

PERMITTING ACTION PLAN

Plains CO₂ Reduction (PCOR) Partnership Phase III Task 3 – Deliverable D29

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PERMITTING ACTION PLAN

INTRODUCTION

Plan Objectives

Guiding regulations are necessary to ensure that the discovery, development, and delivery of energy resources are completed in a manner that is fair, responsible, and in the public interest. It often takes time to complete environmental reviews and obtain permits for energy development projects. Therefore, it is prudent to develop a regulatory permitting action plan (RPAP) in accordance with relevant local, state, and federal regulatory agency requirements.

This RPAP describes the regulatory and permitting steps taken by the Energy & Environmental Research Center (EERC) as well as its partner Denbury Onshore LLC (Denbury) to conduct the Bell Creek Field Demonstration Test. Additionally, relevant federal and state regulatory summaries are provided.

Project Description

Carbon capture and storage (CCS) in geological media has been identified as a technically and economically viable approach for significantly reducing anthropogenic greenhouse gas emissions into the atmosphere. The Plains CO₂ Reduction (PCOR) Partnership's goal is to identify and test CCS opportunities in the central interior of North America. Several means for geological storage of carbon dioxide (CO₂) are available, such as in depleted oil and gas reservoirs, deep saline formations, CO₂ flood enhanced oil recovery (EOR) operations, and enhanced coalbed methane recovery operations. The use of CO₂ for simultaneous enhanced resource recovery and geological storage provides operators with an economic benefit as a result of producing additional oil or methane.

Regional characterization activities conducted by the PCOR Partnership (Peck and others, 2007) indicate that oil reservoirs represent significant opportunities in North America for both long-term storage of CO₂ and incremental oil production through EOR. The opportunity to cost-effectively store CO₂ while simultaneously producing incremental oil as a value-added product provides the basis for conducting the Bell Creek EOR and CCS project as part of the PCOR Partnership's Phase III program.

Activities for this project will be conducted in the Bell Creek oil field in the Montana portion of the Powder River Basin to evaluate the potential for geological storage of CO₂ in an oil reservoir for the dual purpose of CO₂ storage and EOR. The CO₂ will be obtained from ConocoPhillips Lost Cabin gas-processing plant in Fremont County, Wyoming; transported 232 miles by pipeline; and injected into a sandstone reservoir in the Lower Cretaceous Muddy (Newcastle) Formation at a depth of approximately 4500 feet (1372 meters). The locations of the Bell Creek oil field and Lost Cabin Gas Plant are shown in Figure 1.

Environmental Setting

The Bell Creek oil field is located in a rural upland prairie area. The topography is generally rolling hills, with scattered buttes being the primary distinctive features. Most of the land surface ownership in the Bell Creek area is private, although the area does include large tracts of land owned and managed by the U.S. federal government. Surface land use activities in the area include oil production, ranching, and small grain farming. Figure 2 is a photograph of the Bell Creek oil field area.

FEDERAL AND STATE REGULATORY SUMMARIES

The following section provides a brief overview of regulations that may be considered when conducting an integrated CO₂ EOR and CO₂ storage project in the state of Montana.

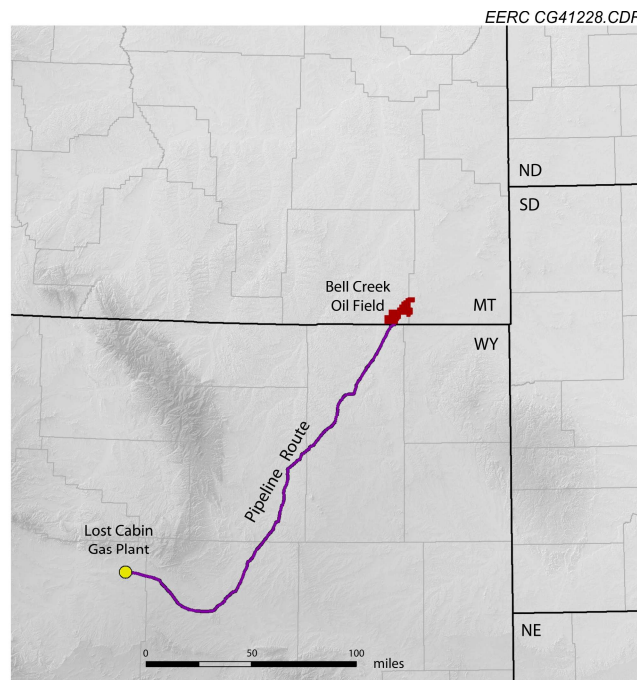


Figure 1. Location of the Lost Cabin Gas Plant and Bell Creek oil field in Wyoming and Montana.



