May 2, 2013

Ms. Karlene Fine  
Executive Director  
North Dakota Industrial Commission  
600 East Boulevard Avenue, Department 405  
State Capitol, 14th Floor  
Bismarck, ND 58505-0840

Dear Ms. Fine:

Contract Nos. FY08-LXIII-162 and G-015-030; EERC Funds 16196 and 15631

Attached please find the Energy & Environmental Research Center (EERC) Quarterly Technical Progress Report for the PCOR Partnership Program for Phase III. An error was found in Table 4 on page 29, which has been corrected.

If you have any questions, please contact me by phone at (701) 777-5355 or by e-mail at cgorecki@undeerc.org.

Sincerely,

Charles D. Gorecki  
Senior Research Manager

CDG/hmv

Attachment

c/att: Michael Jones, Lignite Energy Council  
Brent Brannan, NDIC Department of Mineral Resources, Oil and Gas Division  
Lynn Helms, NDIC Department of Mineral Resources, Oil and Gas Division  
Joe Murphy, North Dakota Department of Commerce

c: Corey Irion, EERC
PLAINS CO₂ REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report

(for the period January 1 – March 31, 2013)

Prepared for:

Karlene Fine
North Dakota Industrial Commission
600 East Boulevard Avenue
State Capitol, 14th Floor
Bismarck, ND 58505-0840

Contract Nos. FY08-LXIII-162 and G-015-030
EERC Funds 16196 and 15631

Prepared by:

Charles D. Gorecki
John A. Harju
Edward N. Steadman
Lucia Romuld
James A. Sorensen
Lisa S. Botnen
Daniel J. Daly
John A. Hamling
Melanie D. Jensen
Wesley D. Peck
Ryan J. Klapperich
Katherine K. Anagnost
Tami J. Votava

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

April 2013
EERC DISCLAIMER

LEGAL NOTICE This research report was prepared by the Energy & Environmental Research Center (EERC), an agency of the University of North Dakota, as an account of work sponsored by the U.S. Department of Energy and the North Dakota Industrial Commission. Because of the research nature of the work performed, neither the EERC nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement or recommendation by the EERC.

ACKNOWLEDGMENT

This material is based upon work supported by the Department of Energy, National Energy Technology Laboratory under Award Number DE-FC26-08NT43291.

DOE DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government, nor any agency thereof, nor any of their employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

NORTH DAKOTA INDUSTRIAL COMMISSION DISCLAIMER

This report was prepared by the EERC pursuant to an agreement partially funded by the Industrial Commission of North Dakota, and neither the EERC nor any of its subcontractors nor the North Dakota Industrial Commission nor any person acting on behalf of either:

(A) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

(B) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this report.
Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the North Dakota Industrial Commission. The views and opinions of authors expressed herein do not necessarily state or reflect those of the North Dakota Industrial Commission.
TABLE OF CONTENTS

LIST OF FIGURES ....................................................................................................................... iii
LIST OF TABLES ......................................................................................................................... iii
EXECUTIVE SUMMARY ........................................................................................................... iv
INTRODUCTION .......................................................................................................................... 1

PROGRESS OF WORK.................................................................................................................... 4
  Task 1 – Regional Characterization ...................................................................................... 4
  Task 2 – Public Outreach and Education ........................................................................... 7
  Task 3 – Permitting and NEPA Compliance ....................................................................... 11
  Task 4 – Site Characterization and Modeling ................................................................. 13
  Task 5 – Well Drilling and Completion ............................................................................. 16
  Task 6 – Infrastructure Development .............................................................................. 19
  Task 7 – CO₂ Procurement ............................................................................................. 20
  Task 8 – Transportation and Injection Operations ........................................................... 20
  Task 9 – Operational Monitoring and Modeling ............................................................... 20
  Task 10 – Site Closure ...................................................................................................... 21
  Task 11 – Postinjection Monitoring and Modeling .......................................................... 21
  Task 12 – Project Assessment ......................................................................................... 22
  Task 13 – Project Management ....................................................................................... 22
  Task 14 – RCSP WWG Coordination ............................................................................. 24
  Task 15 – Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and
             Monitoring Project ............................................................................................. 25
  Task 16 – Characterization of the Basal Cambrian System ................................................ 26

PHASE III COST STATUS.......................................................................................................... 27

PHASE III SCHEDULE STATUS............................................................................................... 27

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES.................................. 45
  Abstracts ........................................................................................................................... 45
  Submitted .......................................................................................................................... 45
  Submitted, Accepted, and Declined by Author .............................................................. 45
  Presentations ...................................................................................................................... 45
  Poster Presentations ......................................................................................................... 46
  Conference Papers ........................................................................................................... 46
  Deliverables/Milestones ................................................................................................. 47
  Draft ................................................................................................................................. 47
  Approved ........................................................................................................................ 47

Continued…
TABLE OF CONTENTS (continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progress Reports</td>
<td>49</td>
</tr>
<tr>
<td>Monthlies</td>
<td>49</td>
</tr>
<tr>
<td>Quarterlies</td>
<td>49</td>
</tr>
<tr>
<td>Meeting Minutes</td>
<td>49</td>
</tr>
<tr>
<td>Journal Articles</td>
<td>50</td>
</tr>
<tr>
<td>MEETINGS/TRAVEL</td>
<td>50</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>51</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

1 RCSP development phase: scaling up toward commercialization ........................................ 3
2 PCOR Partnership Phase III large-scale sites ...................................................................... 4
3 Map of PCOR Partnership global Web traffic ...................................................................... 8
4 PCOR Partnership public Web site traffic ........................................................................... 8
5 Results of reclamation efforts at the Lignite Field Validation Test site ............................... 13
6 Denbury and EERC personnel examine cut core barrels from 56-14R ............................... 15
7 Cut core barrel sections from 33-14R prior to transport to Weatherford Core Labs .......... 16
8 Groundwater-monitoring well drilling 33-12, Bell Creek, Montana .................................... 18
9 EERC staff Guoxiang Liu (left) and Charles Gorecki (right) pose in front of a poster announcing their presentations in Beijing, China ................................................................. 22
10 PCOR Partnership Phase III, BP4, Years 3–6 funding .......................................................... 28

LIST OF TABLES

1 PCOR Partnership Membership Phase III ............................................................................... 2
2 Phase III Responsibility Matrix ............................................................................................. 5
3 Phase III Budget – BP4 ........................................................................................................... 27
4 BP4 – Years 3–6 Spending Plan ............................................................................................ 29
5 Phase III Milestones and Deliverables .................................................................................. 30
6 PCOR Partnership Phase III, BP4, Years 5–6 Gantt Chart ..................................................... 40
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 January 1, 2013, through March 31, 2013.

Activities at the Denbury Resources Inc. (Denbury)-owned Bell Creek Test Site continued at a vigorous pace this reporting period. Operations at the site provided new opportunities for the collection of additional sidewall and full-diameter core samples at previously unavailable wells. In addition, two new groundwater-monitoring wells were installed and the initial baseline pulsed-neutron-logging campaign was completed. In March 2013, Denbury began filling its Greencore Pipeline to transport CO₂ to the Bell Creek oil field. CO₂ injection is planned during the second calendar quarter of 2013. Core analysis efforts and modeling and simulation activities also continued.


In March, the 2nd Annual Technical Advisory Board meeting was held, and planning is now under way for the 5th Annual Regulatory Roundup Meeting (July 2013). Online registration has opened for the PCOR Partnership Annual Membership Meeting scheduled for September 2013 in Minneapolis, Minnesota (www.undeerc.org/pcor13).
INTRODUCTION

The Plains CO₂ Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnership (RCSP) Program. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota (UND) in Grand Forks, North Dakota, and includes stakeholders from the public and private sectors. The membership, as of 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 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)

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

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

In Phase III, the PCOR Partnership is building on the information generated in its characterization (Phase I) and validation (Phase II) phases. The PCOR Partnership plans to fully utilize the infrastructure of its region to maximize CO2 injection volumes. A programmatic development phase (Phase III) goal is implementation of large-scale field testing involving at least 1 million tons (Mt) of CO2 a project. Each of the RCSP’s large-volume injection tests is
Figure 1. RCSP development phase: scaling up toward commercialization (source: www.netl.doe.gov/technologies/carbon_seq/infrastructure/rcspiii.html [accessed April 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 the Denbury Resources Inc. (Denbury)-owned 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 has 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 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:

- Continued review of updates and corrections to the latest edition of the PCOR Partnership Atlas (Deliverable 81 [D81], update due August 2013).
Table 2. Phase III Responsibility Matrix

<table>
<thead>
<tr>
<th>Phase III Task Description</th>
<th>Task Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task 1 – Regional Characterization</td>
<td>Wesley D. Peck</td>
</tr>
<tr>
<td>Task 2 – Public Outreach and Education</td>
<td>Daniel J. Daly</td>
</tr>
<tr>
<td>Task 3 – Permitting and NEPA Compliance</td>
<td>Lisa S. Botnen</td>
</tr>
<tr>
<td>Task 4 – Site Characterization and Modeling</td>
<td>James A. Sorensen</td>
</tr>
<tr>
<td>Task 5 – Well Drilling and Completion</td>
<td>John A. Hamling</td>
</tr>
<tr>
<td>Task 6 – Infrastructure Development</td>
<td>Melanie D. Jensen</td>
</tr>
<tr>
<td>Task 7 – CO₂ Procurement</td>
<td>John A. Harju</td>
</tr>
<tr>
<td>Task 8 – Transportation and Injection Operations</td>
<td>Melanie D. Jensen</td>
</tr>
<tr>
<td>Task 9 – Operational Monitoring and Modeling</td>
<td>Charles D. Gorecki</td>
</tr>
<tr>
<td>Task 10 – Site Closure</td>
<td>TBA¹</td>
</tr>
<tr>
<td>Task 11 – Postinjection Monitoring and Modeling</td>
<td>TBA</td>
</tr>
<tr>
<td>Task 12 – Project Assessment</td>
<td>Katherine K. Anagnost</td>
</tr>
<tr>
<td>Task 13 – Project Management</td>
<td>Charles D. Gorecki</td>
</tr>
<tr>
<td>Task 14 – RCSP WWG Coordination</td>
<td>Ryan J. Klapperich</td>
</tr>
<tr>
<td>Task 15 – Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project</td>
<td>Dayanand Saini</td>
</tr>
<tr>
<td>Task 16 – Characterization of the Basal Cambrian System</td>
<td>Wesley D. Peck</td>
</tr>
</tbody>
</table>

¹To be announced.

