EERC
Energy & Environmental Research Center

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January 30, 2006

AAD Document Control
U.S. Department of Energy
National Energy Technology Laboratory
PO Box 10940, MS 921-107
Pittsburgh, PA 15236-0940

Dear AAD Document Control:

Subject: Plains CO_2 Reduction (PCOR) Partnership Quarterly Technical Progress PowerPoint Presentation Update for the Period October 1 – December 31, 2005; DOE Cooperative Agreement No. DE-PS26-05NT42255; EERC Fund No. 9197

Enclosed are hard copies of the PCOR Partnership Quarterly Technical Progress PowerPoint Presentation and the Request for Patent Clearance Form for the PCOR Partnership Program. All of this information is also enclosed on a disk.

If you have any questions, please call me at (701) 777-5279 or e-mail at esteadman@undeerc.org.

Sincerely,

Edward N. Steadman
PCOR Partnership Manager
EERC Senior Research Advisor

ENS/slw

Enclosures

c/enc: John Litynski, NETL
PCOR Partnership Partners
Sheryl Landis, EERC (Patent Clearance Form)

DOE DISCLAIMER

EERC DISCLAIMER

University of North Dakota
Energy & Environmental Research Center
Plains CO_2 Reduction Partnership

Project Summary

DE-PS26-05NT42255

For Period October 1 – December 31, 2005

National Energy Technology Laboratory

Partnership Objectives

The Plains CO_2 Reduction (PCOR) Partnership is a collaborative regional framework to support the testing and demonstration of CO_2 sequestration technologies in the central interior of North America.

The PCOR Partnership project includes ten performance tasks:

- Task 1 – Project Management and Reporting
- Task 2 – Field Validation Test – Beaver Lodge, North Dakota
- Task 3 – Field Validation Test – Zama, Alberta
- Task 4 – Field Validation Test – Lignite in North Dakota
- Task 5 – Terrestrial Validation Test
- Task 6 – Continued Characterization of Regional Sequestration Opportunities
- Task 7 – Research, Safety, Regulatory, and Permitting Issues
- Task 8 – Public Outreach and Education
- Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment
- Task 10 – Regional Partnership Program Integration

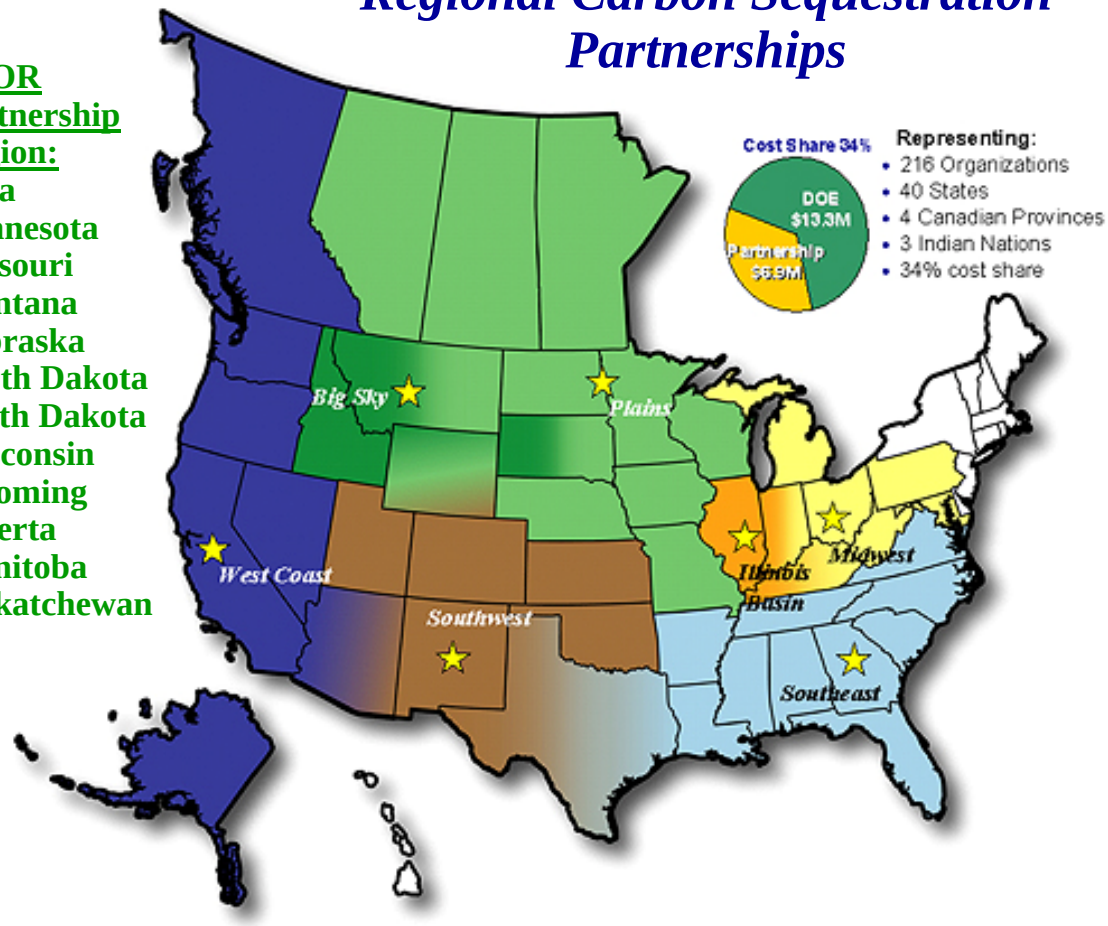
National Energy Technology Laboratory
Regional Carbon Sequestration Partnerships

PCOR Partnership Phase II Partners:

- ☆ University of North Dakota Energy & Environmental Research Center (EERC)
- Alberta Energy and Utilities Board
- Amerada Hess Corporation
- Apache Canada Ltd.
- Basin Electric Power Cooperative
- British Columbia Ministry of Energy, Mines and Petroleum Resources
- Center for Energy & Economic Development (CEED)
- Dakota Gasification Company
- Ducks Unlimited Canada
- Ducks Unlimited, Inc.
- Eagle Operating, Inc.
- Eastern Iowa Community College District
- Encore Acquisition Company
- Environment Canada
- Excelsior Energy, Inc.
- Fischer Oil and Gas, Inc.
- Great Northern Power Development, LP
- Great River Energy
- Interstate Oil and Gas Compact Commission
- Iowa Department of Natural Resources
- Lignite Energy Council
- Minnesota Power
- Minnkota Power Cooperative, Inc.
- Montana–Dakota Utilities Co.
- Montana Department of Environmental Quality
- Natural Resources Canada
- Nexant, Inc.
- North Dakota Department of Health
- North Dakota Geological Survey
- North Dakota Industrial Commission Department of Mineral Resources, Oil and Gas Division
- North Dakota Industrial Commission Lignite Research, Development and Marketing Program
- North Dakota Oil and Gas Research Council
- North Dakota Natural Resources Trust
- North Dakota Petroleum Council
- North Dakota State University
- Otter Tail Power Company
- Petroleum Technology Transfer Council
- Prairie Public Television
- Saskatchewan Industry and Resources
- SaskPower
- Western Governors' Association
- Wisconsin Department of Agriculture, Trade and Consumer Protection
- U.S. Geological Survey Northern Prairie Wildlife Research Center
- Xcel Energy

PCOR Partnership Region:

Iowa
Minnesota
Missouri
Montana
Nebraska
North Dakota
South Dakota
Wisconsin
Wyoming
Alberta
Manitoba
Saskatchewan



Partnership Team

Partner Name	City	State	Congressional District
University of North Dakota Energy & Environmental Research Center (EERC)	Grand Forks	North Dakota	At Large
Alberta Energy and Utilities Board	Edmonton, Alberta		
Amerada Hess Corporation	Williston	North Dakota	At Large
Apache Canada Ltd.	Calgary, Alberta		
Basin Electric Power Cooperative	Bismarck	North Dakota	At Large
British Columbia Ministry of Energy, Mines and Petroleum Resources	Victoria, British Columbia		
Center for Energy & Economic Development (CEED)	Alexandria	Virginia	8
Dakota Gasification Company	Bismarck	North Dakota	At Large
Ducks Unlimited Canada	Stonewall, Manitoba		
Ducks Unlimited, Inc.	Memphis	Tennessee	9
Eagle Operating, Inc.	Kenmare	North Dakota	At Large
Eastern Iowa Community College District	Davenport	Iowa	1
Encore Acquisition Company	Fort Worth	Texas	12
Environment Canada	Manitoba and Saskatchewan Provinces		
Excelsior Energy, Inc.	Minnetonka	Minnesota	3
Fischer Oil and Gas, Inc.	Grand Forks	North Dakota	At Large
Great Northern Power Development, LP	Townsend	Montana	At Large
Great River Energy	Elk River	Minnesota	6
Interstate Oil and Gas Compact Commission	Oklahoma City	Oklahoma	5
Iowa Department of Natural Resources	Iowa City	Iowa	2
Lignite Energy Council	Bismarck	North Dakota	At Large

Continued. . .

Partnership Team (cont.)

