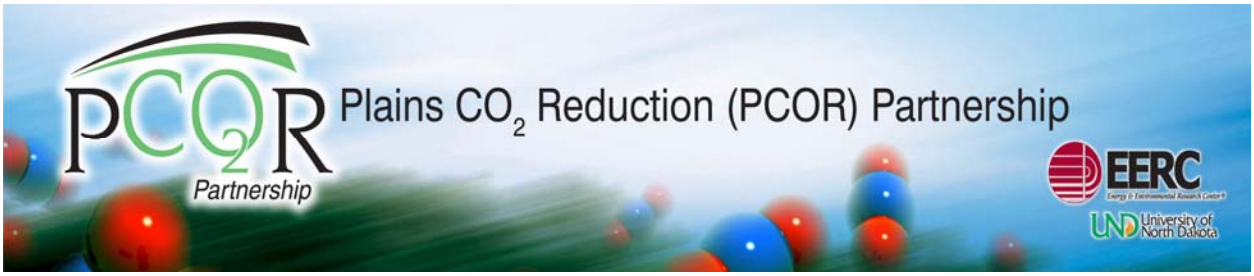

PLAINS CO_2 REDUCTION (PCOR) PARTNERSHIP PHASE II – DELIVERABLE D50: TASK 7 – ROAD MAP DOCUMENT

Report

(For the period October 1, 2007, through September 30, 2009)

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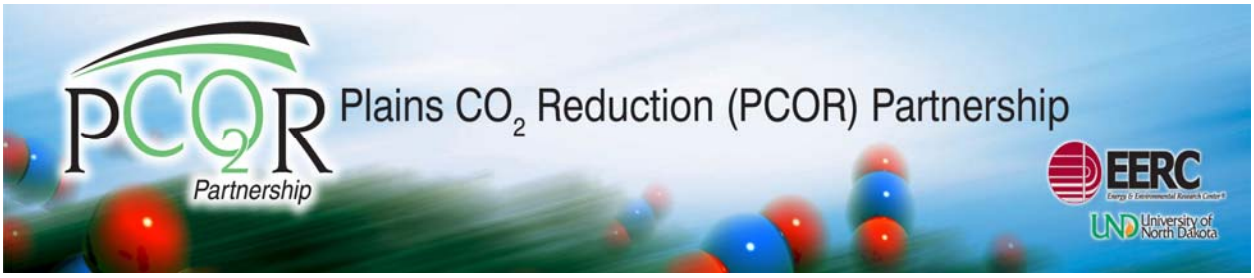

PLAINS CO_2 REDUCTION (PCOR) PARTNERSHIP PHASE II DELIVERABLE D50: TASK 7 – ROAD MAP DOCUMENT

Lisa S. Botnen, Energy & Environmental Research Center
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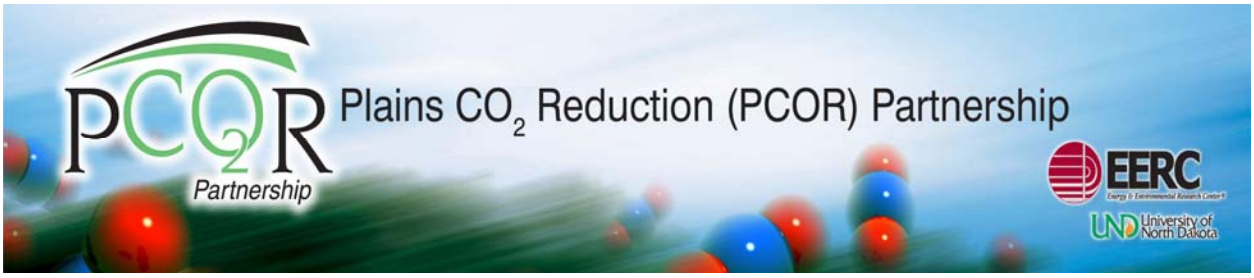
June 2009

EXECUTIVE SUMMARY

In order for the Plains CO_2 Reduction (PCOR) Partnership to conduct its Phase II field validation tests, it was necessary to comply with relevant regional, state/provincial, and federal regulatory agency requirements. The permitting action plans that were developed as part of these efforts provided a road map to assist those conducting the tests in meeting their respective regulatory requirements. Since the plans were initially developed, little has changed with respect to the way similar projects would be permitted today. However, a great deal of development has occurred at the regional, state/provincial, and federal levels with regard to carbon capture and sequestration (CCS) policy that may affect the way similar projects will be permitted in the future.

