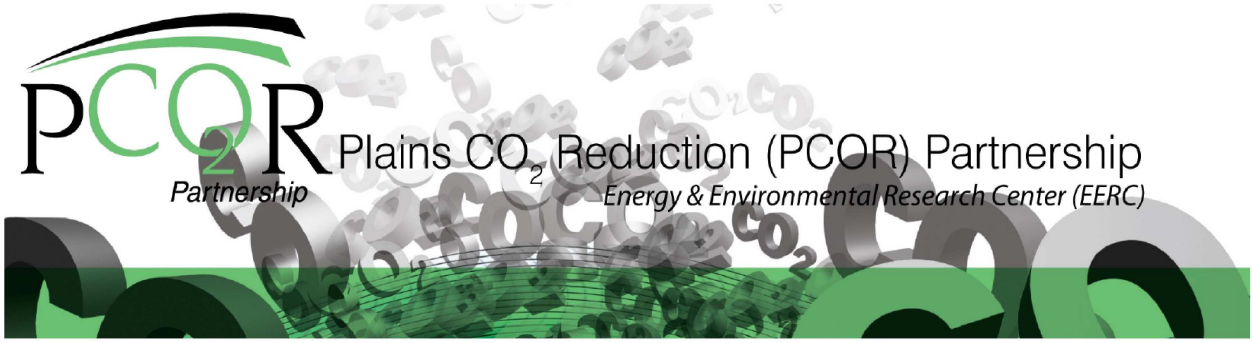

Plains CO_2 Reduction (PCOR) Partnership Monthly Update
March 1–31, 2011

PHASE III ACTIVITIES

Task 1 – Regional Characterization (Wesley D. Peck)

Highlights

- Continued efforts on the revised atlas (4th edition).
- Created maps for use in planning the soil carbon-monitoring efforts at the Bell Creek site.
- Compiled data for future Bell Creek site maps.
- Completed the Demonstration Project Reporting System update (Deliverable [D]10) that will be included on the partners-only Web site.
- Geographic information system (GIS) programming staff attended the Esri Developer Summit held March 7–10 in order to better apply GIS programming advancements to the partners-only Web applications.
- Initiated development of a new Flex-based GIS for the Decision Support System (DSS, © 2007–2011 EERC Foundation).
- Prepared questions for consideration by the Regional Carbon Sequestration Partnership (RCSP) GIS Working Group regarding proposed database design and functionality.
- Regarding the Rival Field characterization:
  - Project meetings were held on March 24 and 25 regarding the development of detailed CO_2 storage calculations for the field.
  - Visited the core and sample library on the University of North Dakota and examined three cores from the Rival Field and collected samples to make thin sections for the characterization of the field.
  - Added an additional 40 wells into Petrel, expanding the study area to include most of the Black Slough oil field.
  - Validated the Black Slough logs that were digitized with Neuralog.
  - Conducted a literature review on the conversion of vintage gamma ray neutron logs to neutron porosity logs.
  - Prepared various maps of the Williston Basin oil fields.
  - Continued to develop the Rival Field geologic model.
  - Uploaded existing 3-D seismic data into the Petrel model.

Task 2 – Public Outreach and Education (Daniel J. Daly)

Highlights

- Continued efforts as a member of the Weyburn–Midale Project Outreach Panel.
- Continued efforts to create a database to more efficiently track the outreach products, including participation in meetings on March 4 and 11.
- Continued assessment of the geographic distribution of teachers exposed to PCOR Partnership materials and information.
- Continued efforts in conjunction with Prairie Public Broadcasting's (PPB's) education group, including preparation of outreach materials for 30+ teachers and planning a fall workshop.
- Prepared a Bell Creek PowerPoint presentation (D18) for review and consideration.
- Prepared a Fort Nelson public outreach poster (D26) for review and consideration.
- Investigated Wikipedia authorship guidelines as part of the ongoing assessment of Web and social media.
- Participated in the monthly RCSP Outreach Working Group conference call on March 10.