Partner Name	City	State	Congressional District
Minnesota Power	Duluth	Minnesota	8
Minnkota Power Cooperative, Inc.	Duluth	Minnesota	8
Montana–Dakota Utilities Co.	Bismarck	North Dakota	At Large
Montana Department of Environmental Quality	Helena	Montana	At Large
Natural Resources Canada	Ottawa, Ontario		
Nexant, Inc.	San Francisco	California	8
North Dakota Department of Health	Bismarck	North Dakota	At Large
North Dakota Geological Survey	Bismarck	North Dakota	At Large
North Dakota Industrial Commission Department of Mineral Resources, Oil and Gas Division	Bismarck	North Dakota	At Large
North Dakota Industrial Commission Lignite Research, Development and Marketing Program	Bismarck	North Dakota	At Large
North Dakota Natural Resources Trust	Bismarck	North Dakota	At Large
North Dakota Petroleum Council	Bismarck	North Dakota	At Large
North Dakota State University	Fargo	North Dakota	At Large
Otter Tail Power Company	Fergus Falls	Minnesota	7
Petroleum Technology Transfer Council	Houston	Texas	7
Prairie Public Television	Fargo	North Dakota	At Large
Saskatchewan Industry and Resources	Regina, Saskatchewan		
SaskPower	Regina, Saskatchewan		
Western Governors Association	Denver	Colorado	1
Wisconsin Department of Agriculture, Trade and Consumer Protection	Madison	Wisconsin	2
U.S. Geological Survey Northern Prairie Wildlife Research Center	Jamestown	North Dakota	At Large
Xcel Energy	Golden	Colorado	7

Partnership Principals

- ***Principal Investigator: Ed Steadman, EERC***
- ***Task Leaders***

  Task 1 – Project Management and Reporting – **Ed Steadman** and **John Harju**

  Task 2 – Field Validation Test – Beaver Lodge, North Dakota – **Jim Sorensen**

  Task 3 – Field Validation Test – Zama, Alberta – **Steve Smith**

  Task 4 – Field Validation Test – Lignite in North Dakota – **Ron Rovenko**

  Task 5 – Terrestrial Validation Test – **Barry Botnen**

  Task 6 – Continued Characterization of Regional Sequestration Opportunities – **Erin O'Leary**

  Task 7 – Research, Safety, Regulatory, and Permitting Issues – **Lisa Botnen**

  Task 8 – Public Outreach and Education – **Dan Daly**

  Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment – **Melanie Jensen**

  Task 10 – Regional Partnership Program Integration – **Ed Steadman**

- ***National Energy Technology Laboratory Project Manager: John Litynski***

Budget

Start Date	End Date	Government Cost	Performer Cost	Total Cost	Cost Share
10/1/05	9/30/09	$14,300,000	$7,161,549	$21,461,549	33%

- **U.S. Department of Energy (DOE) Costs to Date: $626,099**

- **Cost Share to Date: $16,856**

No in-kind cost share reposed yet.

Highlights of Progress to Date

Task 1 – Management and Reporting

Presented at and/or participated in the following meetings/conferences:

- Minneapolis, Minnesota, for Next-Generation Coal Technologies Practices, and Opportunities: Reconciling Coal, Climate, and Energy Security (October)
- Pittsburgh, Pennsylvania, for Regional Carbon Sequestration Partnerships Review Meeting (October)
- Bismarck, North Dakota, for 2005 Lignite Energy Council Annual Meeting (October)
- Minneapolis, Minnesota, for PCOR Phase I Wrap-Up/Phase II Kickoff Meeting (November)
- Denver, Colorado, for Coal Sequestration IV Forum (November)
- Bismarck, North Dakota, for a meeting with the North Dakota Industrial Commission (NDIC) Lignite Research Council and the NDIC Oil and Gas Division (November)
- Bismarck, North Dakota, for meeting with Ducks Unlimited, Inc., and U.S. Geological Survey Northern Prairie Wildlife Research Center (December)

Continued. . .

Highlights of Progress to Date (cont.)

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- Met with Amerada Hess Corporation personnel at the PCOR Partnership Phase II Kickoff Meeting in Minneapolis, Minnesota, in early November. Discussed a variety of technical issues related to the anticipated CO_2-flood enhanced oil recovery (EOR) project at the Beaver Lodge field.
- Initiated the development of the National Environmental Policy Act (NEPA) document for the Beaver Lodge field validation test.
- Initiated a literature search for readily available documents and data specifically related to the Beaver Lodge field.
- Initiated the development of an experimental design package for the Beaver Lodge field validation test.

Continued. . .

Highlights of Progress to Date (cont.)

Task 3 – Field Validation Test – Zama, Alberta

- DOE approved the Task 3 Zama Demonstration NEPA for Categorical Exclusion.
- The draft Experimental Design Package has been completed and is in review.
- Subcontractors are being obtained and contract negotiations are under way.
- Baseline fluid samples are being collected by Apache Canada Ltd. for initial characterization work.
- Injection of acid gas is anticipated to begin in February or March.

Continued. . .

Highlights of Progress to Date (cont.)

Task 4 – Field Validation Test – Lignite in North Dakota

- Well logs from several wells in North Dakota have been downloaded, and the individual coal seams were identified.
- Four areas have been selected for further investigation and will be evaluated for total coal thickness, drilling and leasing activity in the area, infrastructure proximity, and rock characteristics between seams.
- Published reports will be data-mined for information about permeability of the coals and surrounding lithology.
- An operator will be approached about the potential of drilling coalbed methane (CBM) wells in North Dakota.

Continued. . .

Highlights of Progress to Date (cont.)

Task 5 – Terrestrial Validation Test

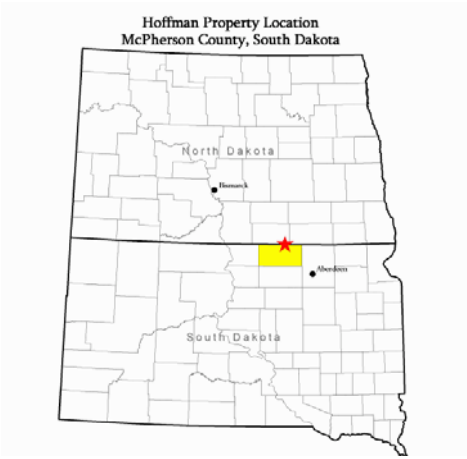
- Held initial Terrestrial Validation Test team meeting, Bismarck, North Dakota (December) with the following:
  - Ducks Unlimited, Inc.
  - U.S. Geological Survey Northern Prairie Wildlife Research Center
  - North Dakota State University (NDSU)
- Completing :
  - Experimental Design Package
  - NEPA Compliance Document
  - Site Health and Safety Plan
- Completing preliminary work on:
  - Outreach Action Plan
  - Gathering informational materials for Web site

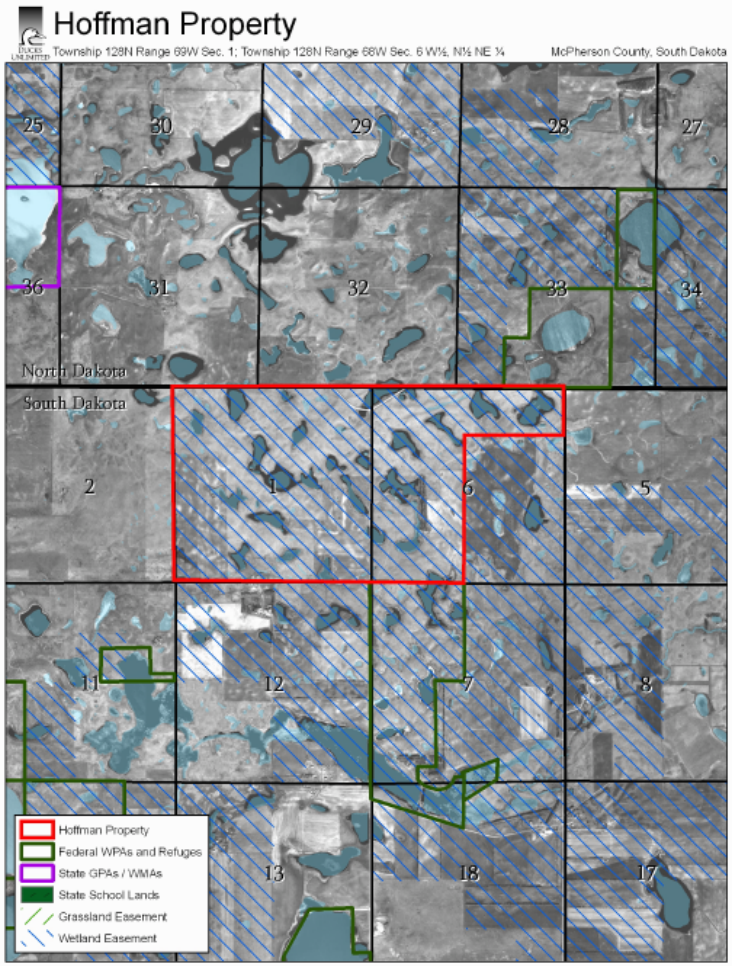
Continued. . .

Highlights of Progress to Date (cont.)

Task 5 – Terrestrial Validation Test

- In the process of selecting field test sites
  - Compiling characterization data
  - Restoration activities planned on the Hoffman property, McPherson County, South Dakota





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Highlights of Progress to Date (cont.)

Task 6 – Continued Characterization of Regional Sequestration Opportunities

- Continued preparing the data gap assessment report of the characterization performed in Phase I and the plans for Phase II characterization.
- Finalized subcontracts with NDSU and Fischer Oil and Gas, Inc.
- Purchased, installed, and received training on Spatial Database Engine (SDE) software, which will allow us to have greater flexibility and programming capabilities with the shape files.
- Developed a method to display shape files for both field and pool layers for the entire partnership region. We are currently displaying layers at the field level. The new pool layer will be displayed in two different colors, based on whether or not there is a CO_2 sequestration estimation for the pool.

