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Energy & Environmental Research Center

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October 31, 2011

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

Dear Ms. Fine:

Subject: EERC Plains CO_2 Reduction Partnership (PCOR) Phase III Quarterly Technical Progress Report for the Period July 1 – September 30, 2011
Contract Nos. FY08-LXIII-162 and G-015-030; EERC Funds 16196 and 15631

Enclosed is a hard copy of the Quarterly Technical Progress Report for the PCOR Partnership Program for Phase III. Also enclosed is a CD-ROM containing the Quarterly Technical Progress Report. A PDF version will also be sent via e-mail.

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/sah

Enclosures

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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 CO_2 REDUCTION PARTNERSHIP PHASE III

Quarterly Technical Progress Report

(for the period July 1 –September 30, 2011)

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

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October 2011

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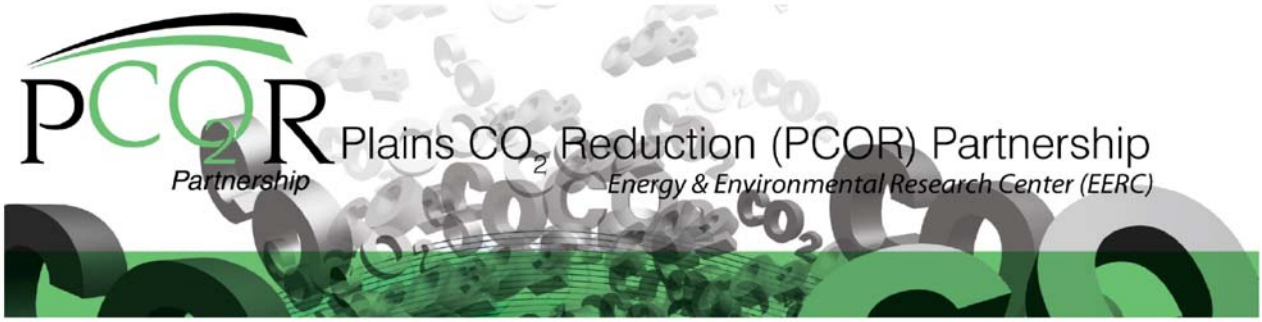

PLAINS CO_2 REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
July 1 – September 30, 2011

EXECUTIVE SUMMARY

The Plains CO_2 Reduction (PCOR) Partnership is one of seven Regional Carbon Sequestration Partnerships (RCSPs) competitively awarded by the U.S. Department of Energy National Energy Technology Laboratory in 2003 as part of a national plan to mitigate greenhouse gas emissions. The PCOR Partnership is led by the Energy & Environmental Research Center at the University of North Dakota and continues to include stakeholders from the public and private sector in Phase III. The PCOR Partnership region includes all or part of nine U.S. states and four Canadian provinces.

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

This progress report presents an update of Phase III PCOR Partnership activities from July 1, 2011, through September 30, 2011.

The ninth PCOR Partnership Annual Meeting, the eighth meeting with results, was held on September 13–14, 2011, in Denver, Colorado. The annual meeting attracted 83 attendees representing 42 organizations from 12 states, the District of Columbia, and four Canadian provinces. On September 12, 2011, the PCOR Partnership held its Foundations of CCS Geology Workshop in Denver. This half-day introductory workshop was designed for everyone involved in or associated with carbon capture and storage (CCS) projects and provided an explanation of key geology concepts. The agendas are located online at www.undeerc.org/aboutus/pastevents/specialevents/pcor11/.

Detailed characterization activities continued in the Rival Field, located in the northwestern corner of North Dakota, and the basal Cambrian (Deadwood) formation lying in both Canada and the United States. Ongoing outreach activities exposed nearly 650 conference and meeting participants to the PCOR Partnership Program. The environmental questionnaire prepared for the monitoring, verification, and accounting program for the Bell Creek demonstration project received a categorical exclusion. Lidar elevation data was collected for the Bell Creek Field and the petrophysical characterization of cap rock samples obtained near Fort Nelson, British Columbia, Canada, was detailed. Geologic and geomechanical modeling, and infrastructure development activities continued, including a literature survey of transportation and injection operations. Participation in the RCSP working groups, namely the Outreach, Sim/Risk, and Water Working Groups, continued.

PLAINS CO_2 REDUCTION PARTNERSHIP PHASE III
Quarterly Technical Progress Report
July 1 – September 30, 2011

INTRODUCTION

The Plains CO_2 Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnership (RCSP) Program. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota in Grand Forks, North Dakota, and includes stakeholders from the public and private sector. The membership as of September 30, 2011, is listed in Table 1. The PCOR Partnership region includes all or parts 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 RCSP Program initiative is being implemented in three phases:

- Phase I – Characterization Phase (2003–2005): characterized opportunities for carbon sequestration
- Phase II – Validation Phase (2005–2009): conducted small-scale field validation tests
- Phase III – Development Phase (2007–2017): involves large-volume carbon storage demonstration tests (Figure 1)

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

BP3: October 1, 2007 – September 30, 2009
BP4: October 1, 2009 – September 30, 2015
BP5: October 1, 2015 – September 30, 2017
Note: BP1 and BP2 were effective in Phase II.

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

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

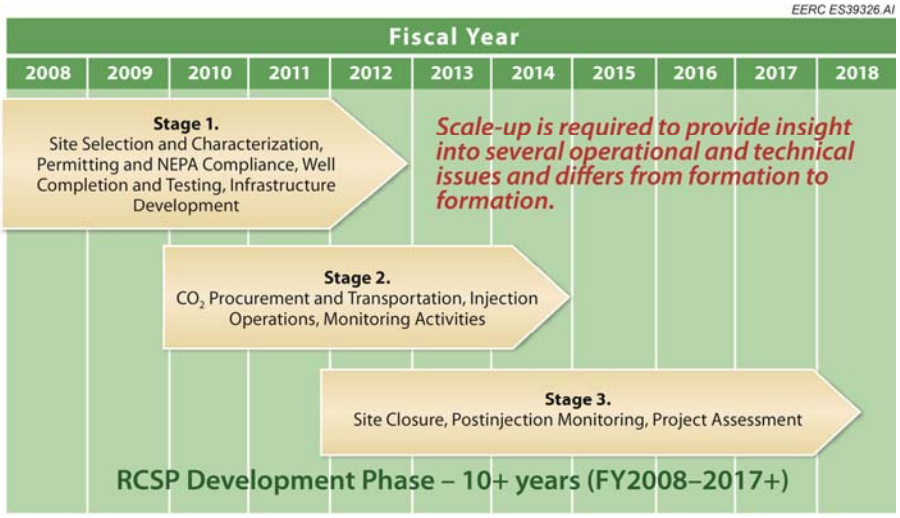

Figure 1. RCSP development phase: scaling up toward commercialization (figure taken from DOE NETL).

The overall mission of the Phase III program is to 1) gather characterization data to verify the ability of the target formations to store carbon dioxide (CO_2), 2) facilitate the development of the infrastructure required to transport CO_2 from sources to the injection sites, 3) facilitate development of the rapidly evolving North American regulatory and permitting framework, 4) develop opportunities for PCOR Partnership partners to capture and store CO_2, 5) establish a technical framework by which carbon credits can be monetized for CO_2 stored in geologic formations, 6) continue collaboration with other RCSPs, and 7) provide outreach and education for CO_2 capture and storage stakeholders and the general public.

In Phase III, the PCOR Partnership is building on the information generated in its characterization (Phase I) and validation (Phase II) phases. The PCOR Partnership plans to fully utilize the infrastructure of its region to maximize CO_2 injection volumes. A programmatic RCSP Phase III goal is the injection of approximately 1 million tons of CO_2 a year into at least one regionally significant geologic formation. Each of the RCSP's large-volume injection tests is designed to demonstrate that CO_2 storage sites have the potential to store regional CO_2 emissions safely, permanently, and economically for hundreds of years.

The PCOR Partnership is working toward the establishment of two demonstration sites. The sites are located 1) in the Bell Creek oil field in Powder River County in southeastern Montana and 2) near Spectra Energy's (Spectra's) Fort Nelson gas-processing facility, situated near Fort Nelson, British Columbia, Canada (Figure 2).

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

The PCOR Partnership plans to achieve its Phase III mission through a series of 16 tasks: 1) Regional Characterization, 2) Public Outreach and Education, 3) Permitting and National Environmental Policy Act (NEPA) Compliance, 4) Site Characterization and Modeling, 5) Well Drilling and Completion, 6) Infrastructure Development, 7) CO_2 Procurement, 8) Transportation and Injection Operations, 9) Operational Monitoring and Modeling, 10) Site Closure, 11) Postinjection Monitoring and Modeling, 12) Project Assessment, 13) Project Management, 14) RCSP Water Working Group (WWG) Coordination, 15) Further Characterization of the Zama Acid Gas Enhanced Oil Recovery (EOR), CO_2 Storage, and Monitoring Project, and 16) Characterization of the Basal Cambrian System. Table 2 lists the responsibility matrix for these 16 tasks.

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

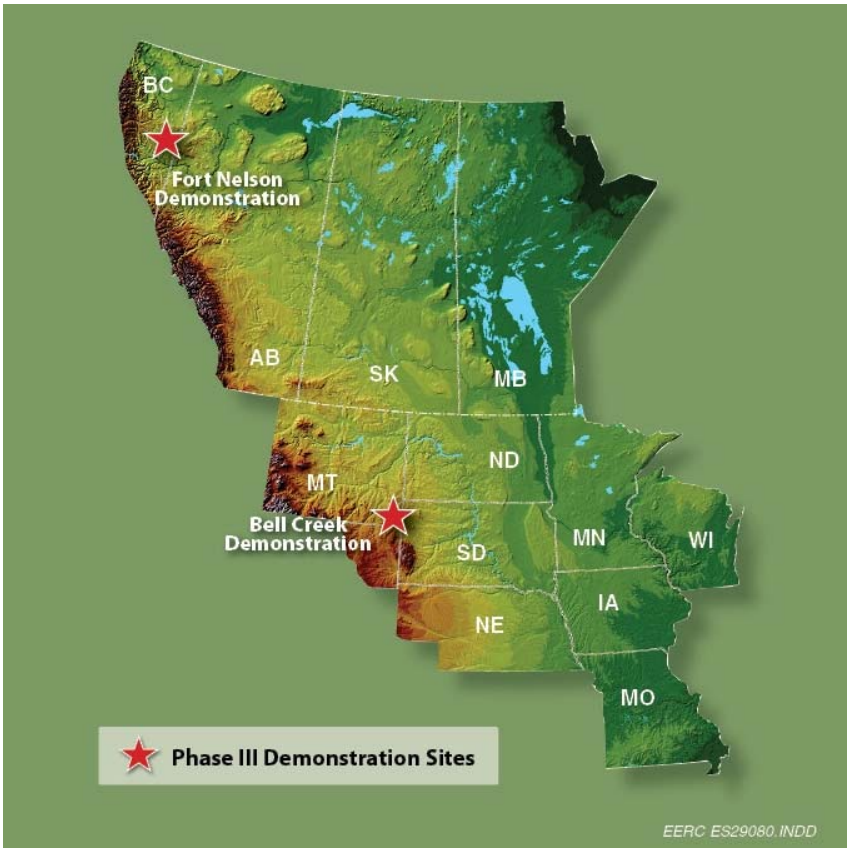

Figure 2. PCOR Partnership Phase III demonstration sites.