Task 3 – Permitting and NEPA (National Environmental Policy Act) Compliance (Lisa S. Botnen)

Highlights

- Continued development of the revised/updated Regulatory Roundup document.
- Continued plans for the next PCOR Partnership Regulatory Meeting (June 29–30). The meeting will follow the IOGCC (Interstate Oil and Gas Compact Commission) Midyear Issues Meeting in Bismarck.
- Prepared and submitted the NEPA questionnaire for the Bell Creek project.
- Participated in the Fort Nelson monthly conference call on March 22 and discussed the status of permitting activities, British Columbia government participation, and risk assessment progress.
- Reviewed the U.S. Environmental Protection Agency's (EPA's) extension of the deadline for its Greenhouse Gas (GHG) Mandatory Reporting Rule (MRR).
- Reviewed Montana drilling permit guidelines for potential monitoring wells at the Bell Creek project site.

Task 4 – Site Characterization and Modeling (James A. Sorensen)

Highlights

- Several individuals began developing protocols and training on calibrating and using the gamma ray spectrascope in the EERC's Applied Geology Lab (AGL).
- Bell Creek test site activities included the following:
  - Continued compilation of approaches and techniques to be outlined in D34: Baseline Hydrogeological Experimental Design Package.
  - Calculated cost estimates for the baseline sampling efforts.
  - Continued development of a near-surface (surface waters, groundwater, and soil gas) testing plan.

- Reviewed existing groundwater well logs in the Bell Creek Field to determine suitability for sampling.
- EERC staff, along with Denbury Resources Inc. (Denbury) staff, met at the Bureau of Economic Geology (BEG) Houston Research Center to examine, photograph, and visually characterize Bell Creek Field core samples on March 9 and 10. Activities included the following:
  - Viewed eight cores taken from the Phase 1 area (18 boxes of core).
  - Created a WellSight Systems MudLog program to record the core descriptions.
  - Documented locations to take future core plug samples from U.S. Geological Survey (USGS) core stored in Denver, Colorado.
- EERC staff traveled to Denbury headquarters in Plano, Texas, on March 7–18 to search and review well files, including the following:
  - Located, scanned, and labeled nearly 600 well files maintained on the Bell Creek Field.
  - Worked with Denbury staff to analyze the well files.
  - Continued working on improved petrophysics for the Bell Creek Field, including better correlations, and ancient and modern analogs.

- Fort Nelson test site activities included the following:
  - Held the monthly conference call on March 22 between the EERC and the Spectra team, and updated the activity list.
  - Prepared a 2011 master schedule for key activities and deliverables for the Fort Nelson project and provided it to Spectra Energy for its review.
  - Continued petrological and geochemical analysis work using cuttings and chips from Fort Nelson reservoir and seal formations.
  - Continued geochemical evaluations on cuttings from Spectra's C-61-E well batch reactor series, including the following:
    - Sample set No. 3 (cuttings): near wellbore conditions (high-pressure, low-temperature regime):
      - Conducted optical profiler to analyze degree of surface degradation.
      - Conducted x-ray diffraction (XRD).
      - Prepared scanning electron microscope (SEM) mounts.
    - Sample set No. 4 (cuttings): deep reservoir conditions (lowered pressure, high-temperature regime):
      - Removed from high-pressure batch reactor.
      - Photographed and transferred fluids to the AGL for analysis.
  - Performed clipping of static Petrel geologic model for future thermal, geochemical, and geomechanical modeling.
  - Began drafting a report based on all laboratory analyses of cuttings.
  - Continued progress on the analytical activities of the core collected from the exploratory well, including the following:
    - Completed white light photography.
    - Completed preparation of 10 thin sections.
    - Optical examination, description, and interpretation of thin sections are under way.
    - Completed five mercury injection capillary pressure tests.
    - Completed three full-diameter routine core analyses.
    - Completed cap rock integrity test, i.e., exposure to brine and gas intrusion.

- ♦ Completed two batches of acid gas synthesis.
- ♦ Reservoir condition relative permeability (drainage and imbibition) is under way, including:
  - Completed preexposure computerized tomography (CT) scan.
  - Completed routine analyses.
  - Actual relative permeability testing is in progress.
- ♦ Hydrogen sulfide (H_2S) and carbon dioxide (CO_2) solubility experimentation is in progress.

