Interior of North America” at GHGT-11 in Kyoto, Japan.
- Continued work on the 3-D model of the full extent of the Cambro–Ordovician Saline System, including the following:
 - Prepared and exported the 3-D model to project participants, namely Princeton University and Lawrence Berkeley National Laboratory.
 - Continued working toward integrating the completed 3-D model into the simulation software.
 - Participated in discussions about the various total dissolved solids for the modeling and simulations.
- Continued efforts to develop the geochemical report (D89, due March 2013), including the following:
 - Continued geochemical modeling runs for the various horizons in several wells in order to investigate the interaction of CO₂ with the host rock.
 - Continued compiling results, including scanning electron microscopy/x-ray diffraction (SEM/XRD) data, from lab work.
 - Completed writing sections on experimental investigation of CO₂–brine–reservoir sandstone interactions and geochemical modeling of CO₂–brine–reservoir sandstone interactions.
 - Continued literature review for the geochemical report to ensure that data generated are valid.

- Continued efforts to describe the wellbore integrity issues (D90, due September 2013), including the following:
 - Worked on adding facies to more wells (utilizing initial 61 wells).
 - Discussed the maximum pressure for CO₂ injection.
 - Prepared a draft report currently undergoing in-house review.
- EERC staff traveled to Calgary, Alberta, Canada, on November 5–8, 2012, to view the core collected from the Aquistore well near Estevan, Saskatchewan, Canada. Notes and photos from the core-viewing trip to Calgary are being compiled into a package for PTRC, including notes, descriptions, and interpretations.

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

- Experienced problems with the transfer process when integrating the large static model into dynamic simulation software. At this time, no delays to the overall project are anticipated.

PHASE III COST STATUS

The approved BP4 (Modification No. 24) budget along with actual costs incurred and in-kind cost share reported are shown in Table 3. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 5 and Table 4.

PHASE III SCHEDULE STATUS

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

Table 3. Phase III Budget – BP4

Organization	Approved Budget, \$	Actual Costs Incurred, \$
DOE Share – Cash	58,400,697	27,849,893
Nonfederal Share – Cash	2,411,971	2,074,728
Nonfederal Share – In-Kind	27,034,759	23,772,133
Total	87,847,427	53,696,754

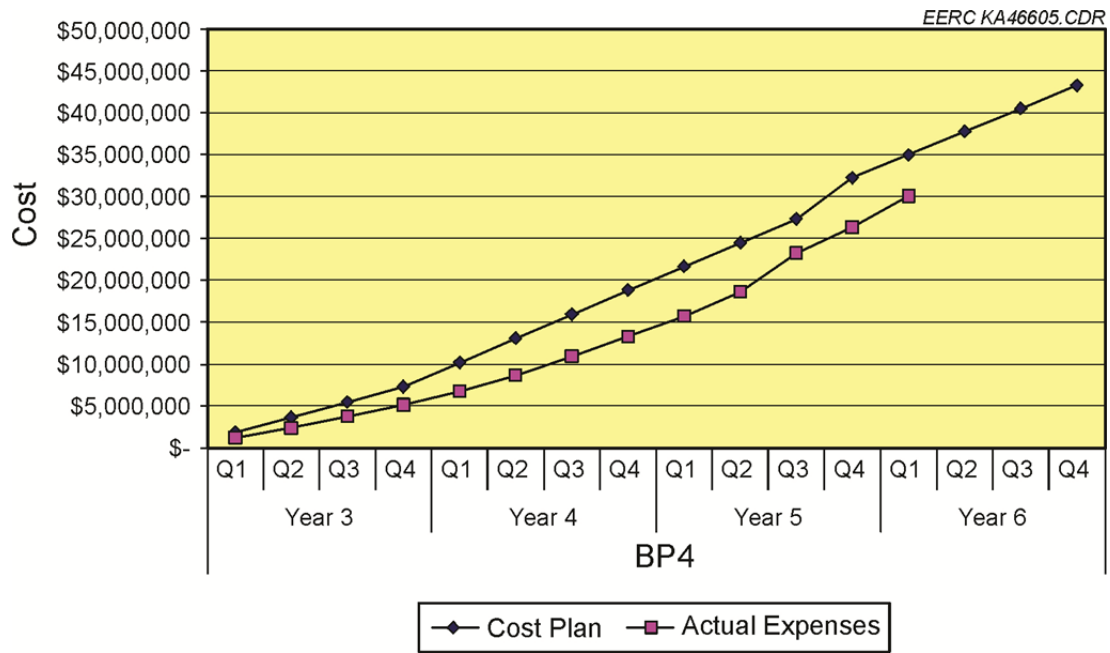


Figure 5. PCOR Partnership Phase III, BP4, Years 3–6 funding (cash only).