- Current plans for the atlas update are to secure approval and then proceed with a reprinting around May 2013. Plans are to call this version of the atlas the PCOR Partnership Atlas, Fourth Edition Revised.
- Continued efforts to characterize the third target area (D7, due September 2013), including the following:
  - 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.
  - Worked on capturing monthly cumulative injection data by well (initially for the first 12 years of the Pine oil field) to create time-lapse bubble maps showing the progression of wells and volumes of injection water.
  - Reviewed production data scans of the first 30+ years.
  - Identified approximately 52 wells with cement bond logs.
  - Calculated cement tops for several wells and disseminated associated methodology.
  - Transferred historic production and injection data into the Petra database.
  - Created maps and cross sections illustrating the vertical and aerial distribution of production information.
  - Collected well ownership information as well as structural information throughout the target area.
  - Reviewed oil field information along the Greencore Pipeline in Nebraska and Wyoming.
  - Downloaded and analyzed field production history graphs from the Wyoming Oil and Gas Conservation Commission.
- Worked on acquiring new data sets for wells in Saskatchewan and North Dakota.
• Continued efforts to characterize additional saline formations for CO₂ storage, including the following:
  – Continued to digitize structure and isopach maps for formations in the Power River and Williston Basins.
  – Reviewed existing Broom Creek Petrel models and associated documentation.
  – Began creating 2013 Broom Creek Petrel model.
  – Began a Web-based literature review of the Broom Creek Formation (North Dakota) and the Minnelusa Formation (South Dakota and Montana).
  – Began compiling data for the Mission Canyon Formation using LAS (Log ASCII Standard) files to fill the gaps.
  – Built structural models for Minnelusa, Mission Canyon, and Inyan Kara Formations.
  – Continued work on Petrel structural models for Broom Creek, Keg River – Zama, and Stuttgart Formations.
• Continued updates and maintenance of the Decision Support System (DSS, © 2007–2013 EERC Foundation®) including the following:
  – Updated the databases that ultimately feed the DSS with new oil fields, wells, and gas plants.
  – Updated the oil field information, especially North Dakota wells.
  – Continued to explore opportunities to augment the demonstration project reporting system housed on the partners-only DSS.
  – Compiled images from the PCOR Partnership Atlas for inclusion in the online image gallery.
  – Continued efforts to update the current GIS (geographic information system) well files with new and corrected well information where discrepancies were identified.
  – Continued development of a new monitoring, verification, and accounting (MVA) section for the Bell Creek portion of the demonstration project reporting system.
  – Reviewed the partners-only site Bell Creek Web pages and prepared draft updates.
• Continued efforts to prepare a value-added report on the methodology used for updating the oil fields in the PCOR Partnership region.
• Conducted a preliminary investigation of CO₂ EOR potential of the area along the Miles City Arch in southeastern Montana.
• Continued updating the Petra database with Montana well data and formation tops.
• Participated in a conference call with the Petroleum Technology Research Centre (PTRC) on February 28, 2013, to discuss the Aquistore collaboration.
• Provided NATCARB (National Carbon Sequestration Database and Geographic Information System) personnel with documentation on the PCOR Partnership latest CO₂ source inventory.

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 16 conferences/meetings, exposing external participants to the PCOR Partnership name, messaging, and informational materials. Specifically, the PCOR Partnership outreach activities included 14 oral presentations and one poster presentation. The following quantities of outreach materials were distributed:
  - PCOR Partnership documentary entitled “Nature in the Balance: CO₂ Sequestration” – 16
  - PCOR Partnership documentary entitled “Reducing Our Carbon Footprint: The Role of Carbon Markets” – 16
  - PCOR Partnership documentary entitled “Out of the Air – Into the Soil” – 15
  - PCOR Partnership documentary entitled “Managing Carbon Dioxide: The Geologic Solution” – 49
  - PCOR Partnership documentary entitled “Global Energy and Carbon: Tracking Our Footprint” – 35

- During this reporting period, there were 1209 visits to the public Web site (www.undeerc.org/pcor) from 1005 external visitors from 67 countries. New visitors comprised 78% of the overall traffic to the Web site. Of the 1209 visits, 62% of the Web traffic was domestic, while 35% was international. As depicted in Figure 3, the countries with the highest number of visits included the United States (747), Canada (96), India (41), United Kingdom (37), Australia (24), South Korea (21), France (18), Malaysia (15), and China (14).

- 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 (14%) was from persons familiar with the PCOR Partnership.
  - Search engine traffic refers to the use of keywords and accounted for nearly three-quarters 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 (14%) is traffic directed to the PCOR Partnership Web page from other sites via links. The top referring sites were the DOE site, the Massachusetts Institute of Technology (MIT) site, and the EERC home page.

---

^Google Analytics is utilized to track activity for the PCOR Partnership public Web site. This Web analysis tool has played an integral part in understanding the online behavior of Web site visitors. Through the use of Advanced Segments in Google Analytics, most internal traffic was excluded, thus providing a more accurate representation of external traffic behavior. All data provided in this section is from external traffic only.
Figure 3. Map of PCOR Partnership global Web traffic (source: Google Analytics).

Figure 4. PCOR Partnership public Web site traffic (source: Google Analytics).
During this reporting period, the nature of the visits to the PCOR Partnership public Web site included nearly 2750 page views and the top three pages viewed included:

- The PCOR Partnership home page (http://undeerc.org/pcor/), with 667 page views or 24%.
- The What is CO₂ Sequestration? Web page (www.undeerc.org/PCOR/sequestration/whatissequestration.aspx), with 422 page views or 15%.
- The CO₂ Sequestration Projects in Our Region Web page (www.undeerc.org/PCOR/co2seqprojects/default.aspx), with 169 page views or 6%.

During this reporting period, there were five (5) telecasts on public television airing in North Dakota, northwestern Minnesota, and Manitoba, as follows:

- “Reducing Our Carbon Footprint: The Role of Markets”: two (2) telecasts.
- “Out of the Air into the Soil”: two (2) telecasts.
- “Global Energy and Carbon: Tracking our Footprint”: one (1) telecast.

Participated in monthly RCSP Outreach Working Group (OWG) conference calls on January 17, February 21, and March 21, 2013. Topics discussed included:

- Participation in an outreach session at the upcoming 12th Annual Conference on Carbon Capture, Utilization, and Sequestration (CCUS-12) scheduled for May 13–16, in Pittsburgh, Pennsylvania.
- A side meeting to be held in conjunction with the DOE project review meeting in August.
- Time line displayed at the 2012 PCOR Partnership Annual Meeting and the potential use of a time line to showcase the 10-year anniversary of the RCSP program at the meeting in August.

Participated in the monthly Aquistore Outreach Advisory Panel conference call on February 25, 2015, where marketing literature, recent press coverage, and upcoming events were discussed.

The monthly Aquistore outreach advisory panel call was canceled for March 2013, but as requested, the draft final of the Aquistore Project marketing booklet was reviewed, and brief comments were provided.

On March 19, 2013, finalized the updated Fort Nelson PowerPoint presentation (D19, originally due June 2012) after EERC review of Spectra’s comments.

Continued collaborative efforts with Prairie Public Broadcasting (PPB), including the following:

- Held a meeting at the EERC on February 8, 2013, to review the planned scope of work for Program Year (PY) 6.
- Made plans to film geophone installation in the Bell Creek Field and maintained communication with regard to scheduling filming.
- Reviewed PowerPoint presentations given at past teacher seminars as a basis for preparing a filmed version to be used for future education activities.
- Practiced the educator PowerPoint presentation at PPB studios on February 27, 2013, in preparation for upcoming filming; the presentation will be used on the Web and in future partnership education activities.
- Held a meeting at the EERC on March 12, 2013, to review schedules and budgets in relation to the subcontract.
- Worked on the four segments of the education presentation, including *Energy, Energy and Carbon, Finding Solutions, and CO₂ Storage — One Action Among Many*.
- Traveled to PPB studios in Fargo, North Dakota, and filmed the four segments of the education presentation on March 20, 2013, that, when finalized and approved, will be used in teacher activities and made available on the Web site.
- Provided the PPB editor with updated slide materials for use in the education presentation.
- On March 28, 2013, PPB signed an agreement with SaskPower granting permission for PPB to film at the Boundary Dam site and conduct interviews as part of Aquistore outreach activities.
- Continued preparation of a value-added video short, including a script revision and film edit, focused on smart casing installation or permanent downhole monitoring for CCS reservoir monitoring.
- Submitted the Phase III general fact sheet (D14) on February 28, 2013.
- Continued development of a new Lignite Field validation site fact sheet (value-added).
- In response to a request from Spectra, provided a PDF file of the Fort Nelson poster (D26) for personnel to print for distribution as part of presentations to select groups in London and Oslo.
- Mailed 25 copies of D26 to Spectra for distribution at conferences.
- Finalized the input and most output modules of the outreach tracking database and continued efforts to refine and finalize the modules.
- Continued efforts to review and improve the public Web site, including identification and prioritization of areas for update, actions to increase Web traffic, planned updates to the education section, and actions to improve tracking and reporting.
- PowerPoint presentations given by the project team regarding demonstration activities included the following:
  - “Overview of the PCOR Partnership Program and other EERC-Led CO₂ Storage-Related Projects” presented to the Division of Engineering Geology and Water Resources Institute of Geology and Geophysics on March 26, 2013, in Beijing, China.
  - “PCOR Partnership Technical Advisory Board Meeting” presented to the PCOR Partnership Technical Advisory Board on March 5–6, 2013, in Orlando, Florida.
  - “Plains CO₂ Reduction (PCOR) Partnership Overview” presented to the CCP Team on March 8, 2013, in Grand Forks, North Dakota.