Table 2. Phase III Responsibility Matrix

Phase III Task Description	Task Leader
Task 1 – Regional Characterization	Wesley D. Peck
Task 2 – Public Outreach and Education	Daniel J. Daly
Task 3 – Permitting and NEPA Compliance	Lisa S. Botnen
Task 4 – Site Characterization and Modeling	James A. Sorensen
Task 5 – Well Drilling and Completion	John A. Hamling
Task 6 – Infrastructure Development	Melanie D. Jensen
Task 7 – CO_2 Procurement	John A. Harju
Task 8 – Transportation and Injection Operations	Melanie D. Jensen
Task 9 – Operational Monitoring and Modeling	Charles D. Gorecki
Task 10 – Site Closure	TBA[1]
Task 11 – Postinjection Monitoring and Modeling	TBA
Task 12 – Project Assessment	Katherine K. Anagnost
Task 13 – Project Management	Charles D. Gorecki
Task 14 – RCSP WWG Coordination	Ryan J. Klapperich
Task 15 – Further Characterization of the Zama Acid Gas EOR, CO_2 Storage, and Monitoring Project	James A. Sorensen
Task 16 – Characterization of the Basal Cambrian System	Wesley D. Peck

[1] To be announced.

PROGRESS OF WORK

Task 1 – Regional Characterization

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

- Continued efforts on the revised atlas (4th edition).
- Completed the annual review of source attributes and submitted Deliverable (D)1: "Review of Source Attributes" on September 21 for review and approval.
- EERC Web programmers attended the Esri International Users Conference as well as a 2-day training session in San Diego. This effort will bolster programming capabilities with respect to online geographic information systems (GIS) and Decision Support System (DSS, © 2007–2011 EERC Foundation) capabilities.
- Submitted D9: "Updated DSS" report on September 23 for review and approval.
- Held discussions with DOE NETL project managers about discrepancies discovered in Canadian GIS data provided to the North American Carbon Atlas Partnership.
- Research staff participated in an Aquistore Project risk assessment meeting in Regina, Saskatchewan, Canada.
- Coordinated and presented at the 2011 workshop entitled "Foundations of CCS Geology" on September 12 in Denver, Colorado.
- Attended the 2011 PCOR Partnership Annual Meeting on September 13 and 14 in Denver, Colorado.
- Held discussions on the availability of water quality analysis for specific geologic horizons across the region and the utility of such data in the greater scheme of regional characterization.
- Continued efforts on Rival Field characterization, including the following:
  - Participated in several conference calls with TAQA North Ltd.
  - Completed second round of petrophysical analysis.
  - Started and completed special core analysis in the Applied Geology Laboratory (AGL).
    - Thin sections
    - Core plugs
      1. Permeameter
      2. Porosimeter
      3. X-ray diffraction (XRD)
      4. Profilometer
  - Set up conversion cross-plots to relate gas permeability to liquid permeability.
  - Literature review of Madison Formation structure
    - Mapped LANDSAT derived lineaments on top of Rival Field structure
  - Review of bottomhole pressure data available
  - Refine 3-D geologic model adding more data and improved cross-plots
  - Completed petrophysical modeling for 3-D model using Gaussian random function simulation algorithm for the following properties:
    - Effective porosity
    - Permeability

    - Water saturation
    - Temperature
    - Pressure
  - Continue to work on Rival report for TAQA
    - "Site Characterization and 3-D Geologic Modeling of the Midale and Rival Reservoirs within Rival Field"
    - Also includes Rival special core analysis report as an Appendix
  - Continue drafting D5, second target area completed, due March 2012

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

- On August 23, approval was granted for the completion date for D81 – regional carbon sequestration atlas (update) to be extended beyond August 31, 2011.

Task 2 – Public Outreach and Education

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

- Thirty two EERC employees attended 15 conferences/meetings and one field trip, resulting in approximately 644 external participants that were exposed to the PCOR Partnership name, messaging, and informational materials. Specifically, the PCOR Partnership outreach activities included 9 oral presentations. The following quantities of outreach materials were distributed:
  - PCOR Partnership documentary entitled "Nature in the Balance: CO_2 Sequestration" – 33
  - PCOR Partnership documentary entitled "Reducing Our Carbon Footprint: The Role of Markets" – 31
  - PCOR Partnership documentary entitled "Out of the Air – Into the Soil" – 31
  - PCOR Partnership documentary entitled "Managing Carbon Dioxide: The Geologic Solution" – 33
  - PCOR Partnership documentary entitled "Global Energy and Carbon: Tracking Our Footprint" – 58
  - PCOR Partnership Atlas 3rd Edition, Revised – 52
  - PCOR Partnership product list – 92
- Submitted D25: "Bell Creek Test Site" poster on September 30 for review and approval.
- Submitted and received approval for D18: "Bell Creek Test Site" PowerPoint presentation.
- Helped coordinate the "Foundations of CCS Geology" Workshop held on September 12 in Denver, Colorado.
- Coordinated discussions with The Ammerman Experience regarding its media communications presentation at the PCOR Partnership Annual Meeting on September 13 in Denver.

- Attended the 2011 PCOR Partnership Annual Meeting on September 13 and 14 in Denver, Colorado.
- Provided information on the demonstration sites for use at the Carbon Sequestration Leadership Forum (CSLF) ministerial meeting held in September 2011 in Beijing, China.
- Continued discussions and prepared budget estimates to explore the potential for Web-based educational games as a communication and education tool for CCS.
- Participated in the Spectra Energy quarterly management meeting in Vancouver, British Columbia, Canada, on July 20 and 21.
- Began preparing video shorts excerpted from the documentary entitled "Global Energy and Carbon: Tracking Our Footprint."
- Continued planning efforts for an update to the public Web site (D13, due June 2012).
- Continued efforts to develop an outreach-tracking database.
- Continued to track state-by-state CCS regulations for development of future outreach materials.
- Delivered a 3-hour presentation on sequestration at the Prairie Public Broadcasting (PPB) "master" teacher training session held on Saturday, August 27, in Fargo, North Dakota. These master teachers will, in turn, facilitate sessions at PPB's Teacher Training Institute in November.
- Continued efforts with PPB's education services on planning the November 2011 teacher training workshop hosted by the EERC.
- Prepared a draft of a Bell Creek documentary (D21) plan, including concept, shot list, schedule, and FAQs (frequency asked questions), to begin the process of seeking site owner permission so filming can begin.
- Began preparation of a Fort Nelson documentary (D22) plan, including concept, shot list, schedule, and FAQs, to begin the process of seeking owner permission so filming can begin.
- Participated in a conference call regarding potential collaboration on focus group activities to improve public presentations.
- Continued development of activities to obtain feedback on clarity of messages and individual outreach and education task products including the following:
  - For planning purposes divided the PCOR Partnership region into 1) the northern and southern regions and 2) eastern and western regions.
  - Proposed a series of triad groups, comprising three members of the general public and a discussion lead coupled with larger, more formal focus groups.
  - Prepared work plans and preliminary budgets.
- Met with EERC AGL personnel regarding development of video-based outreach.
- Compiled a list of proposed outreach activities with preliminary budget estimates for participation in the Aquistore Project.
- Participated on September 20 in a conference call of the Weyburn–Midale Project outreach advisory group to discuss the opening of an information display in the Weyburn city hall and upcoming focus group and survey work.
- On September 21, participated in a conference call to discuss the outreach session and presentation at the Society of Petroleum Engineers (SPE) Forum Series entitled "CO_2

Geological Storage: Will We Be Ready in Time?" to be held in the Algarve, Portugal, in early October (www.spe.org/events/11fse3/pages/about/index.php).

- On September 22, participated in a telephone conversation with Cris Stainbrook, the President of the Indian Land Tenure Foundation (ILTF); ILTF has hired a full-time person to work on energy and carbon issues, and ILTF suggested that this new hire make a 3-day visit to the EERC to learn about PCOR Partnership capabilities and to discuss opportunities for collaboration.
- EERC library staff participated in the 2011 North Dakota Library Association meeting (http://ndla.info/Conference/11conf.htm) in Minot and hosted a booth featuring PCOR Partnership outreach materials, including atlases, documentaries, and fact sheets.

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

- Provided D19 – Fort Nelson Test Site PowerPoint Presentation (update) to Spectra Energy for review and comment on June 3. Discussed the presentation and the draft poster (D26, submitted for review March 31) during the Vancouver meeting held July 20–21. Received Spectra Energy's comments on September 14. Held an in-house meeting on September 22 to prepare revised text.

Task 3 – Permitting and NEPA Compliance

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

- Submitted D29: Permitting Action Plan on August 31 for review and approval.
- Submitted D4: the Permitting Review – Basic U.S. Environmental Protection Agency's (EPA's) Requirements on September 30 for review and approval.
- Attended the 2011 PCOR Partnership Annual Meeting and Workshop on September 12–14 in Denver, Colorado.
- Continued development of the revised/updated Regulatory Roundup document.
- Provided follow-up information to participants who attended the third PCOR Partnership Regulatory Meeting (June 29 and 30), and prepared and distributed meeting summary and presentations.
- Attended the Enhanced Oil Recovery Institute (EORI) Fifth Annual CO_2 Conference on July 13 and 14, in Casper, Wyoming.
- Received a categorical exclusion signed July 14 on the Bell Creek environmental questionnaire (D28, submitted March 30).
- Completed review of the EPA's proposed Resource Conservation and Recovery Act (RCRA) exemption for CCS and had discussions on this proposed rule with various partners.
- On September 14 and 15, updated the annual meeting attendees regarding the EPA's assumption of regulatory authority for permitting Class VI (geologic storage of carbon dioxide) underground injection control wells. Permit applications for such wells will need to be submitted to EPA regional offices.
- Held an in-house meeting and participated in conference calls with various partners to discuss the proposed RCRA regulations.