Table 4. BP4 – Years 3–6 Spending Plan

Budget Period 4																
Baseline Reporting Quarter	Year 3								Year 4							
	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4	
	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total
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	\$2,612,701	\$38,226,626	\$2,612,701	\$40,839,326
Nonfederal Share	\$152,429	\$1,373,944	\$152,429	\$1,526,373	\$152,429	\$1,678,802	\$152,429	\$1,831,231	\$145,185	\$1,976,416	\$145,185	\$2,121,601	\$145,185	\$2,266,786	\$145,185	\$2,411,971
Total Planned	\$2,823,922	\$21,647,808	\$2,823,922	\$24,471,729	\$2,823,922	\$27,295,651	\$4,924,105	\$32,219,755	\$2,757,886	\$34,977,641	\$2,757,886	\$37,735,526	\$2,757,886	\$40,493,412	\$2,757,886	\$43,251,297
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						
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						
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						
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						
Nonfederal Share	\$ (8,322)	\$151,360	\$18,291	\$169,651	\$ (111,980)	\$57,671	\$ (144,513)	\$ (86,842)	\$ (11,470)	\$ (98,312)						
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						

Table 5. 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 5. Phase III Milestones and Deliverables (continued)

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

Continued . . .

Table 5. 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 5. 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 5. 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 5. 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 5. 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	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/13	
D14: Task 2 – General Phase III Fact Sheet (Update)	2/28/13	
M23: Task 14 – Monthly WWG Conference Call Held	2/28/13	
D33: Task 4 – Bell Creek Test Site – Geochemical Final Report	3/31/13	
D85: Task 6 – Report – Opportunities and Challenges Associated with CO ₂ Compression and Transportation During CCS Activities	3/31/13	
D89: Task 16 – Report – Geochemical Evaluation of the Basal Cambrian System	3/31/13	
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	3/31/13	
M12: Task 4 – Bell Creek Test Site Geochemical Work Completed	3/31/13	

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

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

Continued . . .

Table 5. 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	
D6: Task 3 – Permitting Review – Update 1	9/30/13	
D48: Task 7 – Bell Creek Test Site – Procurement Plan and Agreement Report	9/30/13	
D86: Task 15 – Updated Regional Implementation Plan for Zama (Ext. from 4/30/12)	9/30/13	
D90: Task 16 – Report – Wellbore Evaluation of the Basal Cambrian System	9/30/13	
D94: Task 2 – Aquistore Project Fact Sheet	9/30/13	
D95: Task 2 – Aquistore Project Poster	9/30/13	
D98: Task 3 – Report – Findings, Recommendations, and Guidance of CGS Task Force	9/30/13	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/13	
M38: Task 3 – IOGCC Task Force Wrap-Up Meeting Held	9/30/13	
M39: Task 3 – IOGCC Task Force Editing Subgroup Meeting Held	9/30/13	
M40: Task 15 – Further Characterization of the Zama Acid Gas EOR, CO ₂ Storage, and Monitoring Project Completed	9/30/13	
Year 7 – Quarter 1 (October–December 2013)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/13	
D42: Task 5 – Bell Creek Test Site – Injection Experimental Design Package	10/31/13	
D99: Task 14 – Water/CCS Nexus-Related Fact Sheet	10/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/13	
D41: Fort Nelson Test Site – Geochemical Report (Update 1)	12/15/13	
D57: Task 12 – Project Assessment Annual Report	12/31/13	
M23: Task 14 – Monthly WWG Conference Call Held	12/31/13	
Year 7 – Quarter 2 (January–March 2014)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/14	
M41: Task 6 – Decision to Incorporate Ramgen Compression Technology into Bell Creek Project	1/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	2/28/14	