“The Plains CO2 Reduction (PCOR) Partnership” presented to the 8th Annual SECARB Stakeholder’s Briefing on March 12, 2013, in Atlanta, Georgia.


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

- On March 25, 2013, DOE NETL waived the requirement for an updated Fort Nelson Test Site Fact Sheet (D16) due in April 2013.
- Also on March 25, 2013, DOE NETL approved changes in subject matter and/or due dates for the Phase III documentaries, as follows:
  - Extend the due date for D21 – Bell Creek Test Site 30-minute Documentary to April 29, 2016.
  - Extend the due date for D23 – Storage in Carbon Management 30-minute Documentary to April 30, 2017.

Task 3 – Permitting and NEPA Compliance

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

- Continued activities regarding Class VI rules, including the following:
  - Provided information upon request regarding a cost comparison between Class II and Class VI wells.
  - Provided an overview upon request of North Dakota’s proposed Class VI rules and primacy application to an interested party.
  - Held a conference call to discuss Class VI well permit cost factors.
- Provided a brief overview of GS3, a geologic sequestration software suite under development by Pacific Northwest National Laboratory, to the NETL project manager.
Continued activities associated with the Interstate Oil and Gas Compact Commission (IOGCC) Carbon Geologic Storage (CGS) Task Force, including the following:
- Continued to discuss the outline for the final report, comprising the subgroup findings and recommendations, and the writing assignments.
- Held discussions with Bliss Consulting regarding upcoming conference calls and meetings of the operational and postoperational liability groups.
- Participated in subgroup conference call(s).
- Reviewed the final report outline and began writing the CGS Task Force report.
- Participated in a subgroup call to discuss various insurance options for carbon capture and storage (CCS) projects.
- Participated in the IOGCC CGS Task Force Subgroup meeting on February 27 and 28, 2013, in Minneapolis, Minnesota.
- Participated in a conference call with a subset of task force and subgroup members to discuss Class II to Class VI transition liabilities.
- Began planning for the next subgroup and full task force meetings.

Continued planning for the 5th Annual Regulatory Roundup, including the following:
- Drafted and sent an e-mail to regulatory participants soliciting input on date and location preferences.
- Decided upon a venue in Deadwood, South Dakota.

Began review of new U.S. Environmental Protection Agency (EPA) geologic sequestration draft and final guidance documents, including the following:

With regard to the Lignite Field Validation Test site (Phase II) closure:
- Continued efforts to monitor the site during the reclamation phase, including site visits on January 10 and 24; February 7 and 21; and March 7 and 21, 2013 (Figure 5).
- 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.
Figure 5. Results of reclamation efforts at the Lignite Field Validation Test site (top: September 2011, bottom: March 2013).

**Task 4 – Site Characterization and Modeling**

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

- Modeling staff attended Schlumberger NExT software training entitled “Techlog Formation Evaluations” on February 24 – March 1, 2013, in Houston, Texas.
- **Bell Creek** test site activities included the following:
  - Submitted EERC Proposal No. 2013-0123 on February 22, 2013, requesting additional funding in the amount of $999,565 for additional core collection (36-14R and 56-14R), analysis, and logging activities on previously unavailable wells.
  - Worked on a poster entitled “Subsurface Core and Analogous Outcrop Characterization for the Muddy/Newcastle Formation of the Bell Creek Oil Field, Power River County, Montana” for the American Association of Petroleum

- Participated in a conference call on January 8, 2013, with Denbury personnel to discuss vertical seismic profile (VSP) installation.
- Continued pulsed-neutron-logging (PNL) activities, including the following:
  ♦ Completed baseline PNL activities on 27 of 27 wells during the initial campaign.
  ♦ Schlumberger completed processing the 27 baseline PNLs.
  ♦ Participated in a PNL review meeting with Schlumberger Carbon Services (Schlumberger), Denbury, and the EERC on March 12, 2013, in Denver, Colorado.
- Visited a Muddy Formation outcrop near Hulett, Wyoming.
- Continued revising the fieldwide static model, including creating a 3-D grid.
- Continued building a depofacies object model using historic and recently acquired core data.
- Continued work on the geomechanical modeling activities, including the following:
  ♦ Submitted the geomechanical modeling report (D32) on January 31, 2013.
  ♦ Held a conference call with Denbury personnel to discuss their comments on D32.
  ♦ Continued analysis of pressure gauge response from the 05-06 OW well, including construction of a leakage model (including pressure and temperature models) and a simplified geomechanical model.
  ♦ Worked on improving the 1-D mechanical earth model (MEM) with additional analysis of Poisson’s ratio and stresses.
  ♦ Continued work on the 3-D MEM of the Phase 1 area.
- Continued work on the SCAL (special core analysis) plan with Core Labs, including the following:
  ♦ Authorized the scope of work and budget.
  ♦ Discussed basic property testing results and plug selection for planned flow tests.
  ♦ Discussed drilling additional core plugs in bioturbated zones.
  ♦ Reviewed the Petrel model and associated Phase 1 logs.
  ♦ Reviewed the Weatherford cost proposal for planned SCAL work for additional wells.
  ♦ Finalized electrical property test plan with Core Labs.
- Continued 05-06 OW sidewall core activities in the Applied Geology Laboratory (AGL), including the following:
  ♦ Continued efforts to modify the value-added mineralogy report on 12 sidewall core samples.
  ♦ Completed data sheets and porosity point counting for the remaining 35 samples.
- Continued fieldwide core analysis activities on the U.S. Geological Survey (USGS) Denver Core Research Center 81 intervals of core in the AGL, including the following:
  ♦ Scanned thin sections for point counting.
· Continued work on photographs as well as x-ray diffraction, x-ray fluorescence, and scanning electron microscopy analyses.
  - Began 56-14R horizontal sidewall core activities, including the following:
    ♦ Created a plan for the core testing.
    ♦ Provided on-site technical advice during collection (Figure 6).
    ♦ Began cutting samples (for thin-section preparation) from the 23 sidewall cores collected.
      o Denbury received 8 cores.
      o The EERC retained 15 cores.
    ♦ Photographed, weighed, and measured the core plugs and provided the information to Denbury.
  - Began 33-14R full-diameter core collection and provided on-site technical advice during the collection (Figure 7).

- **Fort Nelson** test site activities included the following:
  - Continued efforts to compile a report summarizing the activities and lessons learned at the Fort Nelson test site.
  - Reviewed and answered various questions from Spectra personnel regarding the static model scope of work.
  - Participated in a call with Spectra personnel on February 13, 2013.
  - Packaged the June 2010 and July 2011 Petrel static models and transferred them to Spectra at its request.

Figure 6. Denbury and EERC personnel examine cut core barrels from 56-14R (March 2013).
Responded to Spectra’s questions regarding well tops and structure interpretations in the transferred static models.

- Sent the Fort Nelson Test Site – Site Characterization Report to Spectra for review and approval in May 2012. Spectra comments were received on February 1, 2013, and EERC review is under way.
- Sent the Fort Nelson Test Site – Geochemical Report to Spectra for review and approval in September 2012. Spectra comments were received on February 7, 2013, and EERC review is under way.

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

- Original plans to complete PNL activities on a total of 54 wells were scaled back because of operational and access reasons.
- Acquisition of the two VSP surveys was delayed until May 2013 because of weather and ground-cover reasons.

**Task 5 – Well Drilling and Completion**

Significant accomplishments for Task 5 for the reporting period included the following:
• Field staff completed an 8-hr Occupational Safety and Health Administration (OSHA) (HAZWOPER [hazardous waste operations and emergency response]) refresher training course.
• Field staff participated in a UND Environmental Training Institute OSHA 10-hour Construction Outreach Training on March 4 and 5, 2013, in Grand Forks, North Dakota.
• Held Bell Creek Project Update Meetings on January 15 and March 25, 2013. Topics included upcoming activities, core analysis update, surface and near-surface MVA activities, status of reports, PNL, seismic activities, modeling updates, and upcoming deliverables.
• Continued efforts on the Fox Hills groundwater-monitoring wells, including the following:
  ◦ Completed installation of surface casing for both groundwater-monitoring wells.
  ◦ Collected cutting samples during the surface casing installation.
  ◦ Completed full installation of one well (05-04) in January 2013.
  ◦ Attempted installation of second well (33-12) in February 2013.
  ◦ Installed a larger pump on 05-04 and redrilled 33-12 in March 2013 (Figure 8).
  ◦ Began planning for sampling (anticipated to occur in April 2013).
  ◦ Evaluated permanent pump and solar-powered continuous flow options.
  ◦ Worked on compiling data needs for modeling Fox Hills Formation CO2 rock exposure using PHREEQC.
  ◦ Continued work on a sampling and analysis plan.
• Continued operations planning for the permanent VSP geophone array.
• Traveled to the Bell Creek Field (along with PPB film crew) to observe planned (but unsuccessful) geophone array installation in February 2013.
• Continued analysis of pressure gauge response from the 05-06 OW well, along with an associated literature review.
• Completed a working outline entitled “Evaluation of Continuous Downhole Pressure and Temperature Response in the Muddy and Niobrara Formations in Bell Creek Oil Field 05-06 OW Well from April 2012 through January 2013 During Water Injection” for discussion purposes.
• 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.
• Prepared water chemistry landowner packages based on August and November 2012 sampling trips.
• Completed reviewing and verifying the finalized Baseline Sampling Events 4 and 5 (August and November 2012, respectively) landowner packages for distribution:
  ◦ Collected a total of 24 water samples, including seven (7) surface water, eight (8) stock well, and nine (9) drinking water (residential) well samples during Event 4.
  ◦ Collected a total of 24 water samples, including eight (8) surface water, eight (8) stock well, and eight (8) drinking water (residential) well samples during Event 5.
• Compiled the most recently collected active well and fixed-station soil gas data from the January 2013 sampling event:
  – Sampled a total of ten (10) soil gas profile stations, eight (8) active wells, and ten (10) interspaced locations.
  – Compared field and analytical soil gas measurements between all sampling events (October and November 2012 and January 2013).
• Completed an outline for and began work on the Bell Creek Test Site – Monitoring Experimental Design Package (D43, due May 2013).
• Prepared abstracts for the upcoming Carbon Management Technology Conference (CMTC) due for upload by April 15, 2013.
• Began consideration of an additional suite of baseline soil gas and water monitoring based on timing of CO₂ injection.