- Participated in EPA's webinar entitled "Geologic Sequestration Financial Responsibility Implementation Workshop and Webcast."
- Scheduled a breakfast meeting of the PCOR Partnership's regulatory group for October 17, during the Interstate Oil and Gas Compact Commission (IOGCC) Annual Meeting in Buffalo, New York.
- Activities related to the Lignite Phase II validation site closure included the following:
  - Obtained approval to proceed from the appropriate regulatory agencies.
  - Prepared and submitted subcontracts for plugging and abandoning the wells and for site reclamation.
  - Established the start date as September 6.
  - Acquired necessary information and established appropriate procedures for the removal of the bridge plug from Well 36-15.
  - Completed cementing over the plug pursuant to state authorization.
  - Scheduled reseeding for October 24.
  - Over the next 2 years, scheduled weed spraying and maintenance of the fencing.

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

- Under the Statement of Project Objectives, Subtask 3.2 (Assistance in the Development of the Environmental Assessment), a categorical exclusion was received (July 2011), therefore, activities under Subtask 3.2 will be significantly reduced or eliminated entirely. Efforts are continuing to redefine the efforts of this subtask.

Task 4 – Site Characterization and Modeling

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

- Attended the 2011 PCOR Partnership Annual Meeting and Workshop on September 12–14 in Denver, Colorado.
- Bell Creek test site activities included the following:
  - Traveled to the outcrops of the Muddy Formation in northeastern Wyoming and led a group of Denbury Onshore LLC (Denbury) representatives on a 2-day field trip.
  - Received lidar (light detection and ranging) elevation data, and began correction of surface locations and elevation data of all wells for both surface monitoring and geologic characterization modeling activities.
  - Continued development of the Petrel geological model.
  - Created a new cross section from the geologic model to assist in the core analysis tests for the monitoring well.
  - Held an in-house meeting to discuss the draft geologic core evaluation program.
  - Reviewed price quotes for work under the core analysis program.
  - Visited the Bell Creek Field on August 4 and 5.
  - Held in-house project update meetings on July 25, August 8, and August 22.
  - Performed fracture pressure calculations for sand and shale intervals.

- Discussed the creation of a mechanical earth model for the Bell Creek Field to assist in understanding the geomechanical behavior during CO_2 injection.
- Received approval from DOE NETL on D34: Baseline Hydrogeological Experimental Design Package.
- Received approval from DOE NETL on D31/M28: Bell Creek Test Site – Geological Characterization Experimental Design Package.
- EERC and Denbury personnel examined geologic core from the Bell Creek Field at the Denver U.S. Geological Survey (USGS) office. The USGS provided samples from a well in the Phase 1 development area for thin-section preparation and further in-house laboratory testing. Results will be shared with the USGS as agreed upon as part of a condition of receiving samples.

- Fort Nelson test site activities included the following:
  - Prepared a brief project update for the CSLF July 2011 Strategic Plan Implementation Report (SPIR).
  - Continued work on the cap rock petrography report.
  - Continued work on the geomechanical model.
  - Reviewed the geomechanical testing and modeling program.
  - Continued data collection for the geomechanical simulation, including the lab data, equivalent formation data, and expected data.
  - Held the EERC and Spectra Energy quarterly meeting on July 20 and 21 in Vancouver, British Columbia, Canada. Topics discussed included the following:
    - Outreach activities
    - 2010 Risk Assessment document
    - Kickoff and due dates for the next-round risk assessment
    - Modeling update
    - Monitoring, verification, and accounting (MVA) plan
    - PCOR Partnership annual meeting
    - Weatherford core analytical results
    - The roles of the Canadian federal government, British Columbia government and DOE in the project.
  - Modeling staff traveled to Calgary from July 24–30 to work with Spectra Energy personnel on the model.
  - Reviewed new prediction simulations and suggested a few more scenarios.
  - Reviewed the final report on results of the core analytical work conducted by Weatherford Laboratories in Calgary.
  - Began reconciliation of the various data packages associated with the 2009 wellbore characterization and core analyses to ensure the quality and accuracy of data relative to the specific rock formation intervals under evaluation.
  - Updated the action items list following the management meeting held in Vancouver, British Columbia, Canada, on July 20 and 21.
  - Held in-house project update meetings on August 1, 15, and 29, and September 26.
  - Continued preparation of draft report presenting the results of geochemical experiments conducted over the course of 2009–2011.

- Finalized and delivered a report detailing the petrophysical characterization of cap rock samples obtained from the C-61-E wellbore, including detailed mineralogical characteristics, bulk volume, and skeletal density of three samples.
- Held the monthly project management conference call on September 6.
- Continued work on updating the 2011 static geological model.
- Continued work on D65, Site Characterization Report, which is due October 31, 2011.
- Participated in a call with Dave Moffatt on September 29.

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 5 – Well Drilling and Completion

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

- Attended the 2011 PCOR Annual Meeting and Workshop on September 12–14 in Denver, Colorado, and presented an update on Bell Creek activities on September 14.
- Situated the EERC mobile office trailer at the Bell Creek site.
- Continued efforts to gain landowner permissions for the surface soil gas and groundwater sampling program.
- Continued preparations for the first surface water, soil gas, and groundwater monitoring baseline sampling trip.
- Continued updating the joint Denbury–EERC MVA plan as a "living document."
- Continued work related to the evaluation of wells within the Phase 1 and surrounding areas and incorporated information into a GIS format database for special risk and/or monitoring assessments.
- Continued investigation pricing and operational logistics related to drilling, completions, and MVA technologies to be deployed at the Bell Creek Phase 1 monitoring well.
- Finalized the monitoring well design.
- Designed and ordered the specialty wellhead required for the MVA program and permanent downhole monitoring (PDM) technologies and initiated wellhead design.
- Contracted with Sandia Technologies to consult in the design and deployment of the PDM system in the monitoring well.
- Initiated weekly conference calls with Denbury to discuss monitoring well design, planning, and progress.
- Participated in an outcrop field trip with Denbury personnel in order to gain a better understanding of reservoir conditions through examining analogous rock, and discussed overall project progress and plans with Denbury personnel.
- Held a Bell Creek update meeting in Plano, Texas, on July 27, 2011, and discussed the following:

  - Progress on ongoing work and the path forward.
  - Authorization for expenditure (AFE) for the monitoring well.
  - Use of 3-D and 4-D seismic.
  - Reentry of selected plugged and abandoned wells in the Bell Creek Field.
- Continued work on wells in Phases 2, 3, and 7 for potential reentry for deployment of additional monitoring and data collection
- Initiated efforts to establish phone and Internet connection with Denbury and Range Communications.
- Continued work on a site and operations safety plan for field sampling and monitoring well drilling and completion activities.
- Began preparation of field sampling equipment for a baseline monitoring trip.
- Selected service providers and finalized the well-logging and coring service program for the monitoring well in cooperation with Denbury.
- Ordered and received compliant PPE (personal protective equipment) for site activities for all EERC personnel participating in Bell Creek field activities.
- Received Bureau of Land Management surface access permission for the soil gas and water baseline monitoring programs.
- Discussed potential 3-D seismic characterization and baseline survey with Denbury.
- Continued work in material procurement and design of permanent downhole monitoring equipment for the monitoring well in conjunction with Sandia Technologies and Denbury.

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

- Because of drilling schedules, the estimated spud date for the monitoring well has been delayed from October to mid-November 2011.
- Arrival of the gas chromatograph and, accordingly, start of the baseline sampling at the site were delayed. Sampling is now anticipated to begin on November 1.

Task 6 – Infrastructure Development

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

- Attended the PCOR Partnership Annual Meeting and Workshop held September 12–14 in Denver, Colorado.
- Answered questions and requests received from two partners at the annual meeting.
- Continued work on adapting the capture technologies table (included as an appendix in the value-added capture technologies overview report submitted in March 2011) for the DSS, including the following:
  - Identification of the public information sources that best describe each of the technologies listed.
  - Completion of short summaries of each of the technologies.
  - Initiation of the programming needed to produce the interactive site.

- Research staff attended and presented at the Electric Power Research Institute (EPRI)-sponsored Health and Environmental Toxicity of Amines for Post-Combustion Capture Conference in Palo Alto, California, on August 16 and 17.
- Attended the NETL CO_2 Capture Technology Meeting held August 22–26 in Pittsburgh, Pennsylvania (www.netl.doe.gov/events/11conferences/co2capture).
- Finalized the CO_2 pipelines technical brief (www2.undeerc.org/website/pcorp/ProductsDB/pdfs/PipelineTechnicalBrief2011revisedPWG.pdf).
- Completed the annual update and quality assurance/quality control of the CO_2 emission sources master data spreadsheet (performed in conjunction with Task 1).
- Efforts concentrated on gathering information about the well depth, diameter, downhole pressure, downhole temperature, etc., that will be needed to develop Bell Creek in-field compression specifications. The Ramgen compressor must be able to meet these specifications to be considered for implementation at the site.

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

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

Task 7 – CO_2 Procurement

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

- Participated in ongoing project discussions with Denbury, including the July 25 meeting in Plano, Texas.
- Attended the EORI Fifth Annual CO_2 Conference on July 13–14 in Casper, Wyoming.
- Attended and participated in the 2011 PCOR Partnership Annual Meeting and Workshop held September 12–14 in Denver, Colorado.

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:

- Attended the PCOR Partnership Annual Meeting and Workshop held September 12–14 in Denver, Colorado.
- During a search of publicly available literature, information was gathered about the CO_2 capture technology used at the Lost Cabin gas plant, the CO_2 pipeline from the gas plant to the Bell Creek Field, and downhole pressure and depth at the Bell Creek Field for use in determining compression needs both at the Lost Cabin plant and for

recompression at the Bell Creek Field. This information was summarized in a written document for the PCOR Partnership management.