CCS policy is taking a prominent position in the climate change debate occurring in the U.S. Congress. Both the House and Senate have focused on fundamental legal, economic, and policy issues that may ultimately drive the success or failure of geological sequestration as a carbon mitigation strategy.

While the U.S. Environmental Protection Agency has proposed rules for geologic sequestration wells under the auspices of the Safe Drinking Water Act, many states are moving forward with their own rules and regulations to accommodate CCS projects. Also, many regional initiatives have formed across the United States and Canada to develop greenhouse gas emission strategies, in which CCS may, or may not, play a role as an offset option. This road map document provides a summary of legislative activities at the state, provincial, and federal levels as of June 2009.



PLAINS CO_2 REDUCTION (PCOR) PARTNERSHIP PHASE II DELIVERABLE D50: TASK 7 – ROAD MAP DOCUMENT

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June 2009

BACKGROUND/INTRODUCTION

The Energy & Environmental Research Center (EERC) at the University of North Dakota directs the Plains CO_2 Reduction (PCOR) Partnership, one of seven regional partnerships funded by the U.S. Department of Energy (DOE) National Energy Technology Laboratory's (NETL's) Regional Carbon Sequestration Partnership Program and a broad range of project sponsors. The PCOR Partnership is a diverse group of public and private sector stakeholders working together to better understand the technical and economic feasibility of capturing and storing carbon dioxide (CO_2) emissions from stationary sources in the central interior of North America.

This road map document is intended to provide its readers with a synopsis of the types of regulatory approvals that are or may be necessary to conduct a carbon sequestration project similar to and in the vicinity of those conducted by the PCOR Partnership Phase II field validation tests. The information preceding the section that discusses permitting action plans for field validation tests is meant to give a broad overview of activities that are taking place at the federal, regional, and state/provincial levels that may affect future sequestration 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 currently being debated and can be considered to be up to date as of June 22, 2009, unless otherwise noted.

U.S. CONGRESSIONAL ACTIVITY

Thus far in the 111th Congress, numerous pieces of legislation have been introduced that focus on climate change issues and contain various components that address the development of carbon capture and sequestration (CCS) technology. Because of the volume of legislation introduced that will never reach a full House or Senate vote, this section will provide a brief summary of the CCS issues in a House and Senate bill that have been reported out of at least one committee from each of the respective chambers.

In the House

On May 21, 2009, the House Energy and Commerce Committee passed the American Clean Energy and Security Act, otherwise known as the Waxman–Markey Bill. The 900- plus-page bill includes provisions for CCS research and requires all new coal plants permitted after 2020 to use CCS. It also amends the Clean Air Act (CAA) to require the U.S. Environmental Protection Agency (EPA) Administrator to:

- Set forth a national strategy to address barriers to the commercial-scale deployment of CCS.
- Establish an approach to certify and permit geologic sequestration.
- Promulgate regulations to minimize the risk of escape to the atmosphere of CO_2 injected for purposes of geological sequestration.

In addition, it amends the Safe Drinking Water Act (SDWA) to require the EPA Administrator to promulgate regulations for sequestration wells. As of June 22, 2009, the bill was still under review by various House committees, and a date has not been set for a full House vote (Alston and Bird, 2009).

In the Senate

The Senate Committee on Energy and Natural Resources passed the American Clean Energy Leadership Act on June 17, 2009. The act facilitates carbon capture, transportation, and storage and establishes a national indemnity program through DOE for up to ten commercial-scale CCS projects. The legislation also sets qualifying criteria that will help to ensure that critical early mover projects will be conducted safely while addressing the growing concerns of reducing greenhouse gas emissions. The legislation also maps out a clear framework for final closure and longtime stewardship for geological storage sites for CO_2 (U.S. Senate Committee on Energy and Natural Resources, 2009).