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

• Installation of downhole geophone array was delayed until April 2013 because of well issues in the 08-12A well. After review, Well 04-03 OW was selected.
• Because of a lodged screen in Fox Hills Formation Groundwater-Monitoring Well 33-12, it was necessary to redrill at no additional cost.

**Task 6 – Infrastructure Development**

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

• Continued studying information about surface facilities, as they play a large role in the site infrastructure development at the Bell Creek site.
• Revised and submitted the final version of D84, Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS, based on recommendations from NETL project manager.
• Collected information for the report entitled “Opportunities and Challenges Associated with CO₂ Compression and Transport During CCUS Activities.” This is an update of D85, which the Statement of Project Objectives requires to occur biennially.
• Began preparation of a journal article focusing on CO₂ capture and associated infrastructure requirements, especially pipeline sizing, for sources that produce variable amounts of CO₂, such as power plants. Activities included the following:
  – Continued investigating potential peer-reviewed journals for submittal of the article.
  – Began revisions to an initial draft manuscript.
• Reviewed an *Energy & Fuels* manuscript entitled “Initial Results from a New CO₂ Storage Cost Model: FE/NETL CTS-Saline Cost Model.”
• Continued activities regarding the journal article entitled “A Methodology for Phased Development of a Hypothetical Pipeline Network for CO₂ Transport During Carbon Capture, Utilization, and Storage” for publication in *Energy & Fuels*, including the following:
  – Addressed all peer-review comments and submitted the final manuscript for publication.
  – Received notification that the manuscript was accepted for publication.
  – Received an electronic version of the proof pages for careful proofreading.

Actual or anticipated problems, delays, or changes during the reporting period included the following:
• On March 25, 2013, DOE NETL waived the requirement for an update to D85 due March 31, 2013. A journal article (see above) is under preparation in lieu of the report.

Task 7 – CO₂ Procurement

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

• Participated in ongoing project discussions with Denbury.
• Began planning for the Bell Creek Test Site – Procurement Plan and Agreement Report (D48, due September 2013).

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:

• Participated in the Bell Creek project update meetings held on January 15 and March 25, 2013.
• Potential methods of measurement or estimation of fugitive CO₂ emissions during MVA activities at injection sites are being investigated. The accuracy and application of the techniques as they apply to surface facilities as well as well bores and the subsurface will be studied. The results of the study will be discussed in a value-added report. During the January–March 2013 quarter, fugitive CO₂ emission pathways from surface facility unit operations were examined and EPA regulations that apply to those emissions were documented.

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:

• Staff attended the Society of Petroleum Engineers (SPE) 2013 Reservoir Simulation Symposium and premeeting training courses entitled “Fundamentals of Reservoir Simulation” and “Reservoir Simulation for Practical Decision Making” in The Woodlands, Texas.
• Staff presented at the Rice 2013 Oil & Gas High-Performance Computing (HPC) Workshop in Houston, Texas.
• Worked with Computer Modelling Group Ltd. (CMG) on licensing renewals.
• Continued **Bell Creek** site activities, including the following:
  – Denbury began filling the Greencore Pipeline with CO₂ in March 2013.
  – Participated in a conference call with The CETER Group, Inc., to discuss Bell Creek MVA and risk management.
  – Continued efforts to integrate the risk assessment activities and the MVA plan.
  – Configured CMOST for the numerical tuning process.
  – Reviewed and discussed ongoing dynamic modeling work.
  – Worked on history-matching the simulation model.
  – Continued PVT (pressure–volume–temperature) modeling work, including the following:
    ♦ Digitized the new PVT data and began modeling.
    ♦ Performed a literature review on PVT modeling.
    ♦ Performed a literature review on the relative permeability interface between experimental and simulation data.
    ♦ Discussed the recently received Core Labs PVT report.
    ♦ Ran PVT simulations.
    ♦ Continued work on PVT in regression to match the experimental data.
    ♦ Conducted a literature search and review on a PVT modeling and tuning method for compositional simulation to minimize the convergence problem.
    ♦ Worked on PVT in minimum miscibility pressure.
  – Participated in biweekly project update meetings.
• Continued **Fort Nelson** site activities, including the following:
  – Continued working with Spectra on a scope of work for the next stage of dynamic modeling.
  – Sent D66, Fort Nelson Test Site – Simulation Report, to Spectra for review and approval in September 2011. Spectra comments were received February 4–7, 2013, and EERC review is under way.

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

• CO₂ injection was anticipated in the first quarter of 2013. Because of the time needed to fill the 232-mile pipeline, injection is delayed until the second quarter of 2013.

**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:

- Continued preparations for the 2013 PCOR Partnership Annual Membership Meeting scheduled for September 25 and 26, 2013, in Minneapolis, Minnesota, including the following:
  - Tested the annual meeting Web site, which went “live” (http://undeerc.org/pcor13/) on March 28, 2013.
  - Continued preparing a postcard for mailing and an e-mail blast announcing that registration is open.
  - Began planning the meeting agenda and associated side meetings.
- Prepared and presented an e-poster presentation entitled “The Plains CO₂ Reduction Partnership: CO₂ Sequestration Demonstration Projects Adding Value to the Oil and Gas Industry” for the 2013 International Petroleum and Technology Conference (IPTC) held March 26–28, 2013, in Beijing, China.
- Met with and gave a presentation entitled “Overview of the PCOR Partnership Program and other EERC-Led CO₂ Storage-Related Projects” at the National Academy of Sciences on March 26, 2013, in Beijing, China (Figure 9).

Figure 9. EERC staff Guoxiang Liu (left) and Charles Gorecki (right) pose in front of a poster announcing their presentations in Beijing, China (March 2013).
• Submitted an updated project management plan on January 22, 2013.
• Hosted a Webinar and presented on the Bell Creek surface and near-surface soil gas- and water-monitoring program to the PCOR Partnership Technical Advisory Board (TAB) on January 3, 2013.
• Hosted visitor Bill Jackson of BillyJack Consulting, Inc., TAB Chair, at the EERC on January 3, 2013.
• Participated in a task leader meeting on January 8, 2013. Topics discussed included drilling of Bell Creek groundwater-monitoring wells, planned installation of geophones for the 3-D VSP surveys, filling of the Greencore Pipeline (anticipated to begin in February), TAB Webinar held January 3, upcoming conferences and deliverables, and updates from each task leader present.
• Participated in the RCSP EOR working group conference calls.
• Participated in a task leader meeting on February 5, 2013. Topics discussed included upcoming in-house training opportunities, conferences, deliverables, and updates from each task leader present.
• Numerous staff members participated in an all-day training session entitled “The CO₂ EOR Overview Course for the PCOR Partnership” on February 26, 2013.
• Sent a revised letter and scope of work on February 7, 2013, to PTRC regarding ongoing EERC participation in Aquistore activities.
• Accepted a second review request on a paper for the *International Journal of Greenhouse Gas Control*.
• Submitted the updated project management plan in January 2013.
• Continued preparations for the 2nd Annual Technical Advisory Board (TAB) meeting scheduled for March 5 and 6, 2013, in Orlando, Florida, including the following:
  – Participated in several conference calls with the TAB chair and the meeting facilitator.
  – Prepared an overview presentation on Phase III activities and objectives.
  – Finalized meeting arrangements.
• Participated in a task leader meeting on March 12, 2013. Topics discussed included upcoming in-house training opportunities, conferences, deliverables, and updates from each task leader present.
• Participated in a conference call hosted by DOE NETL with all of the RCSPs on March 15, 2013, to discuss upcoming meetings.
• Attended the Southeast Regional Carbon Sequestration Partnership (SECARB) 8th Annual Stakeholders’ Briefing on March 12 and 13, 2013, in Atlanta, Georgia.
• Deliverables and milestones completed in January:
  – December monthly update
  – Task 4: D32 – Bell Creek Test Site – Geomechanical Report
  – Task 14: M23 – Monthly WWG conference call held
• Deliverables and milestones completed in February:
  – January monthly update
  – Task 2: D14 – General Phase III fact sheet (update)
  – Task 14: M23 – Monthly WWG conference call held
Deliverables and milestones completed in March:
- February monthly update
- Task 16: D89 – Geochemical Evaluation of the Basal Cambrian System
- Task 14: D99 – Water/CCS nexus-related fact sheet
- Task 14: M23 – Monthly WWG conference call held
- Task 13: M36 – Annual Advisory Board meeting scheduled

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

- Continued discussions with Spectra regarding a path forward for the Fort Nelson project now that CO₂ injection will be significantly delayed.

Task 14 – RCSP WWG Coordination

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

- Continued efforts on the WWG review of the water–CCS nexus-related fact sheet (D99-1) and distributed a draft to the WWG for review and comment.
- Held the monthly conference call on January 16, 2013. Ten members participated and the topics included the following:
  - Announced that the joint IEA Greenhouse Gas R&D Programme and DOE extracted water report is available for public use.
  - Discussed the EPA progress report on hydraulic fracturing.
  - Reviewed deliverables required for 2013, namely two fact sheets due in March and October.
  - Announced the annual meeting will be held in August 2013, in conjunction with the DOE Carbon Storage R&D Project Review Meeting.
- Distributed the February meeting agenda on February 6, 2013.
- Distributed the January conference call notes via e-mail on February 22, 2013.
- Continued reviewing the WWG white paper in preparation for journal article submission.
- Held the monthly conference call on February 26, 2013. Eight members participated, and the topics included the following:
  - Discussed revisions to the water resource protection fact sheet (due March 2013).
  - Discussed development of an MVA-centric fact sheet (due October 2013).
  - Reviewed upcoming meetings and scheduling plans for the annual meeting.
  - Heard WWG participant updates from the PCOR Partnership and the Midwest Regional Carbon Sequestration Partnership (MRCSP).
- Distributed the March meeting agenda on March 5, 2013.
- Continued review of upcoming conferences for possible distribution of the fact sheets.
- Distributed the February conference call notes via e-mail on March 22, 2013.
- Submitted the fact sheet entitled “Carbon Capture and Storage: Protecting Freshwater Resources” (D99) on March 22, 2013.
- Held the monthly conference call on March 28, 2013. Nine members participated and the topics included the following:

Continued planning for the MVA-centric fact sheet due in October 2013.