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 9 – Operational Monitoring and Modeling

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

- Attended the PCOR Partnership Annual Meeting and Workshop held September 12–14 in Denver, Colorado.
- Held an in-house modeling meeting on August 30, including an update on the Bell Creek modeling activities.
- Held a monthly modeling meeting on September 27, including an in-house presentation of the Fort Nelson geochemical model.
- Participated in the RCSP Sim/Risk Working Group monthly conference calls on August 23 and September 27.
- Volunteered to present the modeling progress update report in either November or December during the Sim/Risk monthly conference call.
- Modeling staff participated in Petrel Reservoir Engineering training in Houston, Texas.
- Modeling staff participated in a 3-day PEICE (Petroleum Institute for Continuing Education) training course entitled "Fundamentals of Reservoir Simulation."
- Modeling personnel attended an Applied Petroleum Technology Academy training course on CO_2 flooding in Casper, Wyoming.
- Tested a new computer node within the computer cluster.
- Continued Bell Creek site activities, including the following:
  - Submitted the executive summary for D66: "Bell Creek Test Site – Simulation Report" on August 31.
  - Submitted D50/M31: "Site Characterization, Modeling, and Monitoring Plan" on September 30 for review and approval.
  - Began preliminary modeling to determine response and sensitivity of thermal perturbation and its potential as a PDM technology.
  - Continued work on the model on heating temperature variations.
  - Studied the NIPER (National Institute for Petroleum and Energy Research) report (NIPER-713) for insight into Muddy Formation outcrop characteristics.
  - Worked on collecting relevant literature for overpressurization of sandstone reservoirs.
  - Presented Denbury with PowerPoint presentations on modeling efforts and on the potential cause and implications of the initial subnormal pressure regime in the Bell Creek Field.
  - Worked on the reservoir simulation of the Phase 1 area.

  - Worked on the numerical tuning for the reservoir simulation of the Phase 1 area.
  - Began interpretation of the coring program in the Mowry Formation.
  - Continued working on history-matching historic production and injection in the Bell Creek Field.
  - Worked on finalizing the subnormal pressure report, including the implications of subnormal pressure and repressurization to recharge and leaking potential.
  - Continued efforts on the Bell Creek simulation report.
- Continued Fort Nelson site activities, including the following:
  - Submitted the executive summary for D67: "Fort Nelson Test Site – Simulation Report" on August 31.
  - Sent a draft of D67, Fort Nelson Simulation Report, to Spectra Energy for review and comment.
  - Continued work on prediction simulation (CO_2 plume size and bottomhole pressure).
  - Reviewed new prediction simulations and suggested a few more scenarios.
  - Continued work on MVA plan.
  - Reviewed a draft report prepared by RPS Energy presenting the results of an engineering evaluation of the drilling and completion of the exploratory well drilled in 2009 (Well C-61-E).
  - Worked with Dave Nakles to revise schedule of technical activities based on the outcome of a July meeting in Vancouver and to develop descriptions and time lines for technical activities to be conducted over the next 12 months.
  - Began finalizing the 2010 risk assessment report based on Spectra comments received on September 13.
  - A draft MVA plan for shallow groundwater and surface water monitoring has been prepared and is undergoing in-house review.
  - Worked on a PowerPoint for Spectra Energy on simulation efforts.

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

- Continued addressing Spectra's comments on the deliverable submitted for its review, namely the Fort Nelson Test Site – Site Characterization, Modeling, and Monitoring Plan (D52).
- Began incorporation of comments received on August 31 from Spectra Energy following its review of the second-round risk assessment.
- Received an extension for D67 – Simulation Report from July 31, 2011, to August 31, 2011, in order to incorporate the results of the July 20 and 21 meeting held in Vancouver into the report.

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

- The project assessment report (D57) for the period October 1, 2009 – September 30, 2010, was submitted in December 2010 and is available on the partners-only Web site at www2.undeerc.org/website/pcorp/ProductsDB/pdfs/ENS_D57_Task12_Dec10.pdf.

Task 13 – Project Management

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

- Organized and participated in the PCOR Partnership Annual Meeting on September 13–14 in Denver, Colorado. The annual meeting attracted 83 attendees representing 42 organizations from 12 states, the District of Columbia, and four Canadian provinces (Figure 3). Preparatory efforts included the following:
  - Updated the online agenda and sent an accompanying e-mail blast on August 9.
  - Sent an e-mail blast on August 17 regarding the hotel block deadline of August 21.
- On September 12, 2011, participated in the PCOR Partnership's Foundations of CCS Geology Workshop in Denver. This half-day introductory workshop was designed for everyone involved in or associated with CCS projects and provided an explanation of key geology concepts. The agenda is located online at www.undeerc.org/aboutus/pastevents/specialevents/pcor11/.
- On September 22, sent an e-mail to all partners with a link to the location of the annual meeting presentations on the partners-only Web site.
- Held an in-house annual meeting follow-up meeting.
- Began site and date selection process for the 2012 annual meeting. Preliminary plans are to hold it in September.
- Continued efforts toward populating and updating the partners' database, which was programmed in-house.

Figure 3. PCOR Partnership 2011 Annual Meeting attendees.

- Sent a letter proposal on August 26 addressing the creation of an advisory board.
- Participated in an in-house meeting to explore additional opportunities in Rival Field.
- Presented at the Lignite Technology Development Workshop on September 8 in Bismarck, North Dakota.
- Participated in project facilitation and planning meeting on July 19 and 20 with Spectra Energy on the Fort Nelson project in Vancouver, British Columbia.
- Attended the EORI Fifth Annual CO_2 Conference on July 13–14 in Casper, Wyoming.
- Participated in a conference call with Petroleum Technology Research Centre regarding the Aquistore project.
- Provided requested information on August 5 regarding both the Fort Nelson and Zama projects to the CSLF Technical Group for its gaps analysis that will be used for the update of the CSLF Technology Roadmap of 2010. The update is planned to take place in spring 2012.
- On August 2, received a copy of the U.S. Carbon Sequestration Council's paper entitled "Global Status of Geologic CO_2 Storage Technology Development."
- On August 12, submitted to DOE NETL the revised responses to the IEA Greenhouse Gas R&D Programme Expert Review Panel's comments and recommendations.
- Continued preparation of upcoming presentations, including the following:
  - Presentations for the Carbon Management Workshop on October 23 at the Air Quality VIII Conference in Arlington, Virginia.
  - "The PCOR Partnership: Large-Scale Demonstration Projects in the Central Interior of North America" to be presented on October 26 at the Air Quality VIII Conference in Arlington, Virginia.
  - "An Overview on CO_2 Storage Capacity Estimation" also to be presented on October 26 at the Air Quality VIII Conference (http://undeerc.org/aq8/eventschedule.aspx).
  - "Quantifying and Enhancing Storage Capacity" to be presented on October 19 during the Storage in Saline Formations R&D Workshop in Pittsburgh, Pennsylvania.
  - "PCOR Partnership" to be presented on November 17 at the Carbon Storage Program Infrastructure Annual Review Meeting in Pittsburgh, Pennsylvania.
- Submitted and received acceptance for several abstracts for the 2012 Carbon Management Technology Conference (CMTC) scheduled for February 2012.
- Continued preparation of papers due by November 21 for the 2012 CMTC, including the following:
  - (CMTC-151349-PP) "A Risk-Based Monitoring Plan for the Fort Nelson Feasibility Project"
  - (CMTC-151476-PP) "Integrating CO_2 Enhanced Oil Recovery (EOR) and CO_2 Storage in the Bell Creek Oil Field"
  - (CMTC-151566-PP) "Carbon Management Strategies: Commercial Deployment Studies Focused on CO_2 Capture and Storage and the Use of Biomass Fuels to Reduce Carbon Emissions"

- Deliverables and milestones completed in July included the following:
  - June monthly update
  - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
  - Task 14: M23 – Monthly Water Working Group (WWG) Conference Call Held
- Deliverables and milestones completed in August included the following:
  - July monthly update
  - Task 3: D29 – Permitting Action Plan
  - Task 9: D66 – Bell Creek Test Site – Simulation Report (executive summary only)
  - Task 9: D67 – Fort Nelson Test Site – Simulation Report (executive summary only)
  - Task 14: M23 – Monthly WWG Conference Call Held
- Deliverables and milestones completed in September included the following:
  - August monthly update
  - Task 1: D1 – Review of Source Attributes
  - Task 3: D4 – Permitting Review – Basic EPA Requirements
  - Task 1: D9 – Updated DSS
  - Task 2: D25 – Bell Creek Test Site Poster
  - Task 9: D50/M31 – Bell Creek Test Site – Characterization, Modeling, and Monitoring Plan
  - Task 14: M23 – Monthly WWG Conference Call Held
  - Task 16: M33 – Basal Cambrian Baseline Geological Characterization Completed

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

- All activities for Task 13 – Project Management are on schedule, and there were no problems or delays during the reporting period.

Task 14 – RCSP WWG Coordination

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

- Attended the PCOR Partnership Annual Meeting and Workshop held September 12–14 in Denver, Colorado.
- Distributed minutes from the June 23 conference call.
- Held the monthly conference calls on July 26 and August 24 and subsequently distributed the associated minutes. The requirement for a September conference call was waived by DOE.
- During the July 26 conference call, the following items were discussed:
  - Development of topical survey for distribution among identified stakeholder groups and items to assist the National Carbon Sequestration Database and Geographic Information System (NATCARB) project.
  - Began brainstorming survey questions.
  - Began identification of key database items for the NATCARB database request forum and identifying potential ranges of values.

- Updated the WWG overview presentation for a group member to use at the Mountain West Water Institute "Waters of the West Workshop" on July 19 in Salt Lake City, Utah.
- Reviewed changes to the Technology Gaps document.
- Contacted West Virginia University to discuss the WWG's feedback to NATCARB.
- Continued brainstorming survey questions and identifying key database items and potential ranges of values for the NATCARB database request forum.
- Charlie Gorecki accepted an invitation to present on the nexus of CCS and water in a session chaired by John Litynski at the CMTC scheduled for February 2012 (www.carbonmgmt.org).
- Formalized survey development and the associated distribution plan.

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

- On December 15, 2009, DOE waived the requirement for the water resource estimation methodology documents due February 2010 and May 2011. The fact sheet submitted April 30, 2010, replaced the former. An alternative report to replace the latter is still under consideration.

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

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

- Prepared a brief project update for the CSLF July 2011 SPIR.
- Held an in-house discussion on the initial geological model and use of Computer Modelling Group (CMG) software for flow modeling.
- Worked on preparation of data and construction of CMG simulation model for the "F" Pool using unconditional Petrel realizations.
- Worked on initial petrophysical analysis for the "F" Pool.
- Worked on populating the CMG simulation model with reservoir properties.
- Revised the WinProp pressure–volume–temperature model for improved predictions of minimum miscibility pressure.
- Completed the construction of the dynamic model using a single static realization, and started to run initial simulations.
- Prepared rock samples for XRD following removal from the batch reactor after a 14-day exposure period.
- Analyzed fluids from this reaction series to better understand its mass balance.
- Analyzed steel coupons, previously reacted, using XRD to determine the chemistry of the scale precipitated during the exposure period.
- Performed initial simulations for model validation and history match, and worked on the modification of different reservoir parameters for improving the predictions.
- Worked on collection and compilation of data for evaluation of deep saline formations.