Continued. . .

Highlights of Progress to Date (cont.)

Task 6 – Continued Characterization of Regional Sequestration Opportunities (cont.)

- Investigated methods to display data from other remote servers. We may use this method to keep data current.
- Worked on developing a method to create a porosity map for a selected horizon of a brine formation:
  - Used the Neurolog program to convert scanned well logs to a numerical representation of the log.
  - Used the numerical representation of the log in the Petra software package to create detailed porosity values for various stratigraphic intervals in individual wells.
- NDSU continued its analysis of the soils data collected in Phase I.
- Presented the Decision Support System (DSS) at the Pine to Prairie GIS (geographic information system) Users Group meeting in Fergus Falls, Minnesota (December 2005), and at the North Dakota GIS Users Conference (October 2005).
- Participated in the GIS Working group conference calls.
- Held a conference call with Bob Libra and others from the Iowa Geological Survey regarding their potential involvement in the regional characterization task. They will submit a proposal to us for review. During that call, we also discussed potential new members from the gas industry in Iowa.
- Heard from Rich Southwick (Great Northern Power Development, LP), who was extremely complimentary on our DSS. He used it, with great success, to brief his upper management team.

Continued. . .

Highlights of Progress to Date (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- Assisted in the development of NEPA documents for Task 5.
- Prepared regulatory data gap assessment for Phase I and outlined Phase II plans.
- Met with Field Validation Test task leaders to develop communication and support plans for regulatory issues.
- Continued to assess regulatory developments as they relate to CO_2 sequestration.

Continued. . .

Highlights of Progress to Date (cont.)

Task 8 – Public Outreach and Education

- Draft of Fact Sheet 6, Overview of Phase II activities, completed on schedule and sent to NETL for review December 30, 2005
- Prairie Public Television subcontract approval in progress
- Work under way on draft Outreach Plan (due to NETL February 28, 2006)
- Work under way on public Web site update (due August 2006)
- Work under way on Documentary 1 – Carbon Market Trading (due January 2007)
  - Preliminary video outline
  - Preliminary travel planning
  - Initiated background research activities
  - Initiated activities in support of travel to Brazil in January 2006
- Collaboration on Regional Carbon Sequestration Program (RCSP) Outreach Working Group activities

Continued. . .

Highlights of Progress to Date (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Reviewed existing data and performed an assessment on infrastructure information to identify areas for which additional data are needed.
- Hired a graduate student to assist with new source data collection, economic evaluation of capture/transportation/sequestration scenarios, and identification of new capture technologies and improvements in existing technologies.
- Initiated work on the new sequestration approaches subtask.
  - Calculations to better assess the concept of utilizing wind power to reduce the CO_2 emissions penalty on CO_2 compression were performed.
  - Discussions were initiated with Ramgen Power Systems and Cansolv Technologies Inc. to learn more about their compression and CO_2 capture technologies, respectively.

Continued. . .

Highlights of Progress to Date (cont.)

Task 10 – Regional Partnership Program Integration

- Abstracts were submitted for the 8th International Conference on Greenhouse Gas Control Technologies (GHGT-8) in Norway (June 19-23, 2006).
- Membership discussions continued with numerous organizations.
- Participation continued in geologic, outreach, capture and separation, and GIS working group conference calls.

Project Tasks and Status

Task 1 – Management and Reporting		
Activity	**Description**	**Status**
1	Design Project Management and Reporting Plan	Completed (December 30, 2005)
2	Perform Project Management	Ongoing
3	Develop PCOR Partnership Phase II Final Report	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
Activity	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 3 – Field Validation Test at Zama, Alberta		
Activity	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	On target for April 1 start date
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 4 – Field Validation Test of North Dakota Lignite		
Task	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 5 – Terrestrial Validation Test		
Task	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 6 – Characterization of Regional Characterization Opportunities		
Task	**Description**	**Status**
1	Regional Characterization Gap Assessment	Ongoing
2	Data Collection	Ongoing
3	Improvements to the PCOR Partnership Decision Support System	Ongoing
4	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues		
Task	**Description**	**Status**
1	Existing Regulations Related to the Sequestration of CO_2 Identified and Tracked	Ongoing
2	New Regulatory Guidelines Collated for Projects Implemented and Commercially Ready Future Sequestration Projects	Ongoing
3	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 8 – Public Outreach and Education		
Activity	**Description**	**Status**
1	Outreach Planning	In progress
2	Web Site	In progress
3	Outreach Booth	Will be initiated in Year 2, Quarter 1
4	Outreach PowerPoint	Will be initiated in Year 1, Quarter 2
5	Fact Sheets	Fact Sheet 6 completed
6	Television Programs	Documentary 1 – Carbon Market Trading, in progress
7	Progress Reports	Report for Year 1, Quarter 1, completed

Continued. . .

Project Tasks and Status (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
Task	**Description**	**Status**
1	Economic Assessment of Regional Sequestration Opportunities	In progress
2	New Sequestration Approaches	In progress
3	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 10 – Regional Partnership Program Integration		
Task	**Description**	**Status**
1	Development of Regional Partnership Program Integration Plan	Ongoing
2	Integration of Partnership Program Activities	Ongoing
3	Reporting	Ongoing

Project Milestones

Milestone	Description	Status
Task 1 – Management and Reporting		
1	Design Project Management and Reporting Plan	Completed (December 30, 2005)
2	Manage writing of Progress Report	Future activity
3	Provide overall project management	Ongoing
4	Provide Quarterly and Semiannual Reports	Ongoing
5	PCOR Partnership Phase I Wrap-Up/Phase II Kickoff Meeting	Completed (November 1–2, 2005)
Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
1	Finalization of site-specific monitoring, mitigation, and verification (MMV) plan	Ongoing
2	Initiation of baseline characterization activities	Future activity
3	Historical data collection	Future activity
4	Identification of data gaps	Future activity
5	Analytical activities on reservoir and caprock core samples	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 2 – Field Validation Test at Beaver Lodge, North Dakota (cont.)		
6	Identification of specific well locations within the Beaver Lodge field	Future activity
7	Facilitate the development of a site-specific plan for the installation and/or application of selected MMV technologies	Future activity
8	Facilitate the identification of infrastructure requirements	Future activity
9	Finalization of Amerada Hess Corporation CO_2 flood design	Future activity
10	Installation of CO_2 delivery system by Amerada Hess Corporation	Future activity
11	Collection of site-specific baseline surface and subsurface data	Future activity
12	Installation of CO_2 injection wells by Amerada Hess Corporation	Future activity
13	Progress reports 60 days prior to conclusion of Budget Period 1	Future activity
14	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 3 – Field Validation Test at Zama, Alberta		
1	H_2S/CO_2 injection commences	February to March time frame
2	Reservoir modeling	Future activity
3	Data acquisition and design	Ongoing
4	Geologic characterization of the region (northwestern Alberta/northeastern British Columbia)	Ongoing
5	Establish hydrogeology of the study area	Future activity
6	Conduct geomechanical tests of reservoir and caprock core samples to determine the mechanical integrity of those formations; results will be used to predict pressure that can be applied to pinnacle before the sealing formation will be fractured	Future activity
7	Significant achievements/MMV updates	Future activity
8	Stress regimes of the injection zone	Future activity
9	Assessment of influence of underlying aquifers	Future activity
10	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
11	Geochemistry of the surface to subsurface	Future activity
12	Assessment of leakage potential as a result of injection	Future activity
13	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 4 – Field Validation Test of North Dakota Lignite		
1	Initiation of baseline characterization activities	Completed (December 30, 2005)
2	Identification of specific well locations within the North Dakota lignite CBM test	Ongoing
3	Finalization of CO_2 flood design	Future activity
4	Collection of site-specific baseline surface and subsurface data	Future activity
5	Installation of selected MMV technologies	Ongoing
6	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
7	Finalization of site-specific MMV plan	Ongoing
8	Installation of CO_2 delivery system	Future activity
9	Installation of CO_2 injection wells	Future activity
10	Initial injection of CO_2 into subsurface	Future activity
11	Initial collection of MMV data	Future activity
12	Review and analysis of results of first year of operation	Future activity
13	Review and analysis of results of second year of operation	Future activity
14	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 5 – Terrestrial Validation Test		
1	Develop an experimental design package	Ongoing
2	Safety, regulatory, and permitting	Future activity
3	GIS modeling to extrapolate survey site information to region	Ongoing
4	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
5	Preparation and distribution of materials to solicit participation	Future activity
6	Indirect benefits	Ongoing
7	Regional partnerships for CO_2 sequestration	Future activity
8	Land use management practices that increase SOC	Future activity
9	Business flow process for carbon credit trading	Future activity
10	Economic feasibility of CO_2 sequestration	Future activity
11	Regional Technology Implementation Plan	Future activity
12	Compiling design criteria	Ongoing
13	Develop Web-based landowner outreach strategy	Future activity
14	Data compilation and analysis	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 6 – Characterization of Regional Characterization Opportunities		
1	Conduct DSS data gap assessment	Ongoing
2	Place updated DSS into production	Future activity
3	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
4	Conduct data gap assessment	Future activity
5	Create field project data warehouse and put into production	Future activity
Task 7 – Research, Safety, Regulatory, and Permitting Issues		
1	Provide regulatory support to Tasks 3 and 5 field validation testing	Ongoing
2	Provide summary of regulations related to four Phase II validation tests	Ongoing
3	Provide regulatory input to Progress Report	Future activity
4	Provide regulatory support to Tasks 2 and 4	Ongoing
5	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
6	Road map document produced	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 8 – Public Outreach and Education		
1	Fact sheet production	Fact Sheet 6 completed
2	Outreach Action Plan produced	In progress
3	PowerPoint presentation produced	Future activity
4	Update to PCOR Partnership Web site	In progress
5	First Phase II video produced with Prairie Public Television (PPTV) (carbon credit trading)	In progress
6	Outreach booth produced	Future activity
7	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
8	Second Phase II video produced with PPTV (terrestrial)	Future activity
9	Third Phase II video produced with PPTV (geologic)	Future activity
10	Fourth Phase II video produced with PPTV (CO_2 sequestration overview)	Future activity
11	Best Practices Manual detailing outreach activities	Future activity
12	Balancing the regional and general outreach with needs at the specific field validation test locations	Ongoing
13	Keeping regional outreach activity in tune with the national RCSP program message and goals	Ongoing