Task 5 – Well Drilling and Completion (Steven A. Smith)

Highlights

- On March 24, milestone [M]30 was met with notice to NETL that the baseline monitoring, verification, and accounting (MVA) was initiated.
- Continued working on the MVA work plan for surface, near-surface, existing wellbores, and deep monitoring activities.
- Created several maps of the Bell Creek Field for use in MVA plan development.
- Began drafting a memo setting forth the PCOR Partnership's approach to MVA at the Bell Creek site.
- Compiled appendices for inclusion in the MVA plan, specifically:
  - Detailed maps with sample locations (by phase).
  - Creating landowner maps (plats into GIS).
  - Cost estimates.
  - Health and Safety Plan.
  - Detailed existing deep well map.
  - Tables outlining sample analytes.
- Discussed options for drilling a monitoring well in the Bell Creek Field, including drilling mud, logging tools, coring options, core testing, casing options, and seismic options.

Task 6 – Infrastructure Development (Melanie D. Jensen)

Highlights

- Submitted D85, "Opportunities and Challenges Associated with CO_2 Compression and Transportation During CCS Activities" to DOE for review and approval.
- Submitted the final approved value-added report entitled "Current Status of CO_2 Capture Technology Development and Application."
- Responded to an e-mail request for information about the use of CO_2 captured from a flue gas stream in soda pop. Information about plants that capture their CO_2 and sell it for use in the food-processing industry was prepared and sent.
- Addressed a question from a partner regarding estimated acid gas concentrations in coal-fired power plant flue gas.

Task 7 – CO_2 Procurement (John A. Harju)

Highlights

- Participated in ongoing project discussions with Denbury, including potential cash-equivalent contributions to achieve the PCOR Partnership's scope of work.

Task 8 – Transportation and Injection Operations (Melanie D. Jensen)

Highlights

- Attended several in-house Bell Creek project status meetings.
- Continued reading about surface facilities design at an enhanced oil recovery (EOR) injection site in *Nontechnical Guide to Petroleum Geology, Exploration, Drilling, and Production* (2nd edition) by Norman J. Hyne, Ph.D.

Task 9 – Operational Monitoring and Modeling (Charles D. Gorecki)

Highlights

- Modeling staff attended Schlumberger's Petrel Seismic Visualization and Interpretation training course in Houston.
- Continued Bell Creek site activities, including the following:
  - Continued preparation of the report entitled "Site Characterization, Modeling, and Monitoring Plan" (D50).
  - Created a Techlog Bell Creek project.
  - Loaded LAS files for 98 wells into the Bell Creek Petrel model.
  - Created a premade file for each core, including LAS logs and pertinent columns for geologic data.
  - Continued review of digital well logs and correlating tops in Petrel for the Phase 1 region of the Bell Creek Field.
  - Continued identification of Coastal Plain channel sand.
- Continued Fort Nelson site activities, including the following:
  - Continued incorporation of final comments from Spectra Energy on D52 entitled "Site Characterization, Modeling, and Monitoring Plan."
  - Continued work on history matching, i.e., component, temperature, pressure, and anisotropic permeability.
  - Held a history match and risk assessment meeting in Grand Forks on March 1 and 2.
  - Continued preparation of a report on the 2010 risk assessment activities.
  - Adjusted the geologic model (June 2010 version) to run several "worst-case" scenarios for inclusion in the next risk assessment update.
  - Selected a few alternative well locations.
  - Worked on validation of the Slave Point tops.
  - Performed various calculations on Gas Pool A.
  - Scheduled risk management software training.

Task 10 – Site Closure (to be announced [TBA])

- This task is anticipated to be initiated in Quarter 1 – Budget Period (BP) 5, Year 9 (October 2015).

Task 11 – Postinjection Monitoring and Modeling (TBA)

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

Task 12 – Project Assessment (Katherine K. Anagnost)

- The project assessment report (D57) for the period October 1, 2010 – September 30, 2011, will be submitted by December 31, 2011. The report for the previous program year is available on the partners-only Web site.