- Submitted an abstract to the Eighteenth Society of Petroleum Engineers SPE Improved Oil Recovery Symposium entitled "Compositional Flow Simulation Study of Simultaneous Acid Gas EOR and CO_2 Storage at Apache's Zama F Pool."

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

- Apache Corporation was planning to divest certain conventional properties in Canada, including its EOR project in the Zama Field located in Alberta. Because of Apache's corporate planning strategies and personnel redistribution, efforts to initiate the seismic profiles, logging suites, and MVA activities have been delayed. The EERC continues to be optimistic that efforts to initiate the seismic profiles, logging suites, and MVA activities will be back on track soon. They were originally slated to begin in January 2011. An e-mail received in September from Apache Canada Ltd. stated that some decisions on how Apache is proceeding with Zama may be available in the next month or so.

Task 16 – Characterization of the Basal Cambrian System

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

- Submitted M33: "Basal Cambrian Baseline Geological Characterization Completed" on September 29 for review and approval.
- Continued acquisition of digital well logs.
- Continued efforts toward core calibration and revisions to the study area extent in southwestern and southern Montana.
- Participated in the Joint United States–Canada Basal Aquifer Project's technical and steering committees meeting held in conjunction with the PCOR Partnership Annual Meeting in Denver, Colorado, on September 14.
- Prepared a draft poster for discussion at the September 14 meeting.
- Submitted a poster abstract for the DOE Carbon Storage Program Infrastructure Meeting scheduled for November.
- Continued work on the deterministic model for the aquifer system.
- Held an in-house working group meeting on August 8 and September 7.
- Held an in-house project update meeting on August 22 and September 19.
- Updated a draft summary report that describes the CO_2 emission sources and their stream compositions.
- Work continues on the final preparation of the 2-D model of the basal aquifer system. The latest step involves integration of geothermal data to accurately estimate the density of CO_2 at the varying target depths across the study region.
- Presented on the normalization and calibration of the well logs to the core data at an in-house meeting held on September 27.

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

- Because of delays associated with the reallocation of program responsibilities and transfer of responsibility, initiation of CO_2 source characterization was delayed. Activity ramped up again in June 2011, and an in-house report detailing CO_2 emissions, likely stream compositions, and reference annotations was completed by August 31, 2011, instead of May 31, 2011.
- In order for an assessment of the general overall integrity of the system to be conducted (Subtask 16.4), it is necessary that the characterization and storage capacity evaluation need to be under way. Because the capacity evaluation did not begin until August 2011, the start date for the storage integrity assessment initiation was delayed until August 2011 as well. Initiation was originally set for May 2011.

PHASE III COST STATUS

The approved BP4 (Modification No. 21) budget along with actual costs incurred and in-kind cost share reported is shown in Table 3. A spending plan for BP4 and actual incurred cost by quarter of cash funds for BP4 are provided in Figure 4 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 3 and 4).

Table 3. Phase III Budget – BP4

Organization	Approved Budget, $	Actual Costs Incurred, $
DOE Share – Cash*	55,979,431	12,250,846
Nonfederal Share – Cash	2,411,971	1,061,833
Nonfederal Share – In-Kind	17,400,865	16,949,204
Total	75,792,267	30,261,883

*Does not include $1.5 M for Environmental Impact Statement.

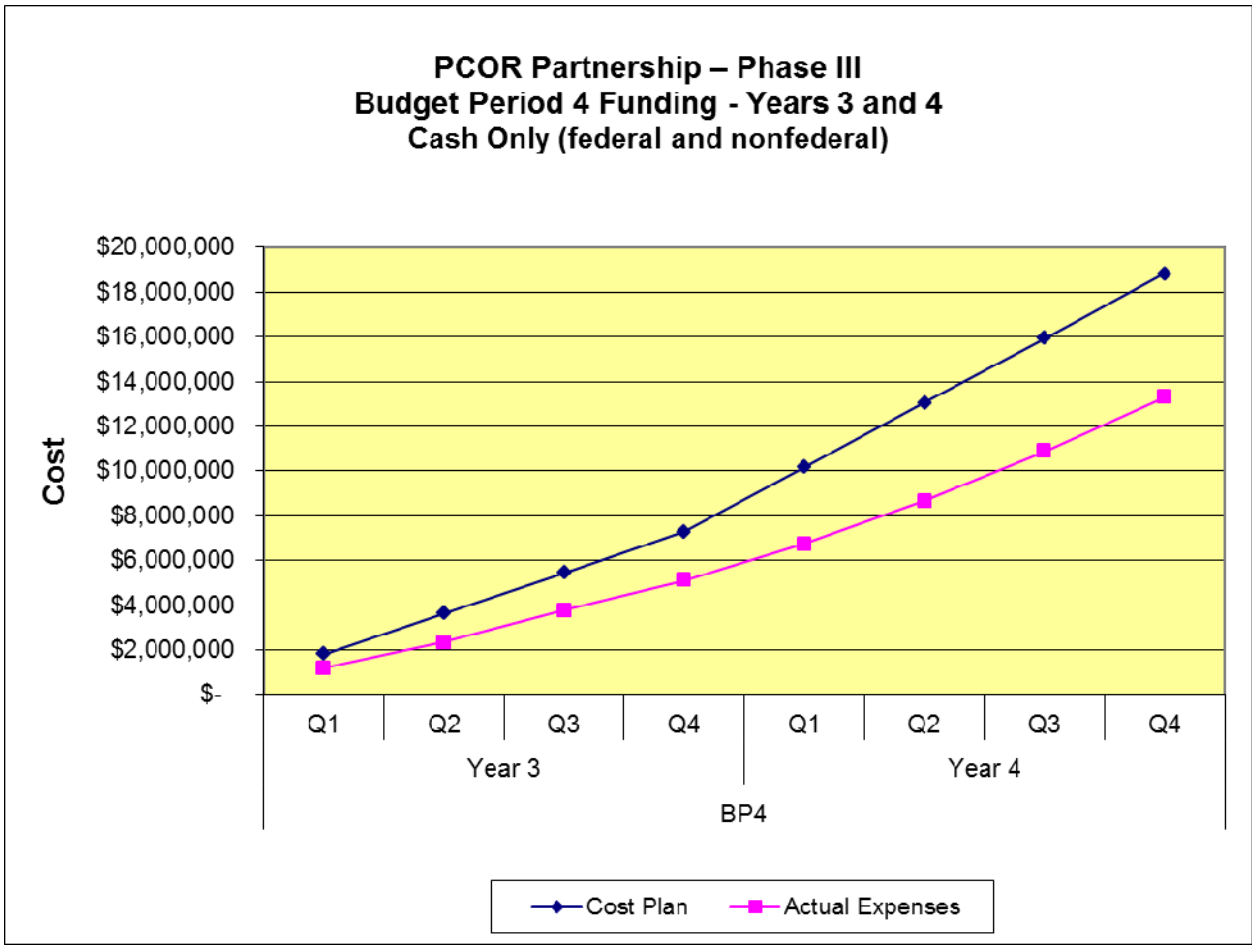

Figure 4. PCOR Partnership Phase III, BP4 – Years 3 and 4 funding (cash only).

Table 4. BP4 – Years 3 and 4 Spending Plan

	Year 3								Year 4							
Baseline Reporting Quarter	Q1		Q2		Q3		Q4		Q1		Q2		Q3		Q4	
	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total	Q1	Cum. BP Total	Q2	Cum. BP Total	Q3	Cum. BP Total	Q4	Cum. BP Total
Baseline Cost Plan																
Federal Share	$1,692,969	$ 1,692,969	$1,692,969	$ 3,385,938	$1,692,969	$ 5,078,906	$1,692,969	$ 6,771,875	$2,707,624	$ 9,479,499	$2,707,624	$12,187,123	$2,707,624	$14,894,747	$2,707,624	$17,602,371
NonFederal Share	$ 127,735	$ 127,735	$ 127,735	$ 255,470	$ 127,735	$ 383,204	$ 127,735	$ 510,939	$ 177,644	$ 688,583	$ 177,644	$ 866,227	$ 177,644	$ 1,043,871	$ 177,644	$ 1,221,515
Total Planned	$1,820,704	$ 1,820,704	$1,820,704	$ 3,641,407	$1,820,704	$ 5,462,111	$1,820,704	$ 7,282,814	$2,885,268	$10,168,082	$2,885,268	$13,053,350	$2,885,268	$15,938,618	$2,885,268	$18,823,886
Actual Incurred Cost																
Federal Share	$1,025,953	$ 1,025,953	$ 983,104	$ 2,009,057	$1,352,281	$ 3,361,338	$1,347,660	$ 4,708,998	$1,531,401	$ 6,240,399	$1,864,304	$ 8,104,703	$1,982,465	$10,087,168	$2,163,678	$12,250,846
NonFederal Share	$ 171,873	$ 171,873	$ 164,935	$ 336,808	$ 74,929	$ 411,737	$ 4,563	$ 416,300	$ 80,246	$ 496,546	$ 56,614	$ 553,160	$ 257,142	$ 810,302	$ 251,531	$ 1,061,833
Total Incurred Cost	$1,197,826	$ 1,197,826	$1,148,039	$ 2,345,865	$1,427,210	$ 3,773,075	$1,352,223	$ 5,125,298	$1,611,647	$ 6,736,945	$1,920,918	$ 8,657,863	$2,239,607	$10,897,470	$2,415,209	$13,312,679
Variance																
Federal Share	$ 667,016	$ 667,016	$ 709,865	$ 1,376,881	$ 340,688	$ 1,717,568	$ 345,309	$ 2,062,877	$1,176,223	$ 3,239,100	$ 843,320	$ 4,082,420	$ 725,159	$ 4,807,579	$ 543,946	$ 5,351,525
NonFederal Share	$ (44,138)	$ (44,138)	$ (37,200)	$ (81,339)	$ 52,806	$ (28,533)	$ 123,172	$ 94,639	$ 97,398	$ 192,037	$ 121,030	$ 313,067	$ (79,498)	$ 233,569	$ (73,887)	$ 159,682
Total Variance	$ 622,878	$ 622,878	$ 672,665	$ 1,295,542	$ 393,494	$ 1,689,036	$ 468,481	$ 2,157,516	$1,273,621	$ 3,431,137	$ 964,350	$ 4,395,487	$ 645,661	$ 5,041,148	$ 470,059	$ 5,511,207