Announced that the annual meeting is tentatively planned for August 20, 21, or 22, 2013, in conjunction with the DOE Carbon Storage R&D Project Review Meeting in Pittsburgh, Pennsylvania.

Received WWG participant updates from the PCOR Partnership, SECARB, MRCSP, SWP (Southwest Regional Partnership on Carbon Sequestration), and DOE NETL.

- Continued review of upcoming water-related conferences for potential distribution of the fact sheets.
- Began work on the next WWG fact sheet (D99, due October 31, 2013) focused on MVA technologies applicable to water.

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

- Received approval from DOE NETL on March 25, 2013, to change the requirement for the annual meeting to be held by June each year to be held by December each year (for 2013–2016). This will allow flexibility in scheduling the meeting in coordination with other DOE meetings.

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:

- Participated in discussions with Apache Canada’s Zama team and presented Task 15 progress to date during Apache’s visit to the EERC on January 24–25, 2013.
- Built porosity and permeability logs and performed calibration using the core data.
- Analyzed routine core analysis data for identification of rock types and generated porosity, permeability, and saturation logs in Techlog for the wells with core data.
- Held biweekly in-house Zama project update meetings.
- Continued work on the G2G Pool, including the following:
  - Worked on production data analysis.
  - Continued building static geologic models.
  - Generated rock type, porosity, permeability, and saturation logs along existing G2G Pool wellbores and then upscaled into a static model.
  - Began facies, property, and petrophysical modeling.
  - Exported the preliminary G2G Pool static model to dynamic simulation software (CMG–GEM) and started working on a test run.
- Continued work on the Muskeg L Pool, including the following:
  - Started preparing dynamic data.
  - Started preparing fluid property data for PVT model development.
Continued to review relevant literature.

- Discussed G2G and Muskeg L Pools static and dynamic modeling work, including the following:
  - Reviewed the structure model and worked to resolve a few occurrences of wedge grid cells around the well.
  - Discussed the dynamic simulation model issues (trace component and CO₂ solubility in aqueous phase).
- Modified dynamic simulation workflow and ran the test model again.
- Continued work on the PVT model for the RRR Pool.
- Conducted a literature review for geostatistical modeling.
- Discussed grid thickness, training image, porosity–permeability relationship, water saturation modeling, Zama area geology, and other static modeling issues.
- Received additional PVT, well, and pool pressure data on February 13 and 20, 2013, from Apache.
- Smoothed dynamic workflow and ran the test dynamic model again.
- Began compiling relevant data and documentation for inclusion into the Updated Regional Implementation Plan for Zama (D86, due in September 2013). Discussed project at in-house meeting on March 12, 2013.
- Discussed in-house subtask requirements and wrap-up plans.

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:

- Successfully integrated the 3-D geomodel into the simulation software and began injection simulation efforts.
- Conducted a literature review for the geochemical report (D89, due March 2013) to ensure that data generated are valid.
- Continued work on the report describing the wellbore integrity issues (D90, due September 2013) for wells in the Cambro–Ordovician Saline System in the United States.
- Attended and presented at the Joint Technical and Steering Committee Meeting for the Basal Aquifer Project on February 21, 2013, in Berkeley, California. Meeting details include the following:
  - Attended by representatives from Alberta Innovates – Technology Futures, Natural Resources Canada (NRCan), Lawrence Berkeley National Laboratory, and Princeton University (by phone).
  - Focused on review of modifications to the EERC-prepared 3-D geomodel and discussion held on preliminary dynamic simulation modeling.
Recognized insufficient injectivity at the local extent to accommodate the CO₂ (at the current annual rate) for some of the large stationary sources even though there is a large storage resource available in the system.

- Began modification of dynamic simulation parameters used to maximize the injectivity at the various large-scale CO₂ sources across the study region.
- Continued simulation efforts.
- Began compilation of updated information regarding the emission rates for some of the Canadian CO₂ sources.
- Completed a preliminary draft report of the 3-D modeling effort.
- Contacted PTRC regarding core plug extraction and implementation of the core testing program for the Aquistore Project in Saskatchewan, Canada. PTRC agreed to provide the 3-D geomodel in April 2013, and the EERC will add in the core analysis results.

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.

**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 10 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>
<thead>
<tr>
<th>Organization</th>
<th>Approved Budget, $</th>
<th>Actual Costs Incurred, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE Share – Cash</td>
<td>58,400,697</td>
<td>31,094,031</td>
</tr>
<tr>
<td>Nonfederal Share – Cash</td>
<td>2,411,971</td>
<td>2,319,073</td>
</tr>
<tr>
<td>Nonfederal Share – In-Kind</td>
<td>27,034,759</td>
<td>23,783,635</td>
</tr>
<tr>
<td>Total</td>
<td>87,847,427</td>
<td>57,196,739</td>
</tr>
</tbody>
</table>
Figure 10. PCOR Partnership Phase III, BP4, Years 3–6 funding (cash only).
Table 4. BP4 – Years 3–6 Spending Plan

<table>
<thead>
<tr>
<th>Baseline Reporting Quarter</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Baseline Cost Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$1,892,969</td>
<td>$1,892,969</td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$127,735</td>
<td>$127,735</td>
</tr>
<tr>
<td>Total Planned</td>
<td>$1,820,704</td>
<td>$1,820,704</td>
</tr>
<tr>
<td>Actual Incurred Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$1,820,704</td>
<td>$1,820,704</td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$127,735</td>
<td>$127,735</td>
</tr>
<tr>
<td>Total Incurred Cost</td>
<td>$1,948,439</td>
<td>$1,948,439</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$51,694</td>
<td>$51,694</td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$20,777</td>
<td>$20,777</td>
</tr>
<tr>
<td>Total Variance</td>
<td>$72,471</td>
<td>$72,471</td>
</tr>
</tbody>
</table>