Figure 2. Photograph of the Bell Creek oil field in Powder River County, Montana.

In the United States, many regulatory jurisdictions may overlap. Correspondingly, a federal regulatory agency that has legislative authority over certain activities, may grant primacy to regulate a particular activity to a qualified state agency. For example, the U.S. Environmental Protection Agency (EPA) currently regulates underground fluid injection under the Safe Drinking Water Act (SDWA) Underground Injection Control (UIC) Program. The UIC Program establishes minimum federal standards for six distinct classes (Class I–VI) of injection wells. Within the auspices of this program, EPA has given the Montana Board of Oil and Gas Conservation primacy (MBOGC) to regulate Class II and III injection wells.

Environmental Assessment and Protection

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 establishes national environmental policies that pertain to the federal government as a whole and stipulates certain procedural requirements for federal agency actions. Except as otherwise provided by Congress, the act applies to all federal agency actions. This includes actions that intersect with private activities, i.e., through a federal permit or funding. However, the requirements may vary depending on the type of action involved. NEPA establishes goals for agency actions as well as the requirement to prepare environmental documents.

Depending on the circumstances and the expected degree of environmental impacts, various levels of analysis of potential environmental effects are required by the regulations. Generally, an environmental impact statement (EIS) must be prepared for major federal actions that significantly affect the environment. An EIS must review a sufficient assortment of proposed alternatives and the direct, indirect, and cumulative effects or impacts of each alternative.

An agency is excluded from preparation of any formal NEPA environmental analysis with respect to activities that are either separately or cumulatively known to have no or only minor environmental effects. These activities are known as categorical exclusions. Most federal agencies have developed criteria for defining and listing actions that may be categorical exclusions. These activities are subject to being removed from the listing if particular circumstances, i.e., if species listed as threatened or endangered, are present.

An environmental assessment (EA) is a midlevel analysis prepared for an activity that is not clearly categorically excluded but does not clearly require an EIS. Based on the EA, the agency either prepares an EIS or issues a “Finding of No Significant Impact” (FONSI), which averts further NEPA study and document preparation. In order to make a valuable contribution, an EA should be prepared early in the decision-making process of a particular action.

CO₂ Pipelines and Transportation

The U.S. Department of Transportation (DOT) Office of Pipeline Safety (OPS) regulates the pipeline movement of CO₂ under Title 49 of the Code of Federal Regulations (CFR) Part 195. Permitting for construction of CO₂ pipelines falls under various jurisdictions, and numerous permits may be required. In most cases, a pipeline route application is submitted to the permitting authority. Various aspects of the proposed pipeline construction must be addressed in the application. These aspects include, but are not limited to, right-of-way and easements and potential cultural, human health, environmental, and ecological impacts. Crossing various waterbodies and wetlands, federal lands, tribal lands, roadways, and railroads may, and often do, require permits from federal, state, and local agencies.

PERMITTING OVERVIEW

Federal Requirements

In the United States, the NEPA of 1969 establishes national environmental policies that pertain to the federal government as a whole and stipulates certain procedural requirements for federal agency actions.

In order to begin the Bell Creek Field Demonstration Test, the EERC was required to complete the U.S. Department of Energy’s (DOE’s) Environmental Questionnaire. DOE’s NEPA implementing procedures require consideration of the potential environmental consequences of all proposed actions. DOE must determine as early as possible whether such actions require an EA or an EIS or if they qualify for Categorical Exclusion. The EERC has completed the questionnaire and provided DOE with the information necessary to determine the appropriate

level of NEPA review. The EERC's activities for this field validation test were granted a Categorical Exclusion.

Because much of the pipeline route and the actual Bell Creek Field itself are located on U.S. Department of the Interior Bureau of Land Management (BLM) lands and mineral leases, Denbury was required to comply with BLM's NEPA implementing procedures. Denbury is in the process of completing EAs for the construction of the pipeline and the redevelopment of the Phase I area of the Bell Creek Field.