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 6 – Quarter 4 (July–September 2013) (continued)		
D24: Task 2 – PCOR Partnership Region Sequestration General Poster (Update)	3/31/14	
D36: Task 4 – Bell Creek Test Site – Wellbore Leakage Final Report	3/31/14	
D92: Task 16 – Report – Storage Capacity and Regional Implications for Large-Scale Storage in the Basal Cambrian System	3/31/14	
M23: Task 14 – Monthly WWG Conference Call Held	3/31/14	
M36: Annual Advisory Board Meeting Scheduled	3/31/14	

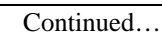
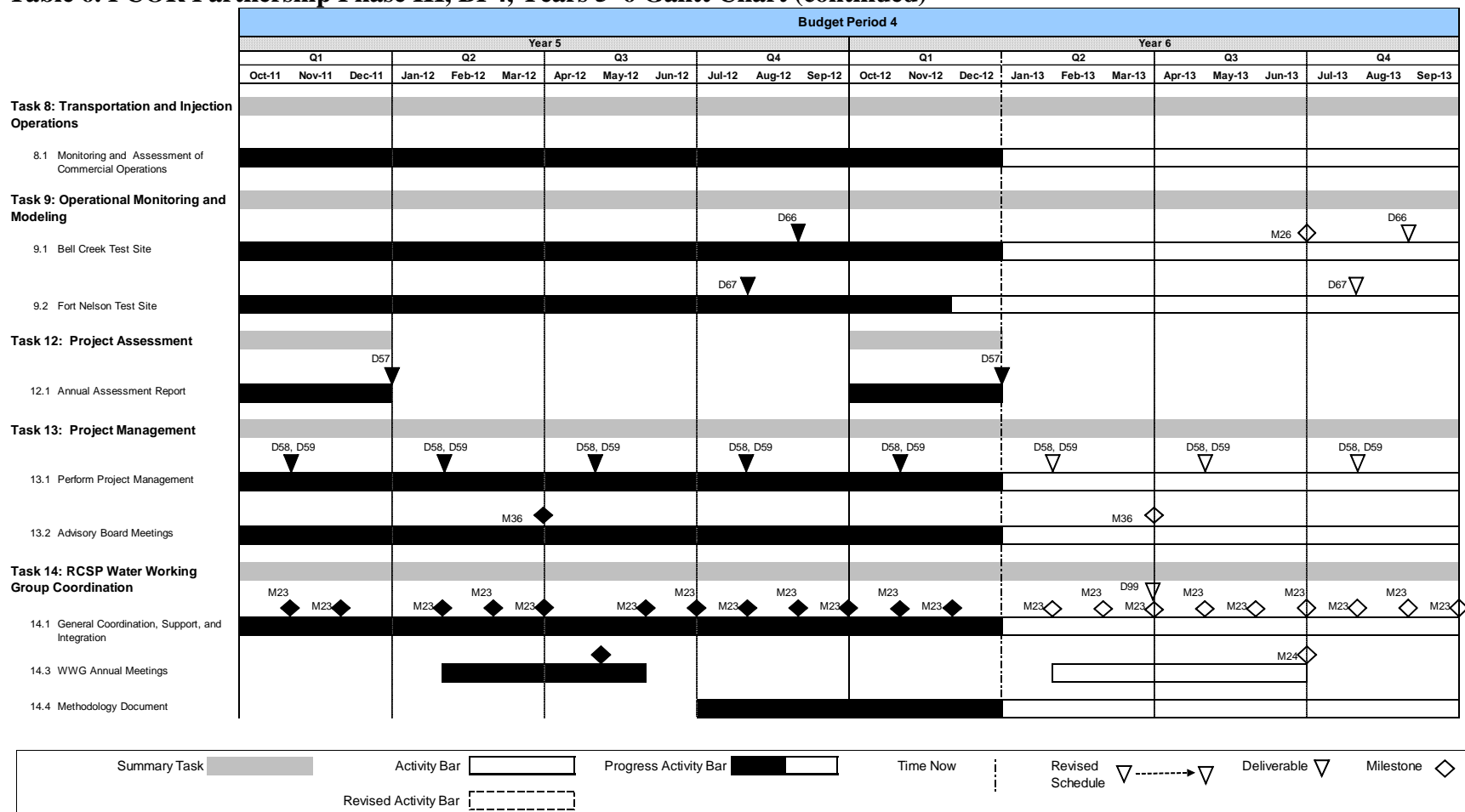