Baseline Reporting Quarter | Year 5 | Year 6 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Baseline Cost Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$2,671,493</td>
<td>$2,671,493</td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$152,429</td>
<td>$152,429</td>
</tr>
<tr>
<td>Actual Incurred Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$152,429</td>
<td>$152,429</td>
</tr>
<tr>
<td>Total Incurred Cost</td>
<td>$3,976,351</td>
<td>$3,976,351</td>
</tr>
<tr>
<td>Variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Share</td>
<td>$416,224</td>
<td>$416,224</td>
</tr>
<tr>
<td>Nonfederal Share</td>
<td>$90,642</td>
<td>$90,642</td>
</tr>
<tr>
<td>Total Variance</td>
<td>$506,866</td>
<td>$506,866</td>
</tr>
<tr>
<td>Title/Description</td>
<td>Due Date</td>
<td>Actual Completion Date</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td>D37: Task 4 – Fort Nelson Test Site – Geological Characterization Experimental</td>
<td>12/31/07</td>
<td>12/28/07</td>
</tr>
<tr>
<td>Package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D63: Task 13 – Project Management Plan</td>
<td>12/31/07</td>
<td>12/28/07</td>
</tr>
<tr>
<td>M17: Task 4 – Fort Nelson Test Site Selected</td>
<td>12/31/07</td>
<td>12/28/07</td>
</tr>
<tr>
<td><strong>Year 1 – Quarter 2 (January–March 2008)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D38: Task 4 – Fort Nelson Test Site – Geomechanical Experimental Design Package</td>
<td>1/31/08</td>
<td>1/31/08</td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>1/31/08</td>
<td>1/31/08</td>
</tr>
<tr>
<td>D11: Task 2 – Outreach Plan</td>
<td>3/31/08</td>
<td>3/31/08</td>
</tr>
<tr>
<td>D27: Task 3 – Environmental Questionnaire – Fort Nelson Test Site</td>
<td>3/31/08</td>
<td>4/02/08</td>
</tr>
<tr>
<td>Package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1: Task 1 – Three Target Areas Selected for Detailed Characterization</td>
<td>3/31/08</td>
<td>3/20/08</td>
</tr>
<tr>
<td>M18: Task 4 – Fort Nelson Test Site Geochemical Work Initiated</td>
<td>3/31/08</td>
<td>3/19/08</td>
</tr>
<tr>
<td><strong>Year 1 – Quarter 3 (April–June 2008)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D14: Task 2 – General Phase III Fact Sheet</td>
<td>4/30/08</td>
<td>4/30/08</td>
</tr>
<tr>
<td>D17: Task 2 – General Phase III Information PowerPoint Presentation</td>
<td>5/30/08</td>
<td>5/30/08</td>
</tr>
<tr>
<td>M3: Task 3 – Start Environmental Questionnaire for Williston Basin Test Site</td>
<td>6/30/08</td>
<td>6/27/08</td>
</tr>
<tr>
<td>M6: Task 4 – Williston Basin Test Site Geochemical Work Initiated</td>
<td>6/30/08</td>
<td>6/30/08</td>
</tr>
<tr>
<td>M7: Task 4 – Williston Basin Test Site Geological Characterization Data</td>
<td>6/30/08</td>
<td>6/30/08</td>
</tr>
<tr>
<td>Collection Initiated</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Year 1 – Quarter 4 (July–September 2008)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D12: Task 2 – Demonstration Web Pages on the Public Site</td>
<td>7/31/08</td>
<td>7/31/08</td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/08</td>
<td>9/26/08</td>
</tr>
<tr>
<td>M2: Task 1 – Demonstration Project Reporting System (DPRS) Prototype Completed</td>
<td>9/30/08</td>
<td>9/26/08</td>
</tr>
<tr>
<td><strong>Year 2 – Quarter 1 (October–December 2008)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>10/31/08</td>
<td>10/31/08</td>
</tr>
<tr>
<td>D20: Task 2 – Documentary Support to PowerPoint and Web Site</td>
<td>12/31/08</td>
<td>12/31/08</td>
</tr>
<tr>
<td>D57: Task 12 – Project Assessment Annual Report</td>
<td>12/31/08</td>
<td>12/31/08</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 2 – Quarter 2 (January–March 2009)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>1/31/09</td>
<td>1/30/09</td>
</tr>
<tr>
<td>D24: Task 2 – PCOR Partnership Region Sequestraton General Poster</td>
<td>3/31/09</td>
<td>3/31/09</td>
</tr>
<tr>
<td><strong>Year 2 – Quarter 3 (April–June 2009)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>4/30/09</td>
<td>4/15/09</td>
</tr>
<tr>
<td>D2: Task 1 – First Target Area Completed</td>
<td>5/29/09</td>
<td>5/29/09</td>
</tr>
<tr>
<td>D16: Task 2 – Fort Nelson Test Site Fact Sheet</td>
<td>5/29/09</td>
<td>5/29/09</td>
</tr>
<tr>
<td>M24: Task 14 – WWG Annual Meeting Held</td>
<td>5/31/09</td>
<td>5/07/09</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>6/30/09</td>
<td>6/25/09</td>
</tr>
<tr>
<td><strong>Year 2 – Quarter 4 (July–September 2009)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>N/A</td>
<td>Not required</td>
</tr>
<tr>
<td>D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation</td>
<td>7/31/09</td>
<td>7/31/09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8/21/09 (WWG)</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/09</td>
<td>8/25/09</td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/09</td>
<td>9/25/09</td>
</tr>
<tr>
<td>D3: Task 1 – Permitting Review – One State and One Province</td>
<td>9/30/09</td>
<td>9/30/09</td>
</tr>
<tr>
<td>D9: Task 1 – Updated DSS</td>
<td>9/30/09</td>
<td>9/29/09</td>
</tr>
<tr>
<td>M4: Task 4 – Bell Creek Test Site Selected</td>
<td>9/30/09</td>
<td>9/30/09</td>
</tr>
<tr>
<td>M5: Task 4 – Bell Creek Test Site – Data Collection Initiated</td>
<td>9/30/09</td>
<td>9/30/09</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>9/30/09</td>
<td>9/22/09</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 3 – Quarter 1 (October–December 2009)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D78: Task 14 – Final White Paper on the Nexus of CCS and Water</td>
<td>10/30/09</td>
<td>10/28/09</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>10/31/09</td>
<td>10/26/09</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>11/30/09</td>
<td>11/16/09</td>
</tr>
<tr>
<td>D57: Task 12 – Project Assessment Annual Report</td>
<td>12/31/09</td>
<td>12/31/09</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>12/31/09</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td><strong>Year 3 – Quarter 2 (January–March 2010)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D13: Task 2 – Public Site Updates</td>
<td>1/15/10</td>
<td>1/15/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>1/31/10</td>
<td>1/6/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>2/28/10</td>
<td>2/25/10</td>
</tr>
<tr>
<td>D11: Task 2 – Outreach Plan</td>
<td>3/31/10</td>
<td>3/31/10</td>
</tr>
<tr>
<td><strong>Year 3 – Quarter 3 (April–June 2010)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>4/30/10</td>
<td>4/28/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>5/31/10</td>
<td>5/13/10</td>
</tr>
<tr>
<td>D17: Task 2 – General Phase III Information PowerPoint Presentation (update)</td>
<td>6/30/10</td>
<td>6/30/10</td>
</tr>
<tr>
<td>D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (update)</td>
<td>6/30/10</td>
<td>6/29/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>6/30/10</td>
<td>6/23/10</td>
</tr>
<tr>
<td>M24: Task 14 – WWG Annual Meeting Held</td>
<td>6/30/10</td>
<td>5/13/10</td>
</tr>
<tr>
<td><strong>Year 3 – Quarter 4 (July–September 2010)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>7/31/10</td>
<td>7/28/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/10</td>
<td>8/31/10</td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/10</td>
<td>9/20/10</td>
</tr>
<tr>
<td>D52: Task 9 – Fort Nelson Test Site – Site Characterization, Modeling, and Monitoring Plan</td>
<td>9/30/10</td>
<td>9/30/10</td>
</tr>
<tr>
<td>M9: Task 4 – Bell Creek Test Site Geological Model Development Initiated</td>
<td>9/30/10</td>
<td>9/30/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>9/30/10</td>
<td>Waived by DOE</td>
</tr>
</tbody>
</table>

Continued . . .
<table>
<thead>
<tr>
<th>Year 4 – Quarter 1 (October–December 2010)</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>D87: Task 4 – Bell Creek Test Site – Geomechanical Experimental Design Package</td>
<td>10/30/10</td>
<td>10/29/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>10/31/10</td>
<td>10/26/10</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>11/30/10</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>12/31/10</td>
<td>12/13/10</td>
</tr>
<tr>
<td>Year 4 – Quarter 2 (January–March 2011)</td>
<td>Due Date</td>
<td>Actual Completion Date</td>
</tr>
<tr>
<td>M8: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Initiated</td>
<td>1/15/11</td>
<td>1/14/11</td>
</tr>
<tr>
<td>D31: Task 4 – Bell Creek Test Site – Geological Characterization Experimental Design Package</td>
<td>1/31/11</td>
<td>1/27/11</td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>1/31/11</td>
<td>1/31/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>1/31/11</td>
<td>1/19/11</td>
</tr>
<tr>
<td>M28: Task 4 – Bell Creek Geological Experimental Design Package Completed</td>
<td>1/31/11</td>
<td>1/27/11</td>
</tr>
<tr>
<td>D15: Task 2 – Bell Creek Test Site Fact Sheet</td>
<td>2/28/11</td>
<td>2/28/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>2/28/11</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (update)</td>
<td>3/31/11</td>
<td>3/31/11</td>
</tr>
<tr>
<td>D26: Task 2 – Fort Nelson Test Site Poster</td>
<td>3/31/11</td>
<td>3/31/11</td>
</tr>
<tr>
<td>D28: Task 3 – Environmental Questionnaire – Bell Creek Test Site</td>
<td>3/31/11</td>
<td>3/30/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>3/31/11</td>
<td>3/22/11</td>
</tr>
<tr>
<td>Year 4 – Quarter 3 (April–June 2011)</td>
<td>Due Date</td>
<td>Actual Completion Date</td>
</tr>
<tr>
<td>M30: Task 5 – Bell Creek Test Site Baseline MVA Initiated</td>
<td>4/01/11</td>
<td>3/24/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>4/30/11</td>
<td>4/21/11</td>
</tr>
<tr>
<td>D17: Task 2 – General Phase III Information PowerPoint Presentation (update)</td>
<td>5/31/11</td>
<td>5/31/11</td>
</tr>
<tr>
<td>D34: Task 4 – Bell Creek Test Site – Baseline Hydrogeological Final Report</td>
<td>5/31/11</td>
<td>5/31/11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 4 – Quarter 3 (April–June 2011) (continued)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>5/31/11</td>
<td>5/5/11</td>
</tr>
<tr>
<td>D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (update)</td>
<td>6/30/11</td>
<td>6/30/11</td>
</tr>
<tr>
<td><strong>Year 4 – Quarter 4 (July–September 2011)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>7/31/11</td>
<td>7/26/11</td>
</tr>
<tr>
<td>D29: Task 3 – Permitting Action Plan</td>
<td>8/31/11</td>
<td>8/31/11</td>
</tr>
<tr>
<td>D66: Task 9 – Bell Creek Test Site – Simulation Report</td>
<td>8/31/11</td>
<td>8/31/11</td>
</tr>
<tr>
<td>D67: Task 9 – Fort Nelson Test Site – Simulation Report</td>
<td>7/31/11</td>
<td>8/31/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/11</td>
<td>8/24/11</td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/11</td>
<td>9/21/11</td>
</tr>
<tr>
<td>D4: Task 1 – Permitting Review – Basic EPA Requirements^</td>
<td>9/30/11</td>
<td>9/30/11</td>
</tr>
<tr>
<td>D9: Task 1 – Updated DSS</td>
<td>9/30/11</td>
<td>9/23/11</td>
</tr>
<tr>
<td>D25: Task 2 – Bell Creek Test Site Poster</td>
<td>9/30/11</td>
<td>9/30/11</td>
</tr>
<tr>
<td>D50: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan</td>
<td>9/30/11</td>
<td>9/30/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>9/30/11</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>M31: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan Completed</td>
<td>9/30/11</td>
<td>9/30/11</td>
</tr>
<tr>
<td>M33: Task 16 – Basal Cambrian Baseline Geological Characterization Completed</td>
<td>9/30/11</td>
<td>9/29/11</td>
</tr>
<tr>
<td><strong>Year 5 – Quarter 1 (October–December 2011)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>10/31/11</td>
<td>10/26/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>11/30/11</td>
<td>11/30/11</td>
</tr>
<tr>
<td>D57: Task 12 – Project Assessment Annual Report</td>
<td>12/31/11</td>
<td>12/30/11</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>12/31/11</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>M34: Task 16 – Basal Cambrian Static Geological Model Completed</td>
<td>12/31/11</td>
<td>12/21/11</td>
</tr>
</tbody>
</table>

Table 5. Phase III Milestones and Deliverables (continued)