While not required to permit a project of this nature, the recently promulgated EPA Greenhouse Gas Mandatory Reporting Rule Subpart UU will require operators injecting CO₂ for the purposes of EOR to report, on an annual basis, the amount of CO₂ being injected and the source of the CO₂ (U.S. Environmental Protection Agency, 2011).

MBOGC Requirements

The general rules and regulations of MBOGC are contained in Title 36, Chapter 22, of the Administrative Rules of Montana. The regulatory actions of MBOGC serve to prevent the waste of oil and gas resources, conserve oil and gas by encouraging maximum efficient recovery of the resource, and protect the correlative rights of the mineral owners (Montana Board of Oil and Gas Conservation, 2011).

There are several types of regulatory filings that are required by MBOGC for different aspects of a resource recovery operation. Since this is an ongoing hydrocarbon recovery site, many of the necessary regulatory requirements have been completed. Most notably, Denbury has an Area Injection Permit that encompasses the entire Bell Creek Field. Any additional work that needs to be completed on existing injector or production wells can most likely be accomplished by filing a Sundry Notice (Form 2). See Appendix A for a copy of MBOGC Form 2.

Additionally, the EERC and Denbury are working on plans to drill a deep monitoring well into the middle of an injector producer pattern to 1) collect additional baseline data such as core, well logs, and well tests; 2) run baseline crosswell and 3-D vertical seismic profiles, which will be used along with repeat surveys to track the CO₂ as it moves through the subsurface; and 3) install downhole pressure and temperature sensors which will continuously track the movement of fluids in the subsurface. Denbury will be the operator of record for this well. In order to drill the well, Denbury will need to file an Application to Drill with MBOGC. The following items must be included in the application:

- Survey plat certified by a registered surveyor. The plat must show the location of the well with reference to the nearest lines of an established public survey.
- Photocopy of the portion of a topographic map showing the well location, access route from the county of other established roads, residences, and water wells within a ½-mile radius of the well.

- Sketch of the well site showing dimensions and orientation of the site, size and location of the pits, topsoil, stockpile, and estimated cut/fill at the corners and centerstake. A sketch of the top and two side views of the reserve pit (if utilized) need to be included. The reserve pit sketch must show the length, width, depth, cut and fill, amount of freeboard, area of topsoil stockpile, and height and width of berms.
- Description of the type and amount of material or liner, if any, to be used to seal the reserve pit. If a synthetic liner is used, indicate the liner thickness (mils), bursting strength, tensile strength, tear strength, puncture resistance, and hydrostatic resistance need to be indicated or the manufacturer's specifications attached.
- Description of the proposed plan for the treatment and/or the disposal of reserve pit fluids and solids after the well is drilled. If the intent is to dispose of or treat the reserve pit contents off-site, the location and the method of waste treatment and disposal need to be specified.
- If the construction of the access road or location or some other aspect of the drilling operation requires additional federal, state, or local permits or authorization, those authorizations will need to be indicated in the permit application.
- Date and time of spudding must be reported to MBOGC within 72 hours after commencement of drilling operations
- Notice of drilling operations must be given to the surface owner before commencement of any surface activity.

CONCLUSIONS

The aforementioned procedures provide a general plan for permitting an EOR-CCS project at an existing hydrocarbon recovery site. It should be noted that EOR business-as-usual reporting and regulatory requirements are not included in this document as it is presumed the operator is aware of these obligations.

REFERENCES

- Peck, W.D., Botnen, B.W., Botnen, L.S., Daly, D.J., Harju, J.A., Jensen, M.D., O'Leary, E.M., Smith, S.A., Sorensen, J.A., Steadman, E.N., Wolfe, S.L., Damiani, D.R., Litynski, J.T., and Fischer, D.W., 2007, PCOR Partnership atlas (2d ed.): Grand Forks, North Dakota, Energy & Environmental Research Center, 54 p.
- U.S. Environmental Protection Agency, 2011, www.epa.gov/climatechange/emissions/subpart/w.html (accessed August 2011).

Montana Board of Oil and Gas Conservation, 2011, <http://bogc.dnrc.mt.gov/BoardSummaries.asp> (accessed August 2011).