Table 6. PCOR Partnership Phase III, BP4, Years 5–6 Gantt Chart (continued)



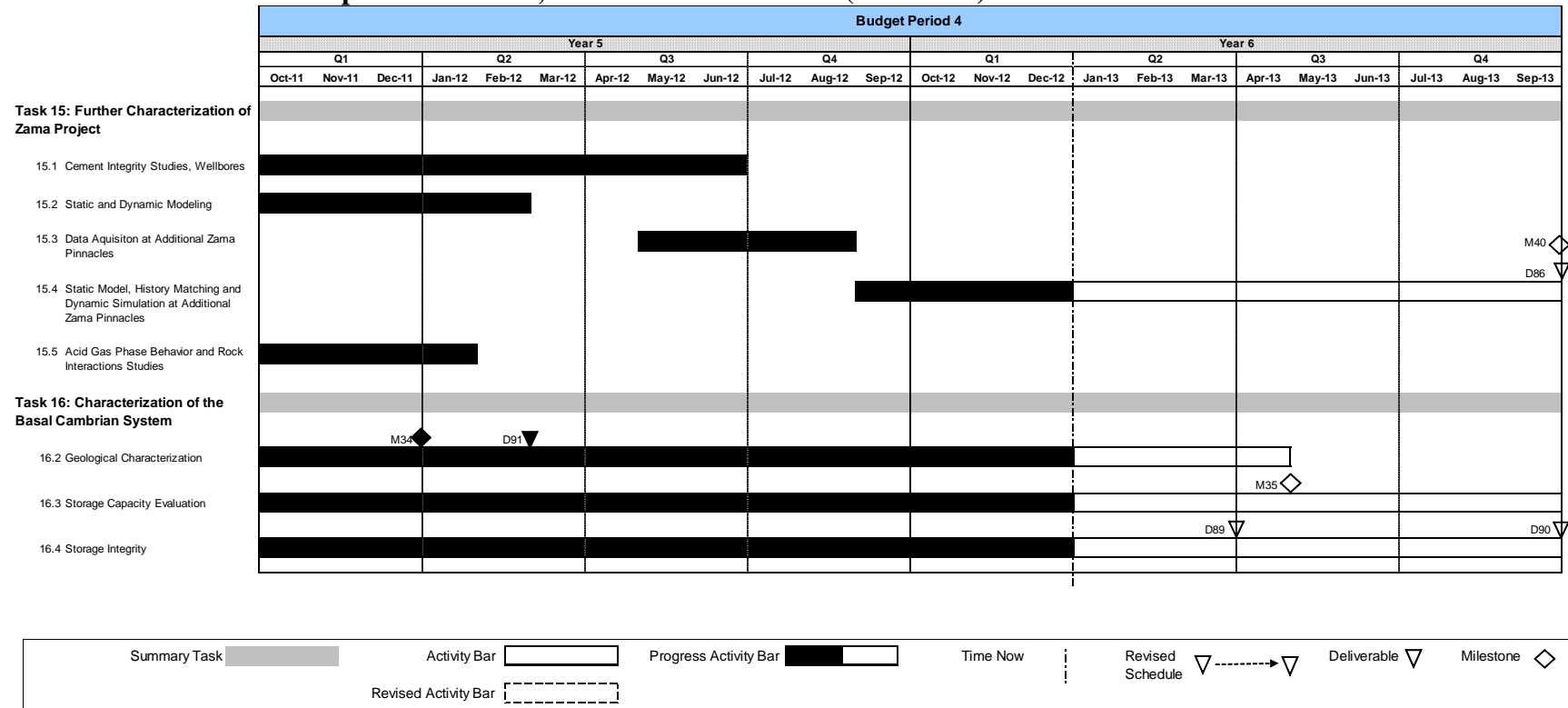
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Table 6. PCOR Partnership Phase III, BP4, Years 5–6 Gantt Chart (continued)



Continued...

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



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

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

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, there were four abstracts (three poster and one oral) accepted for presentation and 16 presentations (11 oral and five poster) given at 18 different meetings/conferences. In addition, a quarterly progress report, two deliverables, and one milestone were completed.

Abstracts

Submitted

Liu, G., Gorecki, C.D., Braunberger, J.R., Bailey, T.P., and Landsverk, K.R., 2012, Integrated reservoir modeling and simulation optimization workflow based on a high-performance parallel computing cluster [abs.]: 2013 Rice Oil & Gas HPC Workshop, Houston, Texas, February 28, 2013.