<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 5 – Quarter 2 (January–March 2012)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M16: Task 4 – Bell Creek Test Site – Initiation of Production and Injection Simulation</td>
<td>1/13/12</td>
<td>12/29/11</td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>1/31/12</td>
<td>1/31/12</td>
</tr>
<tr>
<td>D65: Task 4 – Fort Nelson Test Site – Site Characterization Report</td>
<td>1/31/12</td>
<td>1/31/12</td>
</tr>
<tr>
<td>D81: Task 1 – Regional Carbon Sequestration Atlas (update)</td>
<td>1/31/12</td>
<td>1/31/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>1/31/12</td>
<td>1/31/12</td>
</tr>
<tr>
<td>M29: Task 4 – Fort Nelson Site Characterization Report Completed</td>
<td>1/31/12</td>
<td>1/31/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>2/29/12</td>
<td>2/29/12</td>
</tr>
<tr>
<td>D5: Task 1 – Second Target Area Completed</td>
<td>3/31/12</td>
<td>3/30/12</td>
</tr>
<tr>
<td>D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (update)</td>
<td>3/31/12</td>
<td>3/30/12</td>
</tr>
<tr>
<td>M10: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Completed</td>
<td>3/31/12</td>
<td>3/31/12</td>
</tr>
<tr>
<td>M36: Task 13 – Annual Advisory Board Scheduled</td>
<td>3/31/12</td>
<td>3/28/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>3/31/12</td>
<td>3/27/12</td>
</tr>
<tr>
<td><strong>Year 5 – Quarter 3 (April–June 2012)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>4/30/12</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>D17: Task 2 – General Phase III Information PowerPoint Presentation (update)</td>
<td>5/31/12</td>
<td>5/31/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>5/31/12</td>
<td>5/31/12</td>
</tr>
<tr>
<td>D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (update)</td>
<td>6/30/12</td>
<td>6/29/12</td>
</tr>
<tr>
<td>D41: Task 4 – Fort Nelson Test Site – Geochemical Report</td>
<td>6/30/12</td>
<td>6/29/12</td>
</tr>
<tr>
<td>D84: Task 6 – Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS</td>
<td>6/30/12</td>
<td>6/29/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>6/30/12</td>
<td>6/28/12</td>
</tr>
<tr>
<td>M24: Task 14 – WWG Annual Meeting Held</td>
<td>6/30/12</td>
<td>5/3/12</td>
</tr>
</tbody>
</table>

Continued . . .
<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 5 – Quarter 4 (July–September 2012)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D13: Task 2 – Public Site Updates</td>
<td>7/31/12</td>
<td>7/31/12</td>
</tr>
<tr>
<td>D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report</td>
<td>7/31/12</td>
<td>7/31/12</td>
</tr>
<tr>
<td>D67: Task 9 – Fort Nelson Test Site – Simulation Report</td>
<td>7/31/12</td>
<td>7/24/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>7/31/12</td>
<td>8/31/12</td>
</tr>
<tr>
<td>D66: Task 9 – Bell Creek Test Site – Simulation Report</td>
<td>8/31/12</td>
<td>8/31/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/12</td>
<td>8/30/12</td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/12</td>
<td>9/28/12</td>
</tr>
<tr>
<td>D10: Task 1 – DPRS Update</td>
<td>9/30/12</td>
<td>9/28/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>9/30/12</td>
<td>9/27/12</td>
</tr>
<tr>
<td><strong>Year 6 – Quarter 1 (October–December 2012)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>10/31/12</td>
<td>10/25/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>11/30/12</td>
<td>11/28/12</td>
</tr>
<tr>
<td>D57: Task 12 – Project Assessment Annual Report</td>
<td>12/31/12</td>
<td>12/28/12</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>12/31/12</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>M37: Task 3 – IOGCC Task Force Subgroup Meeting 1 Held</td>
<td>12/31/12</td>
<td>12/21/12</td>
</tr>
<tr>
<td><strong>Year 6 – Quarter 2 (January–March 2013)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D32: Task 4 – Bell Creek Test Site – Geomechanical Final Report</td>
<td>1/31/13</td>
<td>1/31/13</td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>1/31/13</td>
<td>1/16/13</td>
</tr>
<tr>
<td>D14: Task 2 – General Phase III Fact Sheet (update)</td>
<td>2/28/13</td>
<td>2/28/13</td>
</tr>
<tr>
<td>D85: Task 6 – Report – Opportunities and Challenges Associated with CO₂ Compression and Transportation During CCS Activities</td>
<td>3/31/13</td>
<td>Waived by DOE (journal article)</td>
</tr>
<tr>
<td>M36: Task 13 – Annual Advisory Board Meeting Scheduled</td>
<td>3/31/13</td>
<td>3/27/13</td>
</tr>
</tbody>
</table>

Continued . . .
<table>
<thead>
<tr>
<th>Year 6 – Quarter 3 (April–June 2013)</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>D15: Task 2 – Bell Creek Test Site Fact Sheet (update)</td>
<td>4/15/13</td>
<td>3/25/13</td>
</tr>
<tr>
<td>D16: Task 2 – Fort Nelson Test Site Fact Sheet (update)</td>
<td>4/30/13</td>
<td>Waived by DOE</td>
</tr>
<tr>
<td>M14: Task 4 – Bell Creek Test Site Geological Characterization Data Collection Completed</td>
<td>4/30/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>4/30/13</td>
<td></td>
</tr>
<tr>
<td>M35: Task 16 – Basal Cambrian Dynamic Capacity Estimation Completed</td>
<td>4/30/13</td>
<td></td>
</tr>
<tr>
<td>D17: Task 2 – General Phase III Information PowerPoint Presentation (update)</td>
<td>5/31/13</td>
<td></td>
</tr>
<tr>
<td>D43: Task 5 – Bell Creek Test Site – Monitoring Experimental Design Package</td>
<td>5/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>5/31/13</td>
<td></td>
</tr>
<tr>
<td>M35: Task 16 – Basal Cambrian Dynamic Capacity Estimation Completed</td>
<td>5/31/13</td>
<td></td>
</tr>
<tr>
<td>D93: Task 1 – Geological Modeling and Simulation Report for the Aquistore Project</td>
<td>6/30/13</td>
<td></td>
</tr>
<tr>
<td>D96: Task 4 – Bell Creek Test Site – 3-D Seismic and Characterization Report</td>
<td>6/30/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>6/30/13</td>
<td></td>
</tr>
<tr>
<td>D64: Task 4 – Bell Creek Test Site – Site Characterization Report</td>
<td>8/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/13</td>
<td></td>
</tr>
</tbody>
</table>

Year 6 – Quarter 4 (July–September 2013)

<table>
<thead>
<tr>
<th>Year 6 – Quarter 3 (April–June 2013)</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 6 – Quarter 4 (July–September 2013)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D33: Task 4 – Bell Creek Test Site – Geochemical Final Report</td>
<td>7/31/13</td>
<td></td>
</tr>
<tr>
<td>M12: Task 4 – Bell Creek Test Site Geochemical Work Completed</td>
<td>7/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>7/31/13</td>
<td></td>
</tr>
<tr>
<td>D64: Task 4 – Bell Creek Test Site – Site Characterization Report</td>
<td>8/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>8/31/13</td>
<td></td>
</tr>
</tbody>
</table>

Continued . . .
<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 6 – Quarter 4 (July–September 2013) (continued)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1: Task 1 – Review of Source Attributes</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>D6: Task 3 – Permitting Review – Update 1</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>D48: Task 7 – Bell Creek Test Site – Procurement Plan and Agreement Report</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>D86: Task 15 – Updated Regional Implementation Plan for Zama (Ext. from 4/30/12)</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>D94: Task 2 – Aquistore Project Fact Sheet</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>D95: Task 2 – Aquistore Project Poster</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>M38: Task 3 – IOGCC Task Force Wrap-Up Meeting Held</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>M39: Task 3 – IOGCC Task Force Editing Subgroup Meeting Held</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>M40: Task 15 – Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project Completed</td>
<td>9/30/13</td>
<td></td>
</tr>
<tr>
<td>Year 7 – Quarter 1 (October–December 2013)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D42: Task 5 – Bell Creek Test Site – Injection Experimental Design Package</td>
<td>10/31/13</td>
<td></td>
</tr>
<tr>
<td>D99: Task 14 – Water/CCS Nexus-Related Fact Sheet</td>
<td>10/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>10/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>11/30/13</td>
<td></td>
</tr>
<tr>
<td>D41: Fort Nelson Test Site – Geochemical Report (Update 1)</td>
<td>12/15/13</td>
<td></td>
</tr>
<tr>
<td>D57: Task 12 – Project Assessment Annual Report</td>
<td>12/31/13</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>12/31/13</td>
<td></td>
</tr>
<tr>
<td>M24: Task 14 – WWG Annual Meeting Held</td>
<td>12/31/13</td>
<td></td>
</tr>
<tr>
<td>Year 7 – Quarter 2 (January–March 2014)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>1/31/14</td>
<td></td>
</tr>
<tr>
<td>M41: Task 6 – Decision to Incorporate Ramgen Compression Technology into Bell Creek Project</td>
<td>1/31/14</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>2/28/14</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Title/Description</th>
<th>Due Date</th>
<th>Actual Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>D24: Task 2 – PCOR Partnership Region Sequestration General Poster (update)</td>
<td>3/31/14</td>
<td></td>
</tr>
<tr>
<td>D36: Task 4 – Bell Creek Test Site – Wellbore Leakage Final Report</td>
<td>3/31/14</td>
<td></td>
</tr>
<tr>
<td>M23: Task 14 – Monthly WWG Conference Call Held</td>
<td>3/31/14</td>
<td></td>
</tr>
<tr>
<td>M36: Task 13 – Annual Advisory Board Meeting Scheduled</td>
<td>3/31/14</td>
<td></td>
</tr>
</tbody>
</table>
Table 6. PCOR Partnership Phase III, BP4, Years 5–6 Gantt Chart (continued)
Table 6. PCOR Partnership Phase III BP4, Years 5–6 Gantt Chart (continued)

<table>
<thead>
<tr>
<th>Task 15: Further Characterization of Zama Project</th>
<th>Budget Period 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1 Cement Integrity Studies, Wellbores</td>
<td>Q1</td>
</tr>
<tr>
<td>15.2 Static and Dynamic Modeling</td>
<td></td>
</tr>
<tr>
<td>15.3 Data Acquisition at Additional Zama Pinnacles</td>
<td>M34</td>
</tr>
<tr>
<td>15.4 Static Model, History Matching and Dynamic Simulation at Additional Zama Pinnacles</td>
<td></td>
</tr>
<tr>
<td>15.5 Acid Gas Phase Behavior and Rock Interactions Studies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task 16: Characterization of the Basal Cambrian System</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.2 Geological Characterization</td>
</tr>
<tr>
<td>16.3 Storage Capacity Evaluation</td>
</tr>
<tr>
<td>16.4 Storage Integrity</td>
</tr>
</tbody>
</table>
Table 6. PCOR Partnership Phase III BP4, Years 5–6 Gantt Chart (continued)