APPENDIX A
MBOGC FORM 2

Submit In Quadruplicate To:

**MONTANA BOARD OF OIL AND GAS CONSERVATION
2535 ST. JOHNS AVENUE
BILLINGS, MONTANA 59102**

SUNDRY NOTICES AND REPORT OF WELLS

Operator		Lease Name:	
Address		Type (Private/State/Federal/Tribal/Allotted):	
City	State	Zip Code	Well Number:
Telephone		Fax	
Location of well (1/4-1/4 section and footage measurements):		Unit Agreement Name:	
		Field Name or Wildcat:	
		Township, Range, and Section:	
API Number:		Well Type (oil, gas, injection, other):	
25 State County Well		County:	

Indicate below with an X the nature of this notice, report, or other data:

Notice of Intention to Change Plans	<input type="checkbox"/>	Subsequent Report of Mechanical Integrity Test	<input type="checkbox"/>
Notice of Intention to Run Mechanical Integrity Test	<input type="checkbox"/>	Subsequent Report of Stimulation or Treatment	<input type="checkbox"/>
Notice of Intention to Stimulate or to Chemically Treat	<input type="checkbox"/>	Subsequent Report of Perforation or Cementing	<input type="checkbox"/>
Notice of Intention to Perforate or to Cement	<input type="checkbox"/>	Subsequent Report of Well Abandonment	<input type="checkbox"/>
Notice of Intention to Abandon Well	<input type="checkbox"/>	Subsequent Report of Pulled or Altered Casing	<input type="checkbox"/>
Notice of Intention to Pull or Alter Casing	<input type="checkbox"/>	Subsequent Report of Drilling Waste Disposal	<input type="checkbox"/>
Notice of Intention to Change Well Status	<input type="checkbox"/>	Subsequent Report of Production Waste Disposal	<input type="checkbox"/>
Supplemental Well History	<input type="checkbox"/>	Subsequent Report of Change in Well Status	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	Subsequent Report of Gas Analysis (ARM 36.22.1222)	<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>

Describe Proposed or Completed Operations:

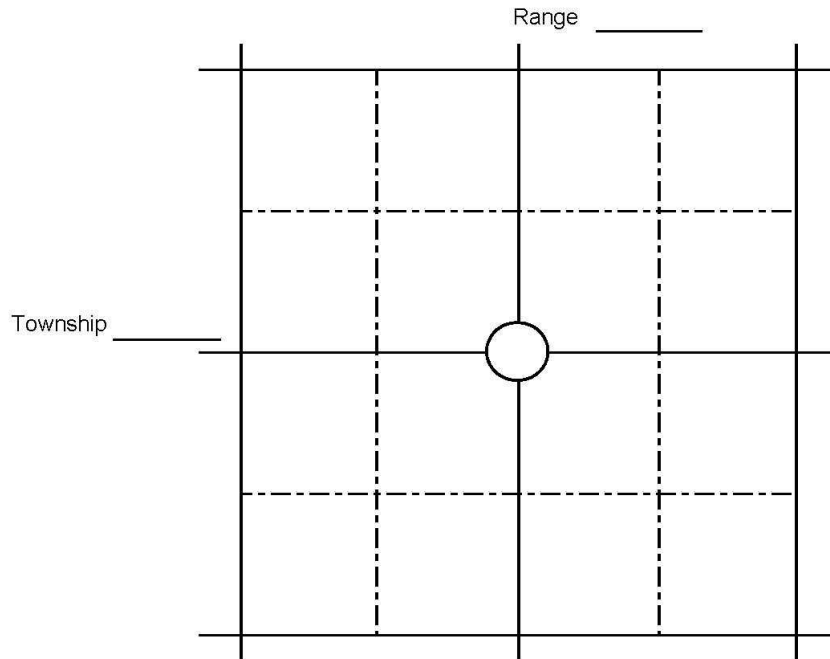
Describe planned or completed work in detail. Attach maps, well-bore configuration diagrams, analyses, or other information as necessary. Indicate the intended starting date for proposed operations or the completion date for completed operations.

BOARD USE ONLY		The undersigned hereby certifies that the information contained on this application is true and correct:	
Approved _____	Date _____	Date _____	Signed (Agent) _____
Name _____ Title _____		Print Name and Title _____	
		Telephone: _____	

SUPPLEMENTAL INFORMATION

NOTE: Additional information or attachments may be required by Rule or by special request.

Plot the location of the well or site that is the subject of this notice or report.



BOARD USE ONLY

CONDITIONS OF APPROVAL

The operator must comply with the following condition(s) of approval:

Failure to comply with the conditions of approval may void this permit.