



PERMITTING REVIEW – UPDATE 1

Plains CO₂ Reduction (PCOR) Partnership Phase III Task 3 – Deliverable D6

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Cooperative Agreement No. DE-FC26-05NT42592

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ACKNOWLEDGMENT

This material is based upon work supported by DOE NETL under Award No. DE-FC26-05NT42592.

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PERMITTING REVIEW – UPDATE 1

INTRODUCTION

This document provides a brief update on the requirements to conduct a geologic carbon dioxide storage project in the United States or Canada. Not a lot has changed in the United States in the past 2 years since the first permitting review was submitted in September 2011 (Botnen and others, 2011). The information provided herein gives a broad overview of the regulatory requirements and the authorities involved. As of this writing, the U.S. Environmental Protection Agency (EPA) has the authority to permit carbon dioxide (CO₂) geologic storage wells in all 50 states. Additionally, EPA requires geologic storage projects to comply with the Mandatory Reporting of Greenhouse Gases Rule (MRR; 40 CFR 98). In Canada, the provinces have the authority to permit geologic storage projects.

Because of the evolving nature of regulatory frameworks at various levels of government as well as daily changes in congressional reporting, this document is intended to provide general overviews of rules and policies and can be considered to be up to date as of September 30, 2013, unless otherwise noted.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Underground Injection Control

In December 2010, EPA finalized the requirements for a new well class (Class VI) under the authority of the Safe Drinking Water Act's Underground Injection Control (UIC) Program. The rule establishes federal requirements for the underground injection of CO₂ for the purpose of long-term underground storage, or geologic storage.

Numerous elements of the Class VI Rule deal with various aspects of permitting and operating a UIC Class VI injection well. These elements include the following:

- Site characterization requirements
- AoR (area of review) delineation and reevaluation
- Well construction and operation requirements
- Testing and monitoring requirements
- Site-specific project plan development
- Financial responsibility for the life of the project
- Postinjection site care monitoring

- Injection depth waiver
- Consideration for wells transitioning from Class II (enhanced resource recovery wells) to Class VI (direct geologic storage wells)

Additionally, a series of guidance documents have been developed or are being developed to provide information and possible approaches for addressing each of the elements listed above. These guidance documents follow the sequence of activities that an owner or operator will perform over time at a proposed and/or permitted geologic storage site. The following are the Guidance Documents that have been finalized by EPA:

- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Site Characterization Guidance (May 2013)
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Area of Review and Corrective Action Guidance (May 2013)
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Testing and Monitoring Guidance (March 2013)
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Project Plan Development Guidance (August 2012)
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Construction Guidance (May 2012)
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Program: Financial Responsibility Guidance (July 2011)

The following Guidance Documents have been released for public review by EPA, but have yet to be finalized:

- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Permitting Authorities
- Geologic Sequestration of Carbon Dioxide: Underground Injection Control (UIC) Program Class VI Well Primacy Application and Implementation Manual

Additional Guidance Documents are expected to be forthcoming.

In the final rule, EPA gave states a deadline of September 6, 2011, to apply for primary enforcement responsibility, or primacy, over Class VI wells. No states met this deadline; therefore, as of September 7, 2011, EPA directly implemented the Class VI Program nationally. As a result, in order to permit a CO₂ geologic storage project, potential owners or operators of a CO₂ geologic storage well will need to submit a permit application to the appropriate EPA regional office. States in the Plains CO₂ Reduction (PCOR) Partnership are divided among three different EPA regions. Table 1 illustrates the appropriate region for each state.

Table 1. EPA Regional Divisions

EPA Region	State
Region 5	Minnesota, Wisconsin
Region 7	Nebraska, Iowa, Missouri
Region 8	Montana, Wyoming, North Dakota, South Dakota

Direct federal implementation of the Class VI Program will remain in effect until such time that a state-submitted primacy application is approved by EPA. As previously mentioned, any state has the right to apply for primacy, if it so chooses.

On June 21, 2013, the North Dakota Industrial Commission Department of Mineral Resources Oil and Gas Division (North Dakota) submitted a primacy application to EPA. It is anticipated it will take at least 6 months before North Dakota will know whether or not its application is approved by EPA.

Please refer to EPA's Web site, <http://water.epa.gov/type/groundwater/uic/class6/gscsclass6wells.cfm>, for additional information on the UIC Class VI Program.