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 8 – Public Outreach and Education (cont.)		
14	Ensuring appropriate feedback opportunities for input and review by partners in the outreach process	Ongoing
15	Documentation of impact of outreach activities	Future activity
Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
1	Economic assessment of regional sequestration opportunities	Ongoing
2	New sequestration approaches – wind power	Ongoing
3	New sequestration approaches – Excelsior Energy	Future activity
4	Economic assessment of regional sequestration opportunities	Future activity
5	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
Task 10 – Regional Partnership Program Integration		
1	Development of Regional Partnership Program Integration Plan	Ongoing
2	PCOR Partnership Annual Meeting	Completed (November 1–2, 2005)
3	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
4	Participation in DOE Regional Partnership Working Groups	Ongoing

Project Recognition

Meetings/Conferences

- Bismarck, North Dakota, for meeting with the NDIC Lignite Research Council and the NDIC Oil and Gas Division (November)
- Bismarck, North Dakota, for meeting with Ducks Unlimited, Inc., and U.S. Geological Survey Northern Prairie Wildlife Research Center (December)
- Evansville, Indiana, to attend a Petroleum Technology Transfer Council (PTTC) meeting; visited with ISGS and Indiana Geological Survey about CO_2 sequestration project (November)
- Minneapolis, Minnesota, for PCOR Phase I Wrap-Up/Phase II Kickoff Meeting (November)
- Denver, Colorado, for Coal Sequestration IV Forum (November)
- Galveston, Texas, for the Society of Petroleum Engineers Applied Technology Workshop (SPE ATW) on CO_2 Sequestration (November)
- Calgary, Alberta, for meeting with Apache Canada Ltd. (December)
- Fergus Falls, Minnesota, for invited presentation of DSS at the Pine to Prairie GIS Users Group (December)
- Bismarck, North Dakota, for presentation of the DSS at the North Dakota GIS Users Conference (October)
- Calgary, Alberta, for meeting with Task 3 subcontractors and Apache Canada Ltd. (January)
- Minneapolis, Minnesota, for Next-Generation Coal Technologies Practices and Opportunities: Reconciling Coal, Climate, and Energy Security (October)
- Pittsburgh, Pennsylvania, for Regional Carbon Sequestration Partnerships Review Meeting (October)
- Bismarck, North Dakota, for 2005 Lignite Energy Council Annual Meeting (October)

Project Deliverables

Deliverable	Description	Status
Task 1 – Management and Reporting		
1	Project Management Plan	Completed (December 30, 2005)
2	Quarterly reports	Ongoing
3	Continuation application for Budget Period 2	Future activity
4	Attendance/presentations at technical meetings	Ongoing
5	PCOR Partnership meetings/workshops	Ongoing
6	PCOR Partnership Phase II Final Report	Future activity
Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
1	Experimental design package and NEPA compliance document	Ongoing
2	Site health and safety plan	Future activity
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Future activity
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 3 – Field Validation Test at Zama, Alberta		
1	Experimental design package and NEPA compliance document	Ongoing (NEPA approved for categorical exclusion)
2	Site health and safety plan	Ongoing
3	Outreach action plan	Ongoing
4	Regulatory permitting action plan	Ongoing
5	Sampling protocols	Ongoing
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity
Task 4 – Field Validation Test of North Dakota Lignite		
1	Experimental design package and NEPA compliance document	Future activity
2	Site health and safety plan	Future activity
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Future activity
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 5 – Terrestrial Validation Test		
1	Experimental design package and NEPA compliance document	Ongoing
2	Site health and safety plan	Ongoing
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Ongoing
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity
Task 6 – Characterization of Regional Characterization Opportunities		
1	Regional characterization gap assessment – budget period 1	Future activity
2	Progress report	Future activity
3	Regional characterization gap assessment – budget period 2	Future activity
4	Regional atlas	Future activity
Task 7 – Research, Safety, Regulatory, and Permitting Issues		
1	Progress report	Future activity
2	Road map document	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 8 – Public Outreach and Education		
1	Fact sheets	Fact Sheet 6 completed; Fact Sheets 7, 8, 9, and 10 future activities
2	Outreach action plan	In progress
4	PowerPoint presentations	Future activity
5	Videos	Documentary 1 in progress; Documentaries 2, 3, and 4 future activities
6	Web site update	In progress
7	Outreach booth	Future activity
8	Progress report	Year 1, Quarter 1 report completed
Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
1	Best Practices Manual – Regional Sequestration Opportunities	Future activity
2	Best Practices Manual – Excelsior Energy, Inc.	Future activity
3	Best Practices Manual – Wind Energy	Future activity
4	Progress report	Future activity
Task 10 – Regional Partnership Program Integration		
1	Regional Partnership Program Integration Plan	Ongoing
2	Progress report	Ongoing

Next Steps

Task 1 – Management and Reporting

- Continue to ensure timely production of deliverables and overall project

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- Finalization of Amerada Hess CO_2-flood EOR pilot project plans
- Identification of specific site location within the Beaver Lodge field where CO_2 injection and EOR activities will be conducted
- Identification of potential subcontractors for selected MMV activities

Continued. . .

Next Steps (cont.)

Task 3 – Field Validation Test – Zama, Alberta

- Get subcontracts in place for all parties involved in Task 3
- Finalize all project design phase work
- Complete experimental design package by February 28, 2006
- Complete site health and safety plan and regulatory permitting action plan by March 3, 2006
- Commence project implementation April 2006

Task 4 – Field Validation Test – North Dakota Lignite

- Select area that indicates CBM potential in lignite
- Develop contract with operator to drill four test wells

Continued. . .

Next Steps (cont.)

Task 5 – Terrestrial Validation Test

- Complete:
  - Experimental design package
  - NEPA compliance document
  - Site health and safety plan
  - Regulatory permitting action plan

Task 6 – Characterization of Regional Sequestration Opportunities

- Complete data gap assessment
- Update DSS with new pool layer
- Collect terrestrial data on present carbon sequestration values for U.S. forestry and urban trees; search for similar data in Canadian provinces
- Prepare estimates for terrestrial carbon sequestration potential for Nebraska cropland
- Continue development of template for non-EOR geologic characterization

Continued. . .

Next Steps (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- Provide support to Field Validation Test task leaders as NEPA compliance documents, site health and safety plans, and experimental design packages are developed
- Continue to assess regulatory developments
- Review regulations and begin summary related to Phase II validation tests

Task 8 – Public Outreach and Education

- Complete outreach plan (due February 28)
- Secure documentary footage from Brazil
- Plan and prepare materials for European video travel and interviews
- Collaborate on the abstract and text of the RCSP outreach working group (OWG) paper for the Fifth Carbon Capture and Sequestration Meeting, May 2006
- Collaborate on the RCSP OWG video clips (due Spring 2006)
- Continue preparations for Web update (due August 31)
- Initiate work on Fact Sheet 7 (due July 31)
- Initiate work on the outreach PowerPoint presentation (due May 30)

Continued. . .

Next Steps (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Prepare paper for presentation at 5th Annual Conference on Carbon Capture and Sequestration on use of wind power to reduce emissions penalty during CO_2 compression
- Explore opportunities to test Cansolv CO_2 capture technology and the Ramgen compression technology
- Compare existing source data with updated data sets from the U.S. Environmental Protection Agency (EPA) and others
- Collect missing infrastructure data to fill DSS data gaps

Task 10 – Regional Partnership Integration

- Develop Regional Partnership Program Integration Plan

Upcoming Issues

Task 1 – Management and Reporting

- None anticipated at this time

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- None anticipated at this time

Task 3 – Field Validation Test – Zama, Alberta

- None anticipated at this time

Continued. . .

Upcoming Issues (cont.)

Task 4 – Field Validation Test – North Dakota lignite

- Have operator drill wells by summer/fall 2006 to initiate program

Task 5 – Terrestrial Validation Test

- None anticipated at this time

Task 6 – Characterization of Regional Sequestration Opportunities

- None anticipated at this time

Continued. . .

Upcoming Issues (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- None anticipated at this time

Task 8 – Public Outreach and Education

- Balancing OWG and PCOR Partnership activities
- Optimizing film and interview opportunities during foreign travel for Documentary 1
- Ensuring coordinated outreach to general public and test sites

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Finding venues to demonstrate Cansolv Technologies Inc. and Ramgen Power Systems, if appropriate

Task 10 – Regional Partnership Integration

- None anticipated at this time

University of North Dakota
Energy & Environmental Research Center
Plains CO_2 Reduction Partnership

Project Summary

DE-PS26-05NT42255

For Period October 1 – December 31, 2005

National Energy Technology Laboratory

Partnership Objectives

The Plains CO_2 Reduction (PCOR) Partnership is a collaborative regional framework to support the testing and demonstration of CO_2 sequestration technologies in the central interior of North America.