An estimated date for a full Senate vote on this act has not been released as of this writing.

EPA PROPOSED RULES FOR CO_2 GEOLOGIC SEQUESTRATION WELLS

In July 2008, EPA issued its federal requirements under the Underground Injection Control Program for CO_2 Geologic Sequestration Wells Proposed Rule. The regulation was proposed under authority of the SDWA, and its scope is limited to groundwater protection. The proposed rules would establish a new injection well class, Class VI. The rules also list technical criteria for geologic site characterization; area of review and corrective action; well construction and operation; mechanical integrity testing and monitoring; well plugging; postinjection site care; and site closure. Because of limitations under the SDWA, the proposed rules do not address long-term stewardship issues beyond the postclosure period, nor do they address property rights issues.

The public comment period on the proposed rule closed on December 24, 2008. The PCOR Partnership provided comments to EPA, and those comments are included in Appendix A. According to EPA's regulatory agenda, final action on the rule should be complete by December 2010 (U.S. Environmental Protection Agency, 2009).

INTERSTATE OIL AND GAS COMPACT COMMISSION (IOGCC)

The IOGCC Geological CO_2 Sequestration Task Force, working with member states and others, was given the task of developing regulatory guidelines for CO_2 sequestration. The primary objective of the task force was to examine the technical, policy, and regulatory issues related to safe and effective storage of CO_2 in the subsurface (oil and natural gas fields, coal beds, and saline formations), whether for enhanced hydrocarbon recovery or permanent storage. A final report was produced that contained an assessment of the current regulatory framework likely applicable to geological CO_2 sequestration and recommended regulatory guidelines and guidance documents.

Additionally, the task force has developed a model statute and regulations that deal with site licensing, well operation, well/site closure, and long-term storage of CO_2. The statute and regulations were released to the public the end of September 2007 and provided guidance to states as they undertake the effort of developing their own statutes and regulations to deal with the geologic storage of CO_2. The final report, entitled "CO_2 Storage: A Legal and Regulatory Guide for States," was released in January 2008.

Recently, IOGCC formed a Pipeline Transportation Task Force to identify barriers and opportunities for wide-scale deployment of a CO_2 pipeline transportation system. The task force will educate decision makers as to policy, legal, regulatory, and liability frameworks for CO_2 transportation and facilitate cooperation among key stakeholders regarding pipeline planning and development (Bliss, 2009).

REGIONAL INITIATIVES

Three regional greenhouse gas initiatives are now in place to reduce CO_2 emissions through the adoption of cap-and-trade programs and the implementation of complementary processes focused on topics such as energy efficiency, low-carbon transportation fuels, and renewable electricity production, to name a few. As listed below, the first of these initiatives was established at the end of 2005, while the other two were put in place during calendar year 2007:

- Regional Greenhouse Gas Initiative (RGGI) (December 2005)
- Midwest Greenhouse Gas Reduction Accord (MGGRA) (November 2007)[1]
- Western Climate Initiative (WCI) (February 2007)

[1] The Energy Security and Climate Stewardship Platform (November 2007) represents a broader energy initiative that is a companion to the MGGRA. It was formed on, or about the same time, as the Accord.

These initiatives now include 23 states as full members and nine states as observers (see Figure 1). These states span the entire United States, including representation from the West Coast, northern plains, Rocky Mountains, Midwest, mid-Atlantic, and East Coast. The initiatives also include six of the ten Canadian provinces, four as full members and two as observers. Observers from six Mexican border states are also involved in the WCI. Table 1 provides a summary of each of these initiatives, providing the date of formation; the participants of the initiative, including both members and observers; the industry sectors that are addressed; and the original goals and mandates of each effort. As shown in Table 1, these initiatives have developed processes to create regional markets that utilize cap-and-trade, along with the trading of emission allowances, as their primary operating mechanism.