Mandatory Reporting of Greenhouse Gases Rule

EPA finalized its MRR, which consists of Subparts A through UU, late 2010. Subpart RR refers to the injection of CO₂ for geologic storage. This subpart covers any well or group of wells that injects CO₂ for long-term geologic storage and all wells permitted as Class VI wells (see previous section for more information on this well class). Such facilities are required to report:

- Source(s) of CO₂.
- Mass of CO₂ received.
- Mass of CO₂ produced (i.e., mixed with produced oil, gas, or other fluids).
- Mass of CO₂ emitted from surface leakage.
- Mass of CO₂ equipment leaks and vented CO₂ emissions from sources between the injection flowmeter and the injection wellhead or between the production flowmeter and the production wellhead.

- Mass of CO₂ stored in subsurface geologic formations.

In addition, Subpart RR reporters must also develop and submit a monitoring, reporting, and verification (MRV) plan to EPA, receive an approved MRV plan from EPA, implement the EPA-approved plan, and submit annual reports. Each MRV plan must have the following elements:

- Delineation of the maximum monitoring area (MMA) and active monitoring area (AMA).
- Identification and evaluation of the potential leakage pathways and an assessment of the likelihood, magnitude, and timing of surface leakage of CO₂ through these pathways to the MMA.
- A strategy for detecting and quantifying any surface leakage of CO₂ in the event leakage occurs.
- An approach for establishing the expected baselines for monitoring CO₂ surface leakage.
- A summary of considerations made to calculate site-specific variables for the mass balance equation.

The AMA is the area that will be monitored over a specified time interval chosen by the reporter, which must be greater than 1 year. The MMA includes the extent of the free-phase CO₂ plume over the lifetime of the project plus a buffer zone of one-half mile. All of the area of the MMA will eventually be covered by one or more AMAs.

For additional information on the MRR Subpart RR, please refer to EPA's Web site, www.epa.gov/climatechange/emissions/subpart/rr.html.

CANADA

Canadian Standards Association

In October 2012, the Canadian Standards Association (CSA) published Z741-12 Geologic Storage of Carbon Dioxide. The Standard establishes the requirements and recommendations for the geologic storage of CO₂, primarily in deep saline formations and depleted hydrocarbon reservoirs. Requirements and recommendations include elements related to the following:

- Site screening, selection, and characterization
- Risk management
- Well infrastructure development
- Monitoring and verification
- Site closure

This standard may be used by provinces as a reference point when and if development of provincial specific rules and regulations related to carbon capture and storage (CCS) are developed or deemed necessary. Additionally, Canada is lead secretariat, along with China, in the development of an ISO CCS Standard. That work began in June of 2012 and is building from CSA Z741-12.

For additional information on CSA Z741-12, please refer to CSA's Web site, <http://shop.csa.ca/en/canada/design-for-the-environment/z741-12/invt/27034612012>.

Alberta

In the PCOR Partnership region, Alberta has been the most active province in the development of CCS projects, legislation, and rules. In April 2011, the Carbon Sequestration Tenure Regulation was passed. This allows operators to obtain evaluation permits and obtain leases for storage. The regulation requires monitoring, measurement, and verification plans as well as closure plans.

In addition, Alberta recently completed an 18-month review of its existing regulatory framework. Regulatory gaps related to applications, approvals, risk assessment, monitoring, public engagement, site closure, and long-term liability were assessed. In all, 71 recommendations to close regulatory gaps or enhance current regulatory requirements were made. It is the hope of the Alberta government that the results of this assessment will provide CCS developers with much-needed regulatory certainty. Alberta released the Regulatory Framework Assessment report on August 19, 2013. For more information, please refer to www.energy.alberta.ca/initiatives/3544.asp.

Other Provinces in the PCOR Partnership Region

Currently, British Columbia, Saskatchewan, and Manitoba continue to review their existing regulations to determine what, if any, new rules and regulations are required for CCS development.

SUMMARY

As CCS regulatory and policy development continues to evolve at the state, provincial, and federal levels, the PCOR Partnership will continue to evaluate potential effects on CCS technology development and, where necessary, will provide technical input and guidance to regulators and those making policy decisions. As new rules and regulations progress and are finalized, the PCOR Partnership will continue to provide its members with the latest, most current information.

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