The PCOR Partnership project includes ten performance tasks:

- Task 1 – Project Management and Reporting
- Task 2 – Field Validation Test – Beaver Lodge, North Dakota
- Task 3 – Field Validation Test – Zama, Alberta
- Task 4 – Field Validation Test – Lignite in North Dakota
- Task 5 – Terrestrial Validation Test
- Task 6 – Continued Characterization of Regional Sequestration Opportunities
- Task 7 – Research, Safety, Regulatory, and Permitting Issues
- Task 8 – Public Outreach and Education
- Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment
- Task 10 – Regional Partnership Program Integration

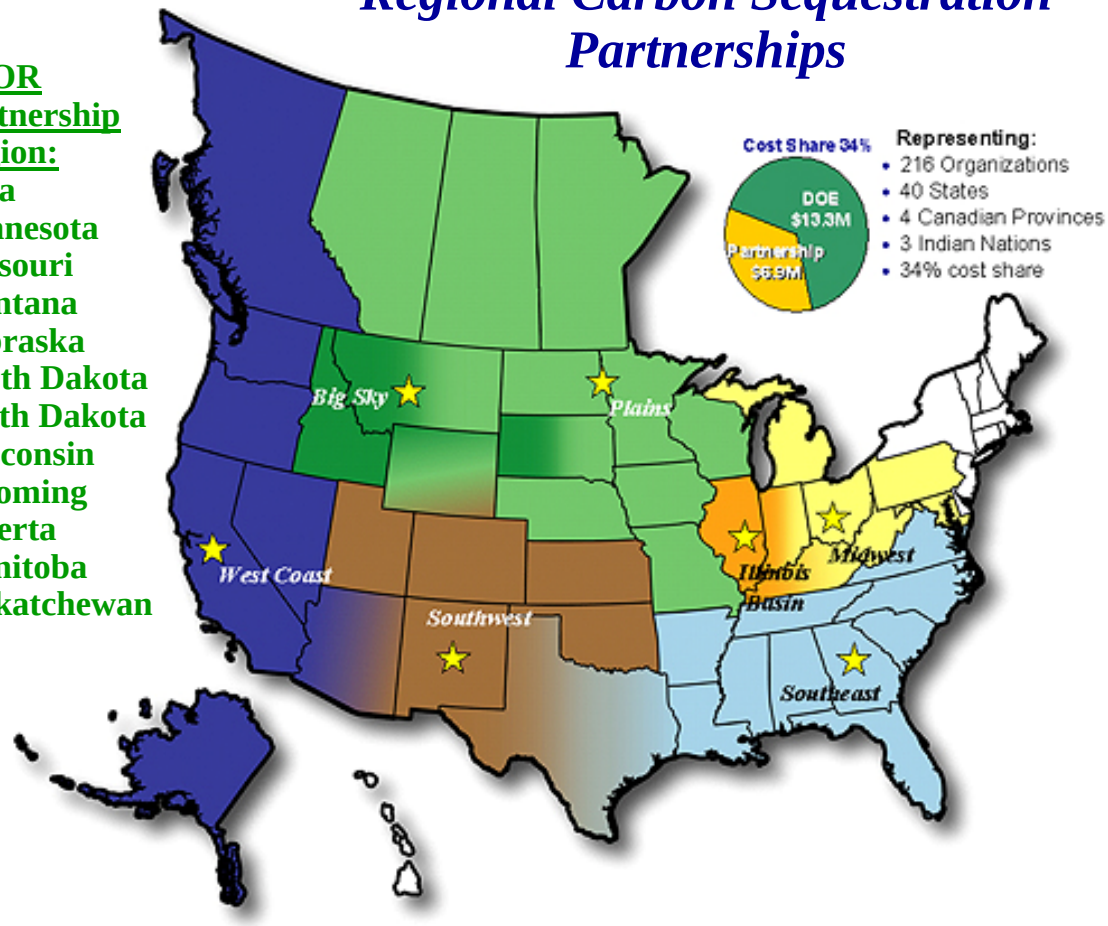
National Energy Technology Laboratory
Regional Carbon Sequestration Partnerships

PCOR Partnership Phase II Partners:

- ☆ University of North Dakota Energy & Environmental Research Center (EERC)
- Alberta Energy and Utilities Board
- Amerada Hess Corporation
- Apache Canada Ltd.
- Basin Electric Power Cooperative
- British Columbia Ministry of Energy, Mines and Petroleum Resources
- Center for Energy & Economic Development (CEED)
- Dakota Gasification Company
- Ducks Unlimited Canada
- Ducks Unlimited, Inc.
- Eagle Operating, Inc.
- Eastern Iowa Community College District
- Encore Acquisition Company
- Environment Canada
- Excelsior Energy, Inc.
- Fischer Oil and Gas, Inc.
- Great Northern Power Development, LP
- Great River Energy
- Interstate Oil and Gas Compact Commission
- Iowa Department of Natural Resources
- Lignite Energy Council
- Minnesota Power
- Minnkota Power Cooperative, Inc.
- Montana–Dakota Utilities Co.
- Montana Department of Environmental Quality
- Natural Resources Canada
- Nexant, Inc.
- North Dakota Department of Health
- North Dakota Geological Survey
- North Dakota Industrial Commission Department of Mineral Resources, Oil and Gas Division
- North Dakota Industrial Commission Lignite Research, Development and Marketing Program
- North Dakota Oil and Gas Research Council
- North Dakota Natural Resources Trust
- North Dakota Petroleum Council
- North Dakota State University
- Otter Tail Power Company
- Petroleum Technology Transfer Council
- Prairie Public Television
- Saskatchewan Industry and Resources
- SaskPower
- Western Governors' Association
- Wisconsin Department of Agriculture, Trade and Consumer Protection
- U.S. Geological Survey Northern Prairie Wildlife Research Center
- Xcel Energy

PCOR Partnership Region:

Iowa
Minnesota
Missouri
Montana
Nebraska
North Dakota
South Dakota
Wisconsin
Wyoming
Alberta
Manitoba
Saskatchewan



Partnership Team

Partner Name	City	State	Congressional District
University of North Dakota Energy & Environmental Research Center (EERC)	Grand Forks	North Dakota	At Large
Alberta Energy and Utilities Board	Edmonton, Alberta		
Amerada Hess Corporation	Williston	North Dakota	At Large
Apache Canada Ltd.	Calgary, Alberta		
Basin Electric Power Cooperative	Bismarck	North Dakota	At Large
British Columbia Ministry of Energy, Mines and Petroleum Resources	Victoria, British Columbia		
Center for Energy & Economic Development (CEED)	Alexandria	Virginia	8
Dakota Gasification Company	Bismarck	North Dakota	At Large
Ducks Unlimited Canada	Stonewall, Manitoba		
Ducks Unlimited, Inc.	Memphis	Tennessee	9
Eagle Operating, Inc.	Kenmare	North Dakota	At Large
Eastern Iowa Community College District	Davenport	Iowa	1
Encore Acquisition Company	Fort Worth	Texas	12
Environment Canada	Manitoba and Saskatchewan Provinces		
Excelsior Energy, Inc.	Minnetonka	Minnesota	3
Fischer Oil and Gas, Inc.	Grand Forks	North Dakota	At Large
Great Northern Power Development, LP	Townsend	Montana	At Large
Great River Energy	Elk River	Minnesota	6
Interstate Oil and Gas Compact Commission	Oklahoma City	Oklahoma	5
Iowa Department of Natural Resources	Iowa City	Iowa	2
Lignite Energy Council	Bismarck	North Dakota	At Large

Continued. . .

Partnership Team (cont.)

Partner Name	City	State	Congressional District
Minnesota Power	Duluth	Minnesota	8
Minnkota Power Cooperative, Inc.	Duluth	Minnesota	8
Montana–Dakota Utilities Co.	Bismarck	North Dakota	At Large
Montana Department of Environmental Quality	Helena	Montana	At Large
Natural Resources Canada	Ottawa, Ontario		
Nexant, Inc.	San Francisco	California	8
North Dakota Department of Health	Bismarck	North Dakota	At Large
North Dakota Geological Survey	Bismarck	North Dakota	At Large
North Dakota Industrial Commission Department of Mineral Resources, Oil and Gas Division	Bismarck	North Dakota	At Large
North Dakota Industrial Commission Lignite Research, Development and Marketing Program	Bismarck	North Dakota	At Large
North Dakota Natural Resources Trust	Bismarck	North Dakota	At Large
North Dakota Petroleum Council	Bismarck	North Dakota	At Large
North Dakota State University	Fargo	North Dakota	At Large
Otter Tail Power Company	Fergus Falls	Minnesota	7
Petroleum Technology Transfer Council	Houston	Texas	7
Prairie Public Television	Fargo	North Dakota	At Large
Saskatchewan Industry and Resources	Regina, Saskatchewan		
SaskPower	Regina, Saskatchewan		
Western Governors Association	Denver	Colorado	1
Wisconsin Department of Agriculture, Trade and Consumer Protection	Madison	Wisconsin	2
U.S. Geological Survey Northern Prairie Wildlife Research Center	Jamestown	North Dakota	At Large
Xcel Energy	Golden	Colorado	7

Partnership Principals

- ***Principal Investigator: Ed Steadman, EERC***
- ***Task Leaders***

  Task 1 – Project Management and Reporting – **Ed Steadman** and **John Harju**

  Task 2 – Field Validation Test – Beaver Lodge, North Dakota – **Jim Sorensen**

  Task 3 – Field Validation Test – Zama, Alberta – **Steve Smith**

  Task 4 – Field Validation Test – Lignite in North Dakota – **Ron Rovenko**

  Task 5 – Terrestrial Validation Test – **Barry Botnen**

  Task 6 – Continued Characterization of Regional Sequestration Opportunities – **Erin O'Leary**

  Task 7 – Research, Safety, Regulatory, and Permitting Issues – **Lisa Botnen**

  Task 8 – Public Outreach and Education – **Dan Daly**

  Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment – **Melanie Jensen**

  Task 10 – Regional Partnership Program Integration – **Ed Steadman**

- ***National Energy Technology Laboratory Project Manager: John Litynski***

Budget

Start Date	End Date	Government Cost	Performer Cost	Total Cost	Cost Share
10/1/05	9/30/09	$14,300,000	$7,161,549	$21,461,549	33%

- **U.S. Department of Energy (DOE) Costs to Date: $626,099**

- **Cost Share to Date: $16,856**

No in-kind cost share reposed yet.