Table 5. Phase III Milestones and Deliverables

Title/Description	Due Date	Actual Completion Date
Year 1 – Quarter 1 (October–December 2007)		
D37: Task 4 – Fort Nelson Test Site – Geological Characterization Experimental Design Package	12/31/07	12/28/07
D63: Task 13 – Project Management Plan	12/31/07	12/28/07
M17: Task 4 – Fort Nelson Test Site Selected	12/31/07	12/28/07
Year 1 – Quarter 2 (January–March 2008)		
D38: Task 4 – Fort Nelson Test Site – Geomechanical Experimental Design Package	1/31/08	1/31/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/08	1/31/08
D11: Task 2 – Outreach Plan	3/31/08	3/31/08
D27: Task 3 – Environmental Questionnaire – Fort Nelson Test Site	3/31/08	4/02/08
D30: Task 4 – Williston Basin Test Site – Geomechanical Experimental Design Package	3/31/08	3/31/08
M1: Task 1 – Three Target Areas Selected for Detailed Characterization	3/31/08	3/20/08
M18: Task 4 – Fort Nelson Test Site Geochemical Work Initiated	3/31/08	3/19/08
Year 1 – Quarter 3 (April–June 2008)		
D14: Task 2 – General Phase III Fact Sheet	4/30/08	4/30/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/08	4/30/08
D17: Task 2 – General Phase III Information PowerPoint Presentation	5/30/08	5/30/08
M3: Task 3 – Start Environmental Questionnaire for Williston Basin Test Site	6/30/08	6/27/08
M6: Task 4 – Williston Basin Test Site Geochemical Work Initiated	6/30/08	6/30/08
M7: Task 4 – Williston Basin Test Site Geological Characterization Data Collection Initiated	6/30/08	6/30/08
Year 1 – Quarter 4 (July–September 2008)		
D12: Task 2 – Demonstration Web Pages on the Public Site	7/31/08	7/31/08
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/08	7/31/08
D1: Task 1 – Review of Source Attributes	9/30/08	9/26/08
M2: Task 1 – Demonstration Project Reporting System (DPRS) Prototype Completed	9/30/08	9/26/08
Year 2 – Quarter 1 (October–December 2008)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/08	10/31/08
D20: Task 2 – Documentary Support to PowerPoint and Web Site	12/31/08	12/31/08
D57: Task 12 – Project Assessment Annual Report	12/31/08	12/31/08

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 2 – Quarter 2 (January–March 2009)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/09	1/30/09
M21: Task 14 – Outline of White Paper on Nexus of CO_2 Capture and Sequestration (CCS) and Water, Part Subtask 14.2 – White Paper on Nexus of CCS and Water	2/28/09	2/27/09
D24: Task 2 – PCOR Partnership Region Sequestration General Poster	3/31/09	3/31/09
Year 2 – Quarter 3 (April–June 2009)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/09	4/30/09
M23: Task 14 – Monthly WWG Conference Call Held	4/30/09	4/15/09
D2: Task 1 – First Target Area Completed	5/29/09	5/29/09
M23: Task 14 – Monthly WWG Conference Call Held	5/29/09	5/29/09
D16: Task 2 – Fort Nelson Test Site Fact Sheet	5/29/09	5/29/09
M24: Task 14 – WWG Annual Meeting Held	5/31/09	5/07/09
M23: Task 14 – Monthly WWG Conference Call Held	6/30/09	6/25/09
Year 2 – Quarter 4 (July–September 2009)		
M23: Task 14 – Monthly WWG Conference Call Held	N/A	Not required
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation	7/31/09	7/31/09
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/09	7/31/09
M22: Task 14 – Draft White Paper – Nexus of CCS and Water Available for Comments	8/17/09	8/18/09 (DOE) 8/21/09 (WWG)
M23: Task 14 – Monthly WWG Conference Call Held	8/31/09	8/25/09
D1: Task 1 – Review of Source Attributes	9/30/09	9/25/09
D3: Task 1 – Permitting Review – One State and One Province	9/30/09	9/30/09
D9: Task 1 – Updated DSS	9/30/09	9/29/09
D47: Task 6 – Report on the Preliminary Design of Advanced Compression Technology	9/30/09	9/30/09
D77: Task 13 – Risk Management Plan Outline	9/30/09	9/18/09
M4: Task 4 – Bell Creek Test Site Selected	9/30/09	9/30/09
M5: Task 4 – Bell Creek Test Site – Data Collection Initiated	9/30/09	9/30/09
M23: Task 14 – Monthly WWG Conference Call Held	9/30/09	9/22/09

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 3 – Quarter 1 (October–December 2009)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/30/09	11/02/09
D78: Task 14 – Final White Paper on the Nexus of CCS and Water	10/30/09	10/28/09
M23: Task 14 – Monthly WWG Conference Call Held	10/31/09	10/26/09
M23: Task 14 – Monthly WWG Conference Call Held	11/30/09	11/16/09
D57: Task 12 – Project Assessment Annual Report	12/31/09	12/31/09
M23: Task 14 – Monthly WWG Conference Call Held	12/31/09	Waived by DOE
Year 3 – Quarter 2 (January–March 2010)		
D13: Task 2 – Public Site Updates	1/15/10	1/15/10
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/10	1/29/10
M23: Task 14 – Monthly WWG Conference Call Held	1/31/10	1/6/10
D79: Task 14 – Water Resource Estimation Methodology Document	2/28/10	Waived by DOE
M23: Task 14 – Monthly WWG Conference Call Held	2/28/10	2/25/10
D11: Task 2 – Outreach Plan	3/31/10	3/31/10
M23: Task 14 – Monthly WWG Conference Call Held	3/31/10	3/23/10
Year 3 – Quarter 3 (April–June 2010)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/10	4/30/10
M23: Task 14 – Monthly WWG Conference Call Held	4/30/10	4/28/10
M23: Task 14 – Monthly WWG Conference Call Held	5/31/10	5/13/10
D17: Task 2 – General Phase III Information PowerPoint Presentation (update)	6/30/10	6/30/10
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (update)	6/30/10	6/29/10
M23: Task 14 – Monthly WWG Conference Call Held	6/30/10	6/23/10
M24: Task 14 – WWG Annual Meeting Held	6/30/10	5/13/10
Year 3 – Quarter 4 (July–September 2010)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/10	7/29/10
M23: Task 14 – Monthly WWG Conference Call Held	7/31/10	7/28/10
M23: Task 14 – Monthly WWG Conference Call Held	8/31/10	8/31/10
D1: Task 1 – Review of Source Attributes	9/30/10	9/20/10
D52: Task 9 – Fort Nelson Test Site – Site Characterization, Modeling, and Monitoring Plan	9/30/10	9/30/10
M9: Task 4 – Bell Creek Test Site Geological Model Development Initiated	9/30/10	9/30/10
M23: Task 14 – Monthly WWG Conference Call Held	9/30/10	Waived by DOE

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 4 – Quarter 1 (October–December 2010)		
D87: Task 4 – Bell Creek Test Site – Geomechanical Experimental Design Package	10/30/10	10/29/10
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/10	10/29/10
M23: Task 14 – Monthly WWG Conference Call Held	10/31/10	10/26/10
M23: Task 14 – Monthly WWG Conference Call Held	11/30/10	Waived by DOE
D57: Task 12 – Project Assessment Annual Report	12/31/10	12/23/10
M23: Task 14 – Monthly WWG Conference Call Held	12/31/10	12/13/10
Year 4 – Quarter 2 (January–March 2011)		
M8: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Initiated	1/15/11	1/14/11
D31: Task 4 – Bell Creek Test Site – Geological Characterization Experimental Design Package	1/31/11	1/27/11
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/11	1/31/11
M23: Task 14 – Monthly WWG Conference Call Held	1/31/11	1/19/11
M28: Task 4 – Bell Creek Geological Experimental Design Package Completed	1/31/11	1/27/11
D15: Task 2 – Bell Creek Test Site Fact Sheet	2/28/11	2/28/11
M23: Task 14 – Monthly WWG Conference Call Held	2/28/11	Waived by DOE
D10: Task 1 – Demonstration Project Reporting System Update	3/31/11	3/25/11
D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (Update)	3/31/11	3/31/11
D26: Task 2 – Fort Nelson Test Site Poster	3/31/11	3/31/11
D28: Task 3 – Environmental Questionnaire – Bell Creek Test Site	3/31/11	3/30/11
D85: Task 6 – Report – Opportunities and Challenges Associated with CO_2 Compression and Transportation During CCS Activities	3/31/11	3/31/11
M23: Task 14 – Monthly WWG Conference Call Held	3/31/11	3/22/11

Continued . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 4 – Quarter 3 (April–June 2011)		
M30: Task 5 – Bell Creek Test Site Baseline MVA Initiated	4/01/11	3/24/11
M23: Task 14 – Monthly WWG Conference Call Held	4/30/11	4/21/11
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/11	4/29/11
D88: Task 13 – Programmatic Risk Management Plan	4/30/11	4/29/11
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/11	5/31/11
D34: Task 4 – Bell Creek Test Site – Baseline Hydrogeological Final Report	5/31/11	5/31/11
M23: Task 14 – Monthly WWG Conference Call Held	5/31/11	5/5/11
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (Update)	6/30/11	6/30/11
M23: Task 14 – Monthly WWG Conference Call Held	6/30/11	6/23/11
M24: Task 14 – WWG Annual Meeting Held	6/30/11	5/5/11
Year 4 – Quarter 4 (July–September 2011)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/11	7/28/11
M23: Task 14 – Monthly WWG Conference Call Held	7/31/11	7/26/11
D29: Task 3 – Permitting Action Plan	8/31/11	8/31/11
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/11	8/31/11
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/11	8/31/11
M23: Task 14 – Monthly WWG Conference Call Held	8/31/11	8/24/11
D1: Task 1 – Review of Source Attributes	9/30/11	9/21/11
D4: Task 1 – Permitting Review – Basic EPA Requirements[+]	9/30/11	9/30/11
D9: Task 1 – Updated DSS	9/30/11	9/23/11
D25: Task 2 – Bell Creek Test Site Poster	9/30/11	9/30/11
D50: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan	9/30/11	9/30/11
M23: Task 14 – Monthly WWG Conference Call Held	9/30/11	Waived by DOE
M31: Task 9 – Bell Creek Test Site – Site Characterization, Modeling, and Monitoring Plan Completed	9/30/11	9/30/11
M33: Task 16 – Basal Cambrian Baseline Geological Characterization Completed	9/30/11	9/29/11

[+] Name change requested September28, 2011, and approved October 3, 2011.