Task 13 – Project Management (Edward N. Steadman)

Highlights

- On March 15, presented before the IEA Greenhouse Gas R&D Research Programme expert panel on the status of PCOR Partnership activities.
- Continued planning for the upcoming PCOR Partnership Annual Meeting (September 12–14, 2011) to be held at the Sheraton Denver Downtown Hotel (www.sheratondenverdowntown.com), including sending a "Mark Your Calendar" e-mail blast to the partnership on March 29.
- On March 8, submitted the updated project management plan for review and approval.
- Participated in the fifth NACAP (North American Carbon Atlas Partnership) meeting held April 5 and 6 in Morgantown, West Virginia.
- Continued work on the programmatic risk management plan (D88).
- Participated in the CSLF (Carbon Sequestration Leadership Forum) Storage and Monitoring Projects Interactive Workshop held February 28 – March 3, 2010, in Saudi Arabia.
- On March 21, participated in a teleconference with Spectra's project lead in preparation for the team's monthly conference call held March 22.
- Deliverables completed in March include the following:
  - February monthly update
  - Task 1: D10 – Demonstration Project Reporting System Update
  - Task 2: D18 – Bell Creek Test Site PowerPoint Presentation
  - Task 2: D26 – Fort Nelson Test Site Poster
  - Task 3: D28 – Environmental Questionnaire – Bell Creek Test Site
  - Task 5: M30 – Bell Creek Test Site Baseline MVA will be initiated
  - Task 6: D85 – Report – Opportunities and Challenges Associated with CO_2 Compression and Transportation During Carbon Capture and Storage (CCS) Activities
  - Task 14: M23 – Monthly Water Working Group (WWG) Conference Call Held
- Deliverables and milestones due in April include the following:
  - March monthly update
  - Task 13: D58/D59 – Quarterly Progress Report/Milestone Quarterly Report
  - Task 13: D88 – Programmatic Risk Management Plan

– Task 14: M23 – Monthly WWG Conference Call Held

Task 14 – RCSP Water Working Group Coordination (Charles D. Gorecki)

Highlights

- Continued work on the Nexus of Water and CCS – Technology Gaps document (f/k/a the roadmap document).
- Continued planning the WWG annual meeting, including selection of date and location, as well as preparation of an agenda. The annual meeting will be held on May 5, 2011, 1:00–5:00 p.m., in conjunction with the 10th Annual Conference on Carbon Capture & Sequestration in Pittsburgh.
- The monthly conference call was held on March 22.
- Continued preparations for presenting at the American Water Resources Association conference in April.

Task 15 – Further Characterization of the Zama Acid Gas EOR, CO_2 Storage, and Monitoring Project (Steven A. Smith)

Highlights

- Presented on the Zama project to the Second France/EU–Canada Workshop on CCS held on March 30 and 31 in Paris.
- Acquired 20 steel coupons representative of oil field casing material and initiated a 28-day batch reaction using CO_2 and H_2S.
- Initiated preexposure optical profiling that will be compared to postexposure measurements in an effort to gauge whether degradation has occurred.

Task 16 – Characterization of the Basal Cambrian System (Steven A. Smith)

Highlights

- Continued planning the next meeting of the technical and steering committees at NETL headquarters in Pittsburgh on May 25.

Travel/Meetings

- February 25 – March 4, 2011: Presented at the CSLF Storage Projects Interactive Workshop in Al Khobar, Saudi Arabia.
- February 28 – March 2, 2011: Attended Schlumberger's Petrel Reservoir Engineering simulation software training in Houston, Texas.
- March 6–18, 2011: Traveled to Denbury's headquarters to search, retrieve, and scan Bell Creek-related documents in Plano, Texas.
- March 7–8, 2011: Participated in an advisor's meeting and abstract review for the 10th Annual Conference on Carbon Capture and Sequestration in Pittsburgh, Pennsylvania.
- March 7–11, 2011: Attended the 2011 Esri Developer Summit in Palm Springs, California.
- March 8–11, 2011: Reviewed core samples from the Bell Creek Field at the Bureau of Economic Geology in Houston, Texas.
- March 14–16, 2011: Participated in the IEA Greenhouse Gas R&D Programme 2011 Expert Review of Regional Carbon Sequestration Partnerships in Arlington, Virginia.

- March 16, 2011: Participated in an education activities meeting at PPB offices in Fargo, North Dakota.
- March 28 – April 3, 2011: Presented at the 2nd France–Canada Workshop on Carbon Capture and Storage in Paris, France.

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