Highlights of Progress to Date

Task 1 – Management and Reporting

Presented at and/or participated in the following meetings/conferences:

- Minneapolis, Minnesota, for Next-Generation Coal Technologies Practices, and Opportunities: Reconciling Coal, Climate, and Energy Security (October)
- Pittsburgh, Pennsylvania, for Regional Carbon Sequestration Partnerships Review Meeting (October)
- Bismarck, North Dakota, for 2005 Lignite Energy Council Annual Meeting (October)
- Minneapolis, Minnesota, for PCOR Phase I Wrap-Up/Phase II Kickoff Meeting (November)
- Denver, Colorado, for Coal Sequestration IV Forum (November)
- Bismarck, North Dakota, for a meeting with the North Dakota Industrial Commission (NDIC) Lignite Research Council and the NDIC Oil and Gas Division (November)
- Bismarck, North Dakota, for meeting with Ducks Unlimited, Inc., and U.S. Geological Survey Northern Prairie Wildlife Research Center (December)

Continued. . .

Highlights of Progress to Date (cont.)

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- Met with Amerada Hess Corporation personnel at the PCOR Partnership Phase II Kickoff Meeting in Minneapolis, Minnesota, in early November. Discussed a variety of technical issues related to the anticipated CO_2-flood enhanced oil recovery (EOR) project at the Beaver Lodge field.
- Initiated the development of the National Environmental Policy Act (NEPA) document for the Beaver Lodge field validation test.
- Initiated a literature search for readily available documents and data specifically related to the Beaver Lodge field.
- Initiated the development of an experimental design package for the Beaver Lodge field validation test.

Continued. . .

Highlights of Progress to Date (cont.)

Task 3 – Field Validation Test – Zama, Alberta

- DOE approved the Task 3 Zama Demonstration NEPA for Categorical Exclusion.
- The draft Experimental Design Package has been completed and is in review.
- Subcontractors are being obtained and contract negotiations are under way.
- Baseline fluid samples are being collected by Apache Canada Ltd. for initial characterization work.
- Injection of acid gas is anticipated to begin in February or March.

Continued. . .

Highlights of Progress to Date (cont.)

Task 4 – Field Validation Test – Lignite in North Dakota

- Well logs from several wells in North Dakota have been downloaded, and the individual coal seams were identified.
- Four areas have been selected for further investigation and will be evaluated for total coal thickness, drilling and leasing activity in the area, infrastructure proximity, and rock characteristics between seams.
- Published reports will be data-mined for information about permeability of the coals and surrounding lithology.
- An operator will be approached about the potential of drilling coalbed methane (CBM) wells in North Dakota.

Continued. . .

Highlights of Progress to Date (cont.)

Task 5 – Terrestrial Validation Test

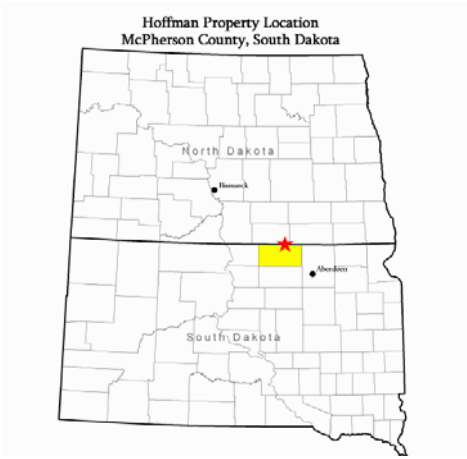
- Held initial Terrestrial Validation Test team meeting, Bismarck, North Dakota (December) with the following:
  - Ducks Unlimited, Inc.
  - U.S. Geological Survey Northern Prairie Wildlife Research Center
  - North Dakota State University (NDSU)
- Completing :
  - Experimental Design Package
  - NEPA Compliance Document
  - Site Health and Safety Plan
- Completing preliminary work on:
  - Outreach Action Plan
  - Gathering informational materials for Web site

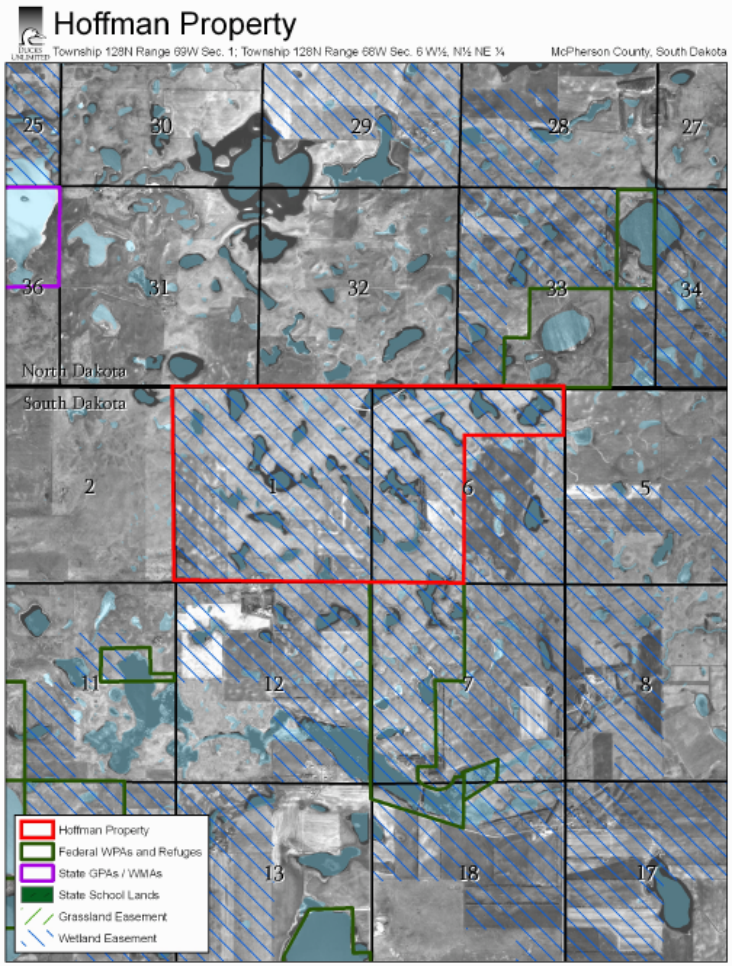
Continued. . .

Highlights of Progress to Date (cont.)

Task 5 – Terrestrial Validation Test

- In the process of selecting field test sites
  - Compiling characterization data
  - Restoration activities planned on the Hoffman property, McPherson County, South Dakota





Continued. . .

Highlights of Progress to Date (cont.)

Task 6 – Continued Characterization of Regional Sequestration Opportunities

- Continued preparing the data gap assessment report of the characterization performed in Phase I and the plans for Phase II characterization.
- Finalized subcontracts with NDSU and Fischer Oil and Gas, Inc.
- Purchased, installed, and received training on Spatial Database Engine (SDE) software, which will allow us to have greater flexibility and programming capabilities with the shape files.
- Developed a method to display shape files for both field and pool layers for the entire partnership region. We are currently displaying layers at the field level. The new pool layer will be displayed in two different colors, based on whether or not there is a CO_2 sequestration estimation for the pool.

Continued. . .

Highlights of Progress to Date (cont.)

Task 6 – Continued Characterization of Regional Sequestration Opportunities (cont.)

- Investigated methods to display data from other remote servers. We may use this method to keep data current.
- Worked on developing a method to create a porosity map for a selected horizon of a brine formation:
  - Used the Neurolog program to convert scanned well logs to a numerical representation of the log.
  - Used the numerical representation of the log in the Petra software package to create detailed porosity values for various stratigraphic intervals in individual wells.
- NDSU continued its analysis of the soils data collected in Phase I.
- Presented the Decision Support System (DSS) at the Pine to Prairie GIS (geographic information system) Users Group meeting in Fergus Falls, Minnesota (December 2005), and at the North Dakota GIS Users Conference (October 2005).
- Participated in the GIS Working group conference calls.
- Held a conference call with Bob Libra and others from the Iowa Geological Survey regarding their potential involvement in the regional characterization task. They will submit a proposal to us for review. During that call, we also discussed potential new members from the gas industry in Iowa.
- Heard from Rich Southwick (Great Northern Power Development, LP), who was extremely complimentary on our DSS. He used it, with great success, to brief his upper management team.