Submitted and Accepted for Presentation

Braunberger, J.R., Peck, W.D., Bailey, T.P., Bremer, J.M., Huffman, B.W., and Gorecki, C.D., 2012, Subsurface core and analogous outcrop characterization of the Muddy/Newcastle Formation for the Bell Creek oil field, Powder River County, Montana [abs.]: 2013 AAPG Annual Convention & Exhibition, Pittsburgh, Pennsylvania, May 19–22, 2013.

Ostadhassan, M., Braunberger, J.R., Ge, J., Hamling, J.A., and Gorecki, C.D., 2012, Geomechanical modeling and in situ stresses around the wellbore, Bell Creek Field, Powder River Basin, Montana [abs.]: 47th US Rock Mechanics Geomechanics Symposium, San Francisco, California, June 23–26, 2013.

Ostadhassan, M., Braunberger, J.R., Hamling, J.A., and Gorecki, C.D., 2012, Post-stack processing and seismic inversion of 2-D line Bell Creek Field, Powder River Basin, Montana [abs.]: 2013 AAPG Annual Convention & Exhibition, Pittsburgh, Pennsylvania, May 19–22, 2013.

Accepted for Presentation

Steadman, E.N., Harju, J.A., Gorecki, C.D., Botnen, L.S., Daly, D.J., Jensen, M.D., Peck, W.D., Sorensen, J.A., Smith, S.A., Hamling, J.A., Klapperich, R.J., and Anagnost, K.K., 2012, The Plains CO₂ Reduction (PCOR) Partnership—a Regional Carbon Sequestration Partnership in the interior plains of North America [abs.]: EUEC 2013: Energy, Utility & Environment Conference, Phoenix, Arizona, January 28–30, 2013.

Presentations

Braunberger, J.R., 2012, A geospatial overview in the PCOR Partnership: Lecture for Introduction to GIS presented at North Dakota State University, Fargo, North Dakota, December 7, 2012.

- Burnison, S.A., and Peck, W.D., 2012, CO₂ EOR opportunities on the Cedar Creek Anticline: Presented to Denbury Resources personnel, Grand Forks, North Dakota, November 13, 2012.
- Daly, D.J. Managing CO₂—carbon capture and storage: Presented at the Prairie Public Broadcasting Master Teacher Meeting, Fargo, North Dakota, October 6, 2012.
- Daly, D.J., Cumming, L., Garrett, G., Stone, M., Cather, M., Watson, K., and Wade, S., 2012, Message mapping—a tool for developing and testing responses to stakeholder concerns: Presented at the 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11), Kyoto, Japan, November 18–22, 2012.
- Gorecki, C.D., 2012, Plains CO₂ Reduction Partnership—CO₂ EOR and MVA update: Presented at the 2012 Joint CoalFleet for Tomorrow & CO₂ Capture and Storage Technical Meeting, Mobile, Alabama, December 11, 2012.
- Gorecki, C.D., 2012, The Plains CO₂ Reduction (PCOR) Partnership—Bell Creek focus: Presented to Denbury Resources Inc. personnel, Grand Forks, North Dakota, November 13, 2012.
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Meeting Minutes

Klapperich, R.J., 2012, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: September 27.

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Conference Papers

Daly, D.J., and Wade, S., 2012, Message mapping for CCUS outreach—testing communications through focus group discussion: Paper presented at the 11th International Conference on Greenhouse Gas Control Technologies (GHGT-11), Kyoto, Japan, November 18–22, 2012.

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Journal Articles

Jensen, M.D., Pei, P., Snyder, A.C., Heebink, L.V., Botnen, L.S., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2012, A methodology for phased development of a hypothetical pipeline network for CO₂ transport during carbon capture, utilization, and storage: Energy & Fuels [in review].

MEETINGS/TRAVEL

Representatives from the PCOR Partnership attended and/or participated in the following 18 meetings/conferences, four training opportunities, and 15 project management site trips in this reporting period:

- October 1–3, 2012: Participated in project meetings with service providers and Denbury in Plano, Texas.
- October 2, 2012: Participated in an MVA Knowledge-Sharing Workshop hosted by Denbury in Plano, Texas.
- October 2–5, 2012: Traveled to the Montana Board of Oil and Gas Conservation to collect well data in Billings, Montana.
- October 3–5, 2012: Hosted the IOGCC CGS Task Force meeting in Denver, Colorado.
- October 3–5, 2012: Hosted an exhibit booth at the 2012 SDLA Annual Meeting in Huron, South Dakota.