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 5 – Quarter 1 (October–December 2011)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	10/31/11	
D65: Task 4 – Fort Nelson Test Site – Site Characterization Report	10/31/11	
M23: Task 14 – Monthly WWG Conference Call Held	10/31/11	
M29: Task 4 – Fort Nelson Site Characterization Report Completed	10/31/11	
M23: Task 14 – Monthly WWG Conference Call Held	11/30/11	
D41: Task 4 – Fort Nelson Test Site – Geochemical Final Report	12/15/11	
M32: Task 4 – Fort Nelson Geochemical Final Report Completed	12/15/11	
D57: Task 12 – Project Assessment Annual Report	12/31/11	
M23: Task 14 – Monthly WWG Conference Call Held	12/31/11	
M34: Task 16 – Basal Cambrian Static Geological Model Completed	12/31/11	
Year 5 – Quarter 2 (January–March 2012)		
M16: Task 4 – Bell Creek Test Site – Initiation of Production and Injection Simulation	1/13/12	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	1/31/12	
D81: Task 1 – Regional Carbon Sequestration Atlas (Update)	1/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	1/31/12	
D91: Task 16 – Report – Geological Characterization of the Basal Cambrian System in the Williston Basin	2/29/12	
M23: Task 14 – Monthly WWG Conference Call Held	2/29/12	
D5: Task 1 – Second Target Area Completed	3/31/12	
D18: Task 2 – Bell Creek Test Site PowerPoint Presentation (Update)	3/31/12	
M10: Task 4 – Bell Creek Test Site Wellbore Leakage Data Collection Completed	3/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	3/31/12	

Continued . . .

Table 5. Phase III Milestones and Deliverables (continued)

Title/Description	Due Date	Actual Completion Date
Year 5 – Quarter 3 (April–June 2012)		
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	4/30/12	
D86: Task 15 – Updated Regional Implementation Plan for Zama	4/30/12	
M23: Task 14 – Monthly WWG Conference Call Held	4/30/12	
D17: Task 2 – General Phase III Information PowerPoint Presentation (Update)	5/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	5/31/12	
D19: Task 2 – Fort Nelson Test Site PowerPoint Presentation (Update)	6/30/12	
D84: Task 6 – Report – A Phased Approach to Building Pipeline Network for CO_2 Transportation During CCS	6/30/12	
M23: Task 14 – Monthly WWG Conference Call Held	6/30/12	
M24: Task 14 – WWG Annual Meeting Held	6/30/12	
Year 5 – Quarter 4 (July–September 2012)		
D13: Task 2 – Public Site Updates	7/31/12	
D58/D59: Task 13 – Quarterly Progress Report/Milestone Quarterly Report	7/31/12	
D67: Task 9 – Fort Nelson Test Site – Simulation Report	7/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	7/31/12	
D66: Task 9 – Bell Creek Test Site – Simulation Report	8/31/12	
M23: Task 14 – Monthly WWG Conference Call Held	8/31/12	
D1: Task 1 – Review of Source Attributes	9/30/12	
D10: Task 1 – DPRS Update	9/30/12	
D42: Task 5 – Bell Creek Test Site – Injection Experimental Design Package	9/30/12	
D64: Task 4 – Bell Creek Test Site – Site Characterization Report	9/30/12	
D82: Task 6 –Report – Issues Associated with Integration of Advanced Compression Technology into a CO_2 Storage Project	9/30/12	
M23: Task 14 – Monthly WWG Conference Call Held	9/30/12	

Table 6. PCOR Partnership Phase III BP4, Years 3–4 Gantt Chart

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Table 6. PCOR Partnership Phase III BP4, Years 3–4 Gantt Chart (continued)

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Table 6. PCOR Partnership Phase III BP4, Years 3–4 Gantt Chart (continued)

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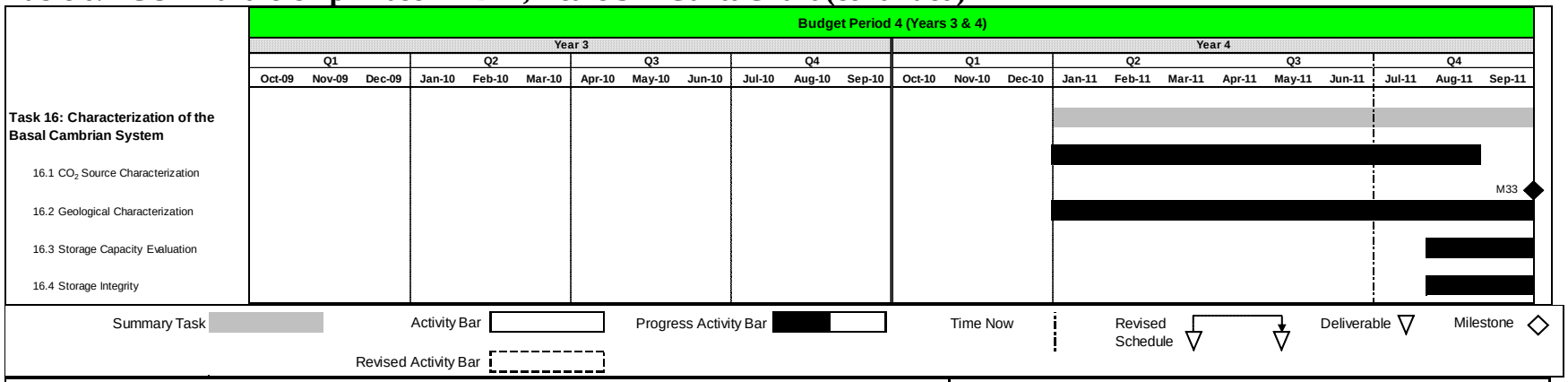
Table 6. PCOR Partnership Phase III BP4, Years 3–4 Gantt Chart (continued)



Key for Deliverables (D) ▼			
D1	Review of Source Attributes	D29	Permitting Action Plan
D4	Permitting Review – Basic EPA Requirements	D31	BC Test Site – Geological Characterization Experimental Design Package
D9	Updated DSS	D34	BC Test Site – Baseline Hydrogeological Experimental Design Package
D10	DPRS Update	D50	BC Test Site – Site Characterization, Modeling, and Monitoring Plan
D11	Outreach Plan	D52	FN Test Site – Site Characterization, Modeling, and Monitoring Plan
D13	Public Site Updates	D57	Project Assessment Annual Report
D15	Bell Creek (BC) Test Site Fact Sheet	D58	Quarterly Progress Report
D16	Fort Nelson (FN) Test Site Fact Sheet	D59	Milestone Quarterly Report
D17	General Phase III Information PowerPoint Presentation	D66	BC Test Site – Simulation Report
D18	BC Test Site PowerPoint Presentation	D67	FN Test Site – Simulation Report
D19	FN Test Site PowerPoint Presentation	D78	White Paper – Nexus of CCS and Water
D20	Video Support to PowerPoint and Web Site	D81	Regional Carbon Sequestration Atlas (update)
D24	PCOR Partnership Region CO_2 Storage General Poster	D85	Report – Opportunities and Challenges Associated with CO_2 Compression and Transportation During CCS Activities
D25	BC Test Site Poster		
D26	FN Test Site Poster	D87	BC Test Site – Geomechanical Experimental Design Package
D28	BC Test Site – Environmental Questionnaire	D88	Programmatic Risk Management Plan

Key for Milestones (M) ◆	
M8	BC Test Site – Wellbore Leakage Data Collection Initiated
M9	BC Test Site – Geological Model Development Initiated
M23	Monthly WWG Conference Call Held
M24	WWG Annual Meeting Held
M28	BC Test Site – Geological Characterization Experimental Design Package Completed
M30	BC Test Site – Baseline MVA Activities Initiated
M31	BC Test Site – Site Characterization, Modeling, and Monitoring Plan Completed
M33	Basal Cambrian Baseline Geological Characterization Completed

PHASE III PRODUCTS OR TECHNOLOGY TRANSFER ACTIVITIES

During the reporting period, there was one abstract accepted for presentation and nine presentations given at nine different meetings/conferences. In addition, nine deliverables, five milestones, and a quarterly progress report were completed.

Abstracts – Submitted

Braunberger, J.R., Bremer, J.M., Liu, G., Gorecki, C.D., Peck, W.D., Steadman, E.N., and Harju, J.A., 2011, Characterization, petrography, and static geologic modeling of an unconventional carbonate reservoir, intervals of the Midale and Rival "Nesson" beds in the Mississippian Madison Group, Burke County, North Dakota [abs.]: American Association of Petroleum Geologists (AAPG) 2012 Annual Convention & Exhibition, Long Beach, California, April 22–25, 2012.

Gorecki, C.D., Hamling, J.A., Steadman, E.N., and Harju, J.A., 2011, Integrating CO_2 EOR and CO_2 storage in the Bell Creek oil field [abs.]: 2012 Carbon Management Technology Conference, Orlando, Florida, February 7–9, 2012.

Gorecki, C.D., Sorensen, J.A., Klapperich, R.J., Botnen, L.S., Steadman, E.N., and Harju, J.A., 2011, A risk-based monitoring plan for the Fort Nelson CCS project [abs.]: 2012 Carbon Management Technology Conference, Orlando, Florida, February 7–9, 2012.

Knudsen, D.J., Peck, W.D., and Bachu, S., 2011, CO_2 storage characterization of the basal aquifer system in the northern Great Plains prairie region of North America [abs.]: American Association of Petroleum Geologists (AAPG) 2012 Annual Convention & Exhibition, Long Beach, California, April 22–25, 2012.

Knudsen, D.J., Saini, D., Gorecki, C.D., Peck, W.D., Sorensen, J.A., Steadman, E.N., and Harju, J.A., 2011, Using multiple-point statistics for conditioning a Zama pinnacle reef facies model to production history [abs.]: American Association of Petroleum Geologists (AAPG) 2012 Annual Convention & Exhibition, Long Beach, California, April 22–25, 2012.

Steadman, E.N., Harju, J.A., Gorecki, C.D., Pavlish, B.M., Jensen, M.D., Zygarlicke, C.J., and Anagnost, K.K., 2011, Carbon management strategies—commercial deployment studies focused on CO_2 capture and storage and the use of biomass fuels to reduce carbon emissions [abs.]: 2012 Carbon Management Technology Conference, Orlando, Florida, February 7–9, 2012.