Continued. . .

Highlights of Progress to Date (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- Assisted in the development of NEPA documents for Task 5.
- Prepared regulatory data gap assessment for Phase I and outlined Phase II plans.
- Met with Field Validation Test task leaders to develop communication and support plans for regulatory issues.
- Continued to assess regulatory developments as they relate to CO_2 sequestration.

Continued. . .

Highlights of Progress to Date (cont.)

Task 8 – Public Outreach and Education

- Draft of Fact Sheet 6, Overview of Phase II activities, completed on schedule and sent to NETL for review December 30, 2005
- Prairie Public Television subcontract approval in progress
- Work under way on draft Outreach Plan (due to NETL February 28, 2006)
- Work under way on public Web site update (due August 2006)
- Work under way on Documentary 1 – Carbon Market Trading (due January 2007)
  - Preliminary video outline
  - Preliminary travel planning
  - Initiated background research activities
  - Initiated activities in support of travel to Brazil in January 2006
- Collaboration on Regional Carbon Sequestration Program (RCSP) Outreach Working Group activities

Continued. . .

Highlights of Progress to Date (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Reviewed existing data and performed an assessment on infrastructure information to identify areas for which additional data are needed.
- Hired a graduate student to assist with new source data collection, economic evaluation of capture/transportation/sequestration scenarios, and identification of new capture technologies and improvements in existing technologies.
- Initiated work on the new sequestration approaches subtask.
  - Calculations to better assess the concept of utilizing wind power to reduce the CO_2 emissions penalty on CO_2 compression were performed.
  - Discussions were initiated with Ramgen Power Systems and Cansolv Technologies Inc. to learn more about their compression and CO_2 capture technologies, respectively.

Continued. . .

Highlights of Progress to Date (cont.)

Task 10 – Regional Partnership Program Integration

- Abstracts were submitted for the 8th International Conference on Greenhouse Gas Control Technologies (GHGT-8) in Norway (June 19-23, 2006).
- Membership discussions continued with numerous organizations.
- Participation continued in geologic, outreach, capture and separation, and GIS working group conference calls.

Project Tasks and Status

Task 1 – Management and Reporting		
Activity	**Description**	**Status**
1	Design Project Management and Reporting Plan	Completed (December 30, 2005)
2	Perform Project Management	Ongoing
3	Develop PCOR Partnership Phase II Final Report	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
Activity	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 3 – Field Validation Test at Zama, Alberta		
Activity	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	On target for April 1 start date
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 4 – Field Validation Test of North Dakota Lignite		
Task	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Future activity

Continued. . .

Project Tasks and Status (cont.)

Task 5 – Terrestrial Validation Test		
Task	**Description**	**Status**
1	Project Design	Ongoing
2	Project Implementation	Future activity
3	Project Operations	Future activity
4	Closeout and Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 6 – Characterization of Regional Characterization Opportunities		
Task	**Description**	**Status**
1	Regional Characterization Gap Assessment	Ongoing
2	Data Collection	Ongoing
3	Improvements to the PCOR Partnership Decision Support System	Ongoing
4	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues		
Task	**Description**	**Status**
1	Existing Regulations Related to the Sequestration of CO_2 Identified and Tracked	Ongoing
2	New Regulatory Guidelines Collated for Projects Implemented and Commercially Ready Future Sequestration Projects	Ongoing
3	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 8 – Public Outreach and Education		
Activity	**Description**	**Status**
1	Outreach Planning	In progress
2	Web Site	In progress
3	Outreach Booth	Will be initiated in Year 2, Quarter 1
4	Outreach PowerPoint	Will be initiated in Year 1, Quarter 2
5	Fact Sheets	Fact Sheet 6 completed
6	Television Programs	Documentary 1 – Carbon Market Trading, in progress
7	Progress Reports	Report for Year 1, Quarter 1, completed

Continued. . .

Project Tasks and Status (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
Task	**Description**	**Status**
1	Economic Assessment of Regional Sequestration Opportunities	In progress
2	New Sequestration Approaches	In progress
3	Reporting	Ongoing

Continued. . .

Project Tasks and Status (cont.)

Task 10 – Regional Partnership Program Integration		
Task	**Description**	**Status**
1	Development of Regional Partnership Program Integration Plan	Ongoing
2	Integration of Partnership Program Activities	Ongoing
3	Reporting	Ongoing

Project Milestones

Milestone	Description	Status
Task 1 – Management and Reporting		
1	Design Project Management and Reporting Plan	Completed (December 30, 2005)
2	Manage writing of Progress Report	Future activity
3	Provide overall project management	Ongoing
4	Provide Quarterly and Semiannual Reports	Ongoing
5	PCOR Partnership Phase I Wrap-Up/Phase II Kickoff Meeting	Completed (November 1–2, 2005)
Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
1	Finalization of site-specific monitoring, mitigation, and verification (MMV) plan	Ongoing
2	Initiation of baseline characterization activities	Future activity
3	Historical data collection	Future activity
4	Identification of data gaps	Future activity
5	Analytical activities on reservoir and caprock core samples	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 2 – Field Validation Test at Beaver Lodge, North Dakota (cont.)		
6	Identification of specific well locations within the Beaver Lodge field	Future activity
7	Facilitate the development of a site-specific plan for the installation and/or application of selected MMV technologies	Future activity
8	Facilitate the identification of infrastructure requirements	Future activity
9	Finalization of Amerada Hess Corporation CO_2 flood design	Future activity
10	Installation of CO_2 delivery system by Amerada Hess Corporation	Future activity
11	Collection of site-specific baseline surface and subsurface data	Future activity
12	Installation of CO_2 injection wells by Amerada Hess Corporation	Future activity
13	Progress reports 60 days prior to conclusion of Budget Period 1	Future activity
14	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 3 – Field Validation Test at Zama, Alberta		
1	H_2S/CO_2 injection commences	February to March time frame
2	Reservoir modeling	Future activity
3	Data acquisition and design	Ongoing
4	Geologic characterization of the region (northwestern Alberta/northeastern British Columbia)	Ongoing
5	Establish hydrogeology of the study area	Future activity
6	Conduct geomechanical tests of reservoir and caprock core samples to determine the mechanical integrity of those formations; results will be used to predict pressure that can be applied to pinnacle before the sealing formation will be fractured	Future activity
7	Significant achievements/MMV updates	Future activity
8	Stress regimes of the injection zone	Future activity
9	Assessment of influence of underlying aquifers	Future activity
10	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
11	Geochemistry of the surface to subsurface	Future activity
12	Assessment of leakage potential as a result of injection	Future activity
13	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 4 – Field Validation Test of North Dakota Lignite		
1	Initiation of baseline characterization activities	Completed (December 30, 2005)
2	Identification of specific well locations within the North Dakota lignite CBM test	Ongoing
3	Finalization of CO_2 flood design	Future activity
4	Collection of site-specific baseline surface and subsurface data	Future activity
5	Installation of selected MMV technologies	Ongoing
6	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
7	Finalization of site-specific MMV plan	Ongoing
8	Installation of CO_2 delivery system	Future activity
9	Installation of CO_2 injection wells	Future activity
10	Initial injection of CO_2 into subsurface	Future activity
11	Initial collection of MMV data	Future activity
12	Review and analysis of results of first year of operation	Future activity
13	Review and analysis of results of second year of operation	Future activity
14	Regional Technology Implementation Plan detailing MMV activities at an ongoing oil-producing facility	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 5 – Terrestrial Validation Test		
1	Develop an experimental design package	Ongoing
2	Safety, regulatory, and permitting	Future activity
3	GIS modeling to extrapolate survey site information to region	Ongoing
4	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
5	Preparation and distribution of materials to solicit participation	Future activity
6	Indirect benefits	Ongoing
7	Regional partnerships for CO_2 sequestration	Future activity
8	Land use management practices that increase SOC	Future activity
9	Business flow process for carbon credit trading	Future activity
10	Economic feasibility of CO_2 sequestration	Future activity
11	Regional Technology Implementation Plan	Future activity
12	Compiling design criteria	Ongoing
13	Develop Web-based landowner outreach strategy	Future activity
14	Data compilation and analysis	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 6 – Characterization of Regional Characterization Opportunities		
1	Conduct DSS data gap assessment	Ongoing
2	Place updated DSS into production	Future activity
3	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
4	Conduct data gap assessment	Future activity
5	Create field project data warehouse and put into production	Future activity
Task 7 – Research, Safety, Regulatory, and Permitting Issues		
1	Provide regulatory support to Tasks 3 and 5 field validation testing	Ongoing
2	Provide summary of regulations related to four Phase II validation tests	Ongoing
3	Provide regulatory input to Progress Report	Future activity
4	Provide regulatory support to Tasks 2 and 4	Ongoing
5	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
6	Road map document produced	Future activity

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 8 – Public Outreach and Education		
1	Fact sheet production	Fact Sheet 6 completed
2	Outreach Action Plan produced	In progress
3	PowerPoint presentation produced	Future activity
4	Update to PCOR Partnership Web site	In progress
5	First Phase II video produced with Prairie Public Television (PPTV) (carbon credit trading)	In progress
6	Outreach booth produced	Future activity
7	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
8	Second Phase II video produced with PPTV (terrestrial)	Future activity
9	Third Phase II video produced with PPTV (geologic)	Future activity
10	Fourth Phase II video produced with PPTV (CO_2 sequestration overview)	Future activity
11	Best Practices Manual detailing outreach activities	Future activity
12	Balancing the regional and general outreach with needs at the specific field validation test locations	Ongoing
13	Keeping regional outreach activity in tune with the national RCSP program message and goals	Ongoing

Continued. . .