<table>
<thead>
<tr>
<th>Key for Deliverables (D) ▼</th>
<th>Key for Milestones (M) ◆</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 Review of Source Attributes</td>
<td>D96 BC Test Site – Simulation Report</td>
</tr>
<tr>
<td>D5 Second Target Area Completed</td>
<td>D97 FN Test Site – Simulation Report</td>
</tr>
<tr>
<td>D6 Permitting Review – Update 1</td>
<td>D81 Regional Carbon Sequestration Atlas</td>
</tr>
<tr>
<td>D10 DPRS Update</td>
<td>D84 Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS</td>
</tr>
<tr>
<td>D13 Public Site Updates</td>
<td>D10 DPRS Update</td>
</tr>
<tr>
<td>D14 General Phase III Fact Sheet</td>
<td>D13 Public Site Updates</td>
</tr>
<tr>
<td>D15 BC Test Site Fact Sheet</td>
<td>D14 General Phase III Fact Sheet</td>
</tr>
<tr>
<td>D17 General Phase III Information PowerPoint Presentation</td>
<td>D15 BC Test Site Fact Sheet</td>
</tr>
<tr>
<td>D18 BC Test Site PowerPoint Presentation</td>
<td>D17 General Phase III Information PowerPoint Presentation</td>
</tr>
<tr>
<td>D19 FN Test Site PowerPoint Presentation</td>
<td>D18 BC Test Site PowerPoint Presentation</td>
</tr>
<tr>
<td>D32 BC Test Site – Geomechanical Report</td>
<td>D32 BC Test Site – Geomechanical Report</td>
</tr>
<tr>
<td>D33 BC Test Site – Preinjection Geochemical Report</td>
<td>D33 BC Test Site – Preinjection Geochemical Report</td>
</tr>
<tr>
<td>D40 FN Test Site – Geomechanical Report</td>
<td>D40 FN Test Site – Geomechanical Report</td>
</tr>
<tr>
<td>D41 FN Test Site – Geochemical Report</td>
<td>D41 FN Test Site – Geochemical Report</td>
</tr>
<tr>
<td>D43 BC Test Site – Monitoring Experimental Design Package</td>
<td>D43 BC Test Site – Monitoring Experimental Design Package</td>
</tr>
<tr>
<td>D48 BC Test Site – Procurement Plan and Agreement Report</td>
<td>D48 BC Test Site – Procurement Plan and Agreement Report</td>
</tr>
<tr>
<td>D57 Project Assessment Annual Report</td>
<td>D57 Project Assessment Annual Report</td>
</tr>
<tr>
<td>D58 Quarterly Progress Report</td>
<td>D58 Quarterly Progress Report</td>
</tr>
<tr>
<td>D59 Milestone Quarterly Report</td>
<td>D59 Milestone Quarterly Report</td>
</tr>
<tr>
<td>D64 BC Test Site – Site Characterization Report</td>
<td>D64 BC Test Site – Site Characterization Report</td>
</tr>
<tr>
<td>D65 FN Test Site – Site Characterization Report</td>
<td>D65 FN Test Site – Site Characterization Report</td>
</tr>
</tbody>
</table>

Key for Deliverables (D) ▼:
- D1 Review of Source Attributes
- D5 Second Target Area Completed
- D6 Permitting Review – Update 1
- D10 DPRS Update
- D13 Public Site Updates
- D14 General Phase III Fact Sheet
- D15 BC Test Site Fact Sheet
- D17 General Phase III Information PowerPoint Presentation
- D18 BC Test Site PowerPoint Presentation
- D19 FN Test Site PowerPoint Presentation
- D32 BC Test Site – Geomechanical Report
- D33 BC Test Site – Preinjection Geochemical Report
- D40 FN Test Site – Geomechanical Report
- D41 FN Test Site – Geochemical Report
- D43 BC Test Site – Monitoring Experimental Design Package
- D48 BC Test Site – Procurement Plan and Agreement Report
- 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

Key for Milestones (M) ◆:
- M10 BC Test Site – Wellbore Leakage Data Collection Completed
- M12 BC Test Site – Preinjection Geochemical Work Completed
- M14 BC Test Site – Geological Characterization Data Collection Completed
- M16 BC Test Site – Initiation of Production and Injection Simulations
- M23 Monthly WWG Conference Call Held
- M24 WWG Annual Meeting Held
- M26 BC Test Site – CO₂ Injection Initiated
- M27 BC Test Site – MVA Equipment Installation and Baseline MVA Activities Completed
- M29 FN Test Site – Site Characterization Report Completed
- M32 FN Test Site – Geochemical Report Completed
- M34 Basal Cambrian Static Geological Model Completed
- M35 Basal Cambrian Dynamic Capacity Estimation Completed
- M36 Annual Advisory Board Meeting Scheduled
- M37 Subgroup Meetings Held
- M38 Task Force Wrap-Up Meeting Held
- M39 Editing Subgroup Meeting Held
- M40 Further Characterization of the Zama Acid Gas EOR, CO₂ Storage, and Monitoring Project Completed

Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS
Report – Geological Modeling and Simulation for the Aquistore Project
Aquistore Project Fact Sheet
Aquistore Project Poster
BC Test Site – 3-D Seismic Acquisition and Characterization Report
Report – Findings and Recommendations – GCS Task Force’s Operational and Postoperational Liability Subgroups
Report – Findings, Recommendations and Guidance of the GCS Task Force on Operational and Postoperational Liability
Water/CCS Nexus Related Fact Sheet

Report – Findings and Recommendations – GCS Task Force’s Operational and Postoperational Liability Subgroups
Report – Findings, Recommendations and Guidance of the GCS Task Force on Operational and Postoperational Liability
Water/CCS Nexus Related Fact Sheet

Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS
Report – Geological Modeling and Simulation for the Aquistore Project
Aquistore Project Fact Sheet
Aquistore Project Poster
BC Test Site – 3-D Seismic Acquisition and Characterization Report
Report – Findings and Recommendations – GCS Task Force’s Operational and Postoperational Liability Subgroups
Report – Findings, Recommendations and Guidance of the GCS Task Force on Operational and Postoperational Liability
Water/CCS Nexus Related Fact Sheet

Report – A Phased Approach to Building Pipeline Network for CO₂ Transportation During CCS
Report – Geological Modeling and Simulation for the Aquistore Project
Aquistore Project Fact Sheet
Aquistore Project Poster
BC Test Site – 3-D Seismic Acquisition and Characterization Report
Report – Findings and Recommendations – GCS Task Force’s Operational and Postoperational Liability Subgroups
Report – Findings, Recommendations and Guidance of the GCS Task Force on Operational and Postoperational Liability
Water/CCS Nexus Related Fact Sheet
PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, there were two abstracts (one poster and one oral) accepted for presentation and 15 presentations (14 oral and one poster) given at 16 different meetings/conferences. In addition, a quarterly progress report, 11 deliverables (eight finalized), and two milestones (one finalized) were completed.

Abstracts

Submitted


Submitted, Accepted, and Declined by Author


Presentations


Saini, D., 2013, An update on completed static and dynamic modeling work (F Pool) and further characterization of Zama CO₂ EOR and storage project: Presented to Apache Canada personnel, Grand Forks, North Dakota, January 24–25, 2013.


**Poster Presentations**


**Conference Papers**

Deliverables/Milestones

Draft


Approved


Progress Reports

Monthlies


Quarterlies


Meeting Minutes


Journal Articles


MEETINGS/TRAVEL

Representatives from the PCOR Partnership attended and/or participated in the following 16 meetings/conferences, three training opportunities, and nine project management site trips in this reporting period:

- January 7–18, 2013: Traveled to the Bell Creek oil field for site activities in southeastern Montana.
- January 10 and 24, 2013: Traveled to the Lignite Field Validation Test site near Kenmare, North Dakota, to inspect the site.
- January 16, 2013: Attended a meeting at PPB headquarters in Fargo, North Dakota.
- February 5–9, 2013: Traveled to Gillette, Wyoming, for sampling work near the Bell Creek Field.
- February 7 and 21, 2013: Traveled to the Lignite Field validation site near Kenmare, North Dakota, to inspect the site.
- February 16–20, 2013: Attended the SPE 2013 Reservoir Simulation Symposium and premeeting training courses entitled “Fundamentals of Reservoir Simulation” and “Reservoir Simulation for Practical Decision Making” in The Woodlands, Texas.
- February 19–22, 2013: Visited NETL offices in Morgantown, West Virginia, and Pittsburgh, Pennsylvania, to discuss project activities.
- February 20–23, 2013: Traveled to view proposed geophone installation in the Bell Creek Field.
- February 24 – March 1, 2013: Attended Schlumberger’s NExT software training entitled “Techlog Formation Evaluations” in Houston, Texas.
- February 26–28, 2013: Participated in the IOGCC CGS Subgroup meeting in Minneapolis, Minnesota.
- February 27, 2013: Traveled to PPB headquarters to discuss educational materials in Fargo, North Dakota.
- February 27 – March 1, 2013: Presented at the Rice 2013 Oil & Gas HPC Workshop in Houston, Texas.
• March 2–10, 2013: Provided technical advice during 56-14R core collection in the Bell Creek Field.
• March 4–7, 2013: Hosted the 2nd annual TAB meeting in Orlando, Florida.
• March 7 and 21, 2013: Traveled to the Lignite Field validation site near Kenmare, North Dakota, to inspect the site.
• March 11–12, 2013: Participated in a logging review meeting with Denbury and Schlumberger in Denver, Colorado.
• March 11–13, 2013: Presented at the SECARB 8th Annual Stakeholders’ Briefing in Atlanta, Georgia.
• March 15–22, 2013: Provided technical advice during 33-14R core collection in the Bell Creek Field.
• March 18–22, 2013: Traveled to the Bell Creek Field for sampling activities.
• March 20, 2013: Filmed preliminary version of the education presentation at PPB in Fargo, North Dakota.
• March 22–29, 2013: Presented at the 6th IPTC in Beijing, China.

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

REFERENCES

None.