Abstracts – Submitted and Accepted for Presentation

Peck, W.D., and Bachu, S., 2011, CO_2 storage characterization of the basal aquifer system in the northern plains – prairie region of North America [abs.]: U.S. Department of Energy (DOE) Carbon Storage Program Infrastructure Annual Review Meeting (Featuring DOE's Regional Carbon Sequestration Partnerships), Pittsburgh, Pennsylvania, November 15–17, 2011.

Presentations, Conference Papers, Posters, and Other Media

Daly, D.J., 2011, Plains CO_2 Reduction (PCOR) Partnership outreach and education: Presented at the Fort Nelson Quarterly Meeting, Vancouver, British Columbia, July 20–21, 2011.

Gorecki, C.D., 2011, Plains CO_2 Reduction (PCOR) Partnership update: Presented at the Plains CO_2 Reduction (PCOR) Partnership Annual Meeting, Denver, Colorado, September 13–14, 2011.

Hamling, J.A., 2011, Bell Creek CO_2 EOR and CO_2 storage demonstration project, Montana: Presented at the Plains CO_2 Reduction (PCOR) Partnership Annual Meeting, Denver, Colorado, September 13–14, 2011.

Kurz, B., 2011, Environmental fate, effects, and treatment of alkanolamines: their degradation products and associated chemicals: Presented at Health and Environmental Toxicity of Amines for Postcombustion Capture: Launching a Dialogue on Research Needs, Palo Alto, California, August 16–17, 2011.

Peck, W.D., 2011, Characterization of the basal aquifer system: Presented at the Plains CO_2 Reduction (PCOR) Partnership Annual Meeting, Denver, Colorado, September 13–14, 2011.

Peck, W.D., 2011, Geologic concepts and CCS: Presented at the Plains CO_2 Reduction (PCOR) Partnership Annual Meeting Workshop, Denver, Colorado, September 12, 2011.

Steadman, E.N. (author), and Hill, K. (presenter), 2011, Key issues presented in the identification of suitable storage sites for CO_2: Presented at Carbon Capture & Storage (CCS) World Australia 2011, Melbourne, Australia, August 30 – September 1, 2011.

Steadman, E.N., 2011, Plains CO_2 Reduction (PCOR) Partnership update: Presented to Nebraska Public Power District personnel, Grand Forks, North Dakota, July 28, 2011.

Steadman, E.N., 2011, The Plains CO_2 Reduction (PCOR) Partnership: Presented at the Lignite Technology Development Workshop, Bismarck, North Dakota, September 8, 2011.

Technical Reports

Crocker, C.R., Daly, D.J., Gorecki, C.D., and Steadman, E.N, 2011, Plains CO_2 Reduction Partnership (PCOR) general audience CO_2 sequestration outreach PowerPoint: Phase III Task 2 Deliverable D17 (Update 2) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Progress Reports, Meeting Minutes, and Project Management Documents

Klapperich, R.J., 2011, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: August 24.

Klapperich, R.J., 2011, Minutes—Regional Carbon Sequestration Partnership Water Working Group conference call: July 26.

Gorecki, C.D., Harju, J.A., Steadman, E.N., Romuld, L., Sorensen, J.A., Daly, D.J., Hamling, J.A., Jensen, M.D., Botnen, L.S., Klapperich, R.J., Peck, W.D., Anagnost, K.K., and Votava, T.J., 2011, Plains CO_2 Reduction Partnership Phase III: Task 13 Deliverable D58/59 quarterly technical progress report (April 1 – June 30, 2011) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592 and North Dakota Industrial Commission Contract Nos. FY08-LX111-162 and G-015-030, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Gorecki, C.D., Anagnost, K.K., and Klapperich, R.J., 2011, Plains CO_2 Reduction (PCOR) Partnership: Phase III monthly report (August 1–31, 2011) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Gorecki, C.D., Anagnost, K.K., and Klapperich, R.J., 2011, Plains CO_2 Reduction (PCOR) Partnership: Phase III monthly report (July 1–31, 2011) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, July.

Steadman, E.N., Peck, W.D., Daly, D.J., Botnen, L.S., Sorensen, J.A., Hamling, J.A., Jensen, M.D., Harju, J.A., Gorecki, C.D., Anagnost, K.K., and Klapperich, R.J., 2011, Plains CO_2 Reduction (PCOR) Partnership: Phase III monthly report (June 1–30, 2011) for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, June.

Draft Documents

Botnen, L.S., Gorecki, C.D., and Steadman, E.N., 2011, Permitting action plan: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 3 Deliverable D29 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2011-EERC-10-05, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Botnen, L.S., Gorecki, C.D., and Steadman, E.N., 2011, Permitting review – basic EPA requirements: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 3 Deliverable D4 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Buckley, T.D., Peck, W.D., Gorecki, C.D., and Steadman, E.N., 2011, Decision Support System Web site update: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 1 Deliverable D9 Update 2 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Daly, D.J., Crocker, C.R., Hamling, J.A., Gorecki, C.D., and Steadman, E.N., 2011, CO_2 emissions go to work to produce more oil: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 2 Deliverable D25 poster for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Jensen, M.D., Pei, P., Peck, W.D., Gorecki, C.D., and Steadman, E.N., 2011, Review of source attributes: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 1 Deliverable D1 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05BT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Klapperich, R.J., Gorecki, C.D., Hamling, J.A., Bremer, J.M., Steadman, E.N., and Harju, J.A., 2011, Bell Creek test site – characterization, modeling, and monitoring plan: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 9 Deliverable D50 and Milestone M31 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Liu, G., Gorecki, C.D., Bailey, T.P., Saini, D., Braunberger, J.R., Sorensen, J.A., and Steadman, E.N., 2011, Fort Nelson test site – simulation report: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 9 Deliverable D67 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

Peck, W.D., Sorensen, J.A., Gorecki, C.D., and Steadman, E.N., 2011, Basal Cambrian geological characterization completed: Plains CO_2 Reduction (PCOR) Partnership Phase III draft Task 16 Milestone M33 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

Pu, H., Hamling, J.A., Bailey, T.P., Braunberger, J.R., Ge, J., Gorecki, C.D., and Steadman, E.N., 2011, Bell Creek test site – simulation report: Plains CO_2 Reduction (PCOR) Partnership Phase III draft executive summary for Task 9 Deliverable D66 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, Grand Forks, North Dakota, Energy & Environmental Research Center, August.

MEETINGS/TRAVEL

Representatives from the PCOR Partnership participated in and/or presented at the following 15 meetings/conferences and six training opportunities in this reporting period:

- July 5–8, 2011: Situated two mobile trailers (field offices) at the Bell Creek Field in southeastern Montana.
- July 5–9, 2011: Traveled to begin soliciting landowner permissions for the baseline monitoring work in the Bell Creek Field area.
- July 8–15, 2011: Attended the Esri International User Conference and a preconference course entitled "Building Web Applications Using ArcGIS API for Flex" (www.esri.com/events/user-conference/agenda/index.html) in San Diego, California.
- July 10–13, 2011: Led an outcrop field trip near Hulett, Wyoming.
- July 12–14, 2011: Attended the EORI Fifth Annual CO_2 Conference in Casper, Wyoming.
- July 18–22, 2011: Participated in the facilitation and quarterly management meetings with Spectra Energy regarding the Fort Nelson CCS Project in Vancouver, British Columbia, Canada.
- July 20–27, 2011: Participated in meetings with oil and gas producers and the National Petroleum Council's Committee on Resource Development in Houston and The Woodlands, Texas.
- July 24–30, 2011: Traveled to continue construction of the Fort Nelson geological model to Calgary, Alberta, Canada.
- July 26–27, 2011: Participated in a meeting with Denbury at its headquarters in Plano, Texas.
- July 26–31, 2011: Attended the Esri training course entitled "Introduction to Geoprocessing Scripts Using Python (9.3)" in Vienna, Virginia (http://training.esri.com/gateway/index.cfm?fa=catalog.courseDetail&CourseID=50089911_9.X).
- August 1–5, 2011: Traveled to the Bell Creek Field and surrounding area in southeastern Montana to contact landowners regarding project activities.
- August 4–5, 2011: Traveled to the Bell Creek Field for a site visit.
- August 9–11, 2011: Participated in a risk assessment meeting for the Aquistore Project in Regina, Saskatchewan, Canada.
- August 14–20, 2011: Participated in the Eventbrite CO_2 Flooding School training and field trip in Casper, Wyoming.
- August 16–17, 2011: Presented at the EPRI Health and Environmental Toxicity of Amines for Post-Combustion Capture Conference in Palo Alto, California.
- August 16–19, 2011: Attended Esri Building Geodatabases training course in Broomfield, Colorado.
- August 21–26, 2011: Attended the 2011 CO_2 Capture Technology Meeting in Pittsburgh, Pennsylvania.
- August 27, 2011: Presented at the PPB master teacher training session in Fargo, North Dakota.

- September 5–9, 7–13, and 18–23, 2011: Traveled to the Lignite field validation test site (Phase II) for site work near Kenmare, North Dakota.
- September 8, 2011: Presented at the Lignite Technology Development Workshop in Bismarck, North Dakota.
- September 11–14, 2011: Held the 2011 PCOR Partnership Annual Meeting and Foundations of CCS Geology Workshop in Denver, Colorado.
- September 15, 2011: Held a Basal Aquifer Project meeting in Denver, Colorado.
- September 13–17, 2011: Participated in a 3-day PEICE training course entitled "Fundamentals of Reservoir Simulation" in Houston, Texas.
- September 17–22, 2011: Attended the 2011 Society of Core Analysts Symposium in Austin, Texas (www.regonline.com/custImages/239450/2011TechnicalProgram.pdf).
- September 19–22, 2011: Attended the IPIECA workshop entitled "Addressing the Remaining Gaps in Knowledge for CCS" in Washington, DC (www.ipieca.org/event/20110506/addressing-remaining-gaps-knowledge-ccs).
- September 20–23, 2011: Attended the North Dakota Petroleum Council annual meeting in Medora, North Dakota.
- September 24–29, 2011: Participated in Schlumberger's training course entitled "Petrel Reservoir Engineering 2011" in Houston, Texas.
- September 25–28, 2011: Attended the 2011 Ground Water Protection Council Annual Forum in Atlanta, Georgia (www.gwpc.org/meetings/forum/forum.htm).

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

REFERENCES

None.