Project Milestones (cont.)

Milestone	Description	Status
Task 8 – Public Outreach and Education (cont.)		
14	Ensuring appropriate feedback opportunities for input and review by partners in the outreach process	Ongoing
15	Documentation of impact of outreach activities	Future activity
Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
1	Economic assessment of regional sequestration opportunities	Ongoing
2	New sequestration approaches – wind power	Ongoing
3	New sequestration approaches – Excelsior Energy	Future activity
4	Economic assessment of regional sequestration opportunities	Future activity
5	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
Task 10 – Regional Partnership Program Integration		
1	Development of Regional Partnership Program Integration Plan	Ongoing
2	PCOR Partnership Annual Meeting	Completed (November 1–2, 2005)
3	Progress Report 60 days prior to conclusion of Budget Period 1	Future activity
4	Participation in DOE Regional Partnership Working Groups	Ongoing

Project Recognition

Meetings/Conferences

- Bismarck, North Dakota, for meeting with the NDIC Lignite Research Council and the NDIC Oil and Gas Division (November)
- Bismarck, North Dakota, for meeting with Ducks Unlimited, Inc., and U.S. Geological Survey Northern Prairie Wildlife Research Center (December)
- Evansville, Indiana, to attend a Petroleum Technology Transfer Council (PTTC) meeting; visited with ISGS and Indiana Geological Survey about CO_2 sequestration project (November)
- Minneapolis, Minnesota, for PCOR Phase I Wrap-Up/Phase II Kickoff Meeting (November)
- Denver, Colorado, for Coal Sequestration IV Forum (November)
- Galveston, Texas, for the Society of Petroleum Engineers Applied Technology Workshop (SPE ATW) on CO_2 Sequestration (November)
- Calgary, Alberta, for meeting with Apache Canada Ltd. (December)
- Fergus Falls, Minnesota, for invited presentation of DSS at the Pine to Prairie GIS Users Group (December)
- Bismarck, North Dakota, for presentation of the DSS at the North Dakota GIS Users Conference (October)
- Calgary, Alberta, for meeting with Task 3 subcontractors and Apache Canada Ltd. (January)
- Minneapolis, Minnesota, for Next-Generation Coal Technologies Practices and Opportunities: Reconciling Coal, Climate, and Energy Security (October)
- Pittsburgh, Pennsylvania, for Regional Carbon Sequestration Partnerships Review Meeting (October)
- Bismarck, North Dakota, for 2005 Lignite Energy Council Annual Meeting (October)

Project Deliverables

Deliverable	Description	Status
Task 1 – Management and Reporting		
1	Project Management Plan	Completed (December 30, 2005)
2	Quarterly reports	Ongoing
3	Continuation application for Budget Period 2	Future activity
4	Attendance/presentations at technical meetings	Ongoing
5	PCOR Partnership meetings/workshops	Ongoing
6	PCOR Partnership Phase II Final Report	Future activity
Task 2 – Field Validation Test at Beaver Lodge, North Dakota		
1	Experimental design package and NEPA compliance document	Ongoing
2	Site health and safety plan	Future activity
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Future activity
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 3 – Field Validation Test at Zama, Alberta		
1	Experimental design package and NEPA compliance document	Ongoing (NEPA approved for categorical exclusion)
2	Site health and safety plan	Ongoing
3	Outreach action plan	Ongoing
4	Regulatory permitting action plan	Ongoing
5	Sampling protocols	Ongoing
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity
Task 4 – Field Validation Test of North Dakota Lignite		
1	Experimental design package and NEPA compliance document	Future activity
2	Site health and safety plan	Future activity
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Future activity
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 5 – Terrestrial Validation Test		
1	Experimental design package and NEPA compliance document	Ongoing
2	Site health and safety plan	Ongoing
3	Outreach action plan	Future activity
4	Regulatory permitting action plan	Future activity
5	Sampling protocols	Ongoing
6	Progress report	Future activity
7	Regional Technology Implementation Plan	Future activity
Task 6 – Characterization of Regional Characterization Opportunities		
1	Regional characterization gap assessment – budget period 1	Future activity
2	Progress report	Future activity
3	Regional characterization gap assessment – budget period 2	Future activity
4	Regional atlas	Future activity
Task 7 – Research, Safety, Regulatory, and Permitting Issues		
1	Progress report	Future activity
2	Road map document	Future activity

Continued. . .

Project Deliverables (cont.)

Deliverable	Description	Status
Task 8 – Public Outreach and Education		
1	Fact sheets	Fact Sheet 6 completed; Fact Sheets 7, 8, 9, and 10 future activities
2	Outreach action plan	In progress
4	PowerPoint presentations	Future activity
5	Videos	Documentary 1 in progress; Documentaries 2, 3, and 4 future activities
6	Web site update	In progress
7	Outreach booth	Future activity
8	Progress report	Year 1, Quarter 1 report completed
Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment		
1	Best Practices Manual – Regional Sequestration Opportunities	Future activity
2	Best Practices Manual – Excelsior Energy, Inc.	Future activity
3	Best Practices Manual – Wind Energy	Future activity
4	Progress report	Future activity
Task 10 – Regional Partnership Program Integration		
1	Regional Partnership Program Integration Plan	Ongoing
2	Progress report	Ongoing

Next Steps

Task 1 – Management and Reporting

- Continue to ensure timely production of deliverables and overall project

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- Finalization of Amerada Hess CO_2-flood EOR pilot project plans
- Identification of specific site location within the Beaver Lodge field where CO_2 injection and EOR activities will be conducted
- Identification of potential subcontractors for selected MMV activities

Continued. . .

Next Steps (cont.)

Task 3 – Field Validation Test – Zama, Alberta

- Get subcontracts in place for all parties involved in Task 3
- Finalize all project design phase work
- Complete experimental design package by February 28, 2006
- Complete site health and safety plan and regulatory permitting action plan by March 3, 2006
- Commence project implementation April 2006

Task 4 – Field Validation Test – North Dakota Lignite

- Select area that indicates CBM potential in lignite
- Develop contract with operator to drill four test wells

Continued. . .

Next Steps (cont.)

Task 5 – Terrestrial Validation Test

- Complete:
  - Experimental design package
  - NEPA compliance document
  - Site health and safety plan
  - Regulatory permitting action plan

Task 6 – Characterization of Regional Sequestration Opportunities

- Complete data gap assessment
- Update DSS with new pool layer
- Collect terrestrial data on present carbon sequestration values for U.S. forestry and urban trees; search for similar data in Canadian provinces
- Prepare estimates for terrestrial carbon sequestration potential for Nebraska cropland
- Continue development of template for non-EOR geologic characterization

Continued. . .

Next Steps (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- Provide support to Field Validation Test task leaders as NEPA compliance documents, site health and safety plans, and experimental design packages are developed
- Continue to assess regulatory developments
- Review regulations and begin summary related to Phase II validation tests

Task 8 – Public Outreach and Education

- Complete outreach plan (due February 28)
- Secure documentary footage from Brazil
- Plan and prepare materials for European video travel and interviews
- Collaborate on the abstract and text of the RCSP outreach working group (OWG) paper for the Fifth Carbon Capture and Sequestration Meeting, May 2006
- Collaborate on the RCSP OWG video clips (due Spring 2006)
- Continue preparations for Web update (due August 31)
- Initiate work on Fact Sheet 7 (due July 31)
- Initiate work on the outreach PowerPoint presentation (due May 30)

Continued. . .

Next Steps (cont.)

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Prepare paper for presentation at 5th Annual Conference on Carbon Capture and Sequestration on use of wind power to reduce emissions penalty during CO_2 compression
- Explore opportunities to test Cansolv CO_2 capture technology and the Ramgen compression technology
- Compare existing source data with updated data sets from the U.S. Environmental Protection Agency (EPA) and others
- Collect missing infrastructure data to fill DSS data gaps

Task 10 – Regional Partnership Integration

- Develop Regional Partnership Program Integration Plan

Upcoming Issues

Task 1 – Management and Reporting

- None anticipated at this time

Task 2 – Field Validation Test – Beaver Lodge, North Dakota

- None anticipated at this time

Task 3 – Field Validation Test – Zama, Alberta

- None anticipated at this time

Continued. . .

Upcoming Issues (cont.)

Task 4 – Field Validation Test – North Dakota lignite

- Have operator drill wells by summer/fall 2006 to initiate program

Task 5 – Terrestrial Validation Test

- None anticipated at this time

Task 6 – Characterization of Regional Sequestration Opportunities

- None anticipated at this time

Continued. . .

Upcoming Issues (cont.)

Task 7 – Research, Safety, Regulatory, and Permitting Issues

- None anticipated at this time

Task 8 – Public Outreach and Education

- Balancing OWG and PCOR Partnership activities
- Optimizing film and interview opportunities during foreign travel for Documentary 1
- Ensuring coordinated outreach to general public and test sites

Task 9 – Identification of the Commercially Available Sequestration Technologies Ready for Large-Scale Deployment

- Finding venues to demonstrate Cansolv Technologies Inc. and Ramgen Power Systems, if appropriate

Task 10 – Regional Partnership Integration

- None anticipated at this time