- October 6, 2012: Participated in a meeting regarding upcoming teacher training institutes at PPB offices in Fargo, North Dakota.
- October 6–8, 2012: Traveled to the Bell Creek oil field to download information from the PDM system located on the 0506OW monitoring well in southeastern, Montana.
- October 7–12, 2012: Remotely located staff traveled to the EERC for work plan discussions in Grand Forks, North Dakota.
- October 7–13, 2012: Modeling staff participated in Schlumberger software training entitled “Techlog Formation Evaluation Course” in Houston, Texas.
- October 8–11, 2012: Participated in focus group sessions with the OWG lead in Washington, D.C.
- October 15–19, 2012: Installed soil gas-profiling stations in the Bell Creek Field.
- October 16–19, 2012: Hosted an exhibit booth at the MPLA/NLA/NSLA 2012 Tri-Conference in LaVista, Nebraska.
- October 18, 2012: Visited the Lignite (Phase II) site near Kenmare, North Dakota.
- October 21–25, 2012: Modeling staff participated in Schlumberger software training entitled “Petrel Property Modeling” in Houston, Texas.
- October 24, 2012: Participated in a meeting regarding educational materials with PPB at its offices in Fargo, North Dakota.
- October 28 – November 2, 2012: Presented at the 2012 AIChE Annual Meeting in Pittsburgh, Pennsylvania.
- October 28 – November 3, 2012: Modeling staff participated in Schlumberger software training entitled “Techlog Formation Evaluation Course” in Houston, Texas.
- October 29–30, 2012: Attended the MRCSP Partners Meeting in Independence, Ohio.
- October 29 – November 2, 2012: Participated in and presented at the IOGCC 2012 Annual Meeting in San Antonio, Texas.
- October 30 – November 2, 2012: Traveled to the Montana Board of Oil and Gas Conservation to collect well data in Billings, Montana.
- November 1, 2012: Traveled to the Lignite Field site to inspect the site in Kenmare, North Dakota.
- November 1–13, 2012: Traveled to the Bell Creek oil field for site work near Gillette, Wyoming.
- November 4–9, 2012: Attended the SPE Novel Techniques for Reservoir Modeling Forum in Santa Fe, New Mexico.
- November 5–6, 2012: Traveled to the Bell Creek oil field to collect data near Miles City, Montana.
- November 5–7, 2012: Participated in meetings with PTRC in Calgary, Alberta.
- November 6–7, 2012: Traveled to the Bell Creek oil field for a site visit near Gillette, Wyoming.
- November 8–9, 2012: Traveled for a hotel site visit for a future PCOR Partnership annual meeting in Minneapolis, Minnesota.
- November 14–24, 2012: Attended and presented at GHGT-11 in Kyoto, Japan.
- November 15, 2012: Traveled to the Lignite Field site in Kenmare, North Dakota, to inspect the site.
- November 29, 2012: Traveled to the Lignite Field site in Kenmare, North Dakota, to inspect the site.

- December 2–7, 2012: Attended the CO₂ Conference Week activities in Midland, Texas.
- December 3–4, 2012: Participated in an RST log review meeting at Denbury headquarters in Plano, Texas.
- December 3–6, 2012: Attended the National Groundwater Expo and Annual Meeting in Las Vegas, Nevada.
- December 9–22, 2012: Traveled to the Bell Creek oil field for site activities in southeastern Montana.
- December 10–11, 2012: Presented at the EPRI Annual Meeting in Mobile, Alabama.
- December 10–15, 2012: Met with landowners in the Bell Creek oil field and surrounding area.
- December 11, 2012: Participated in a meeting to discuss education materials at PPB headquarters in Fargo, North Dakota.
- December 13 and 27, 2012: Traveled to the Lignite Field validation site near Kenmare, North Dakota, to inspect the site.
- December 17–21, 2012: Participated in Schlumberger NExT (Network of Excellence in Training) Techlog Fundamentals software training in Houston, Texas.

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

REFERENCES

None.