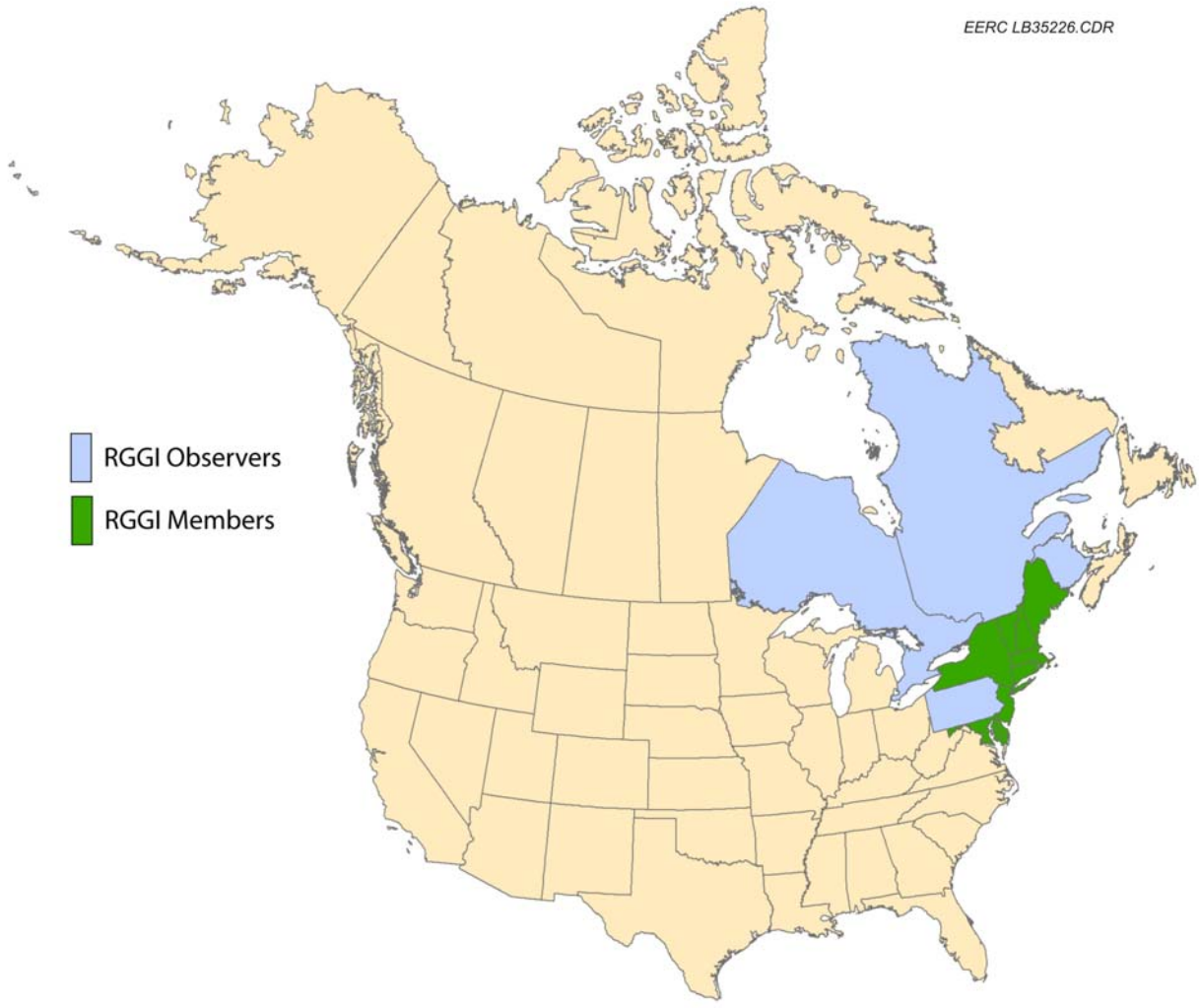

Figure 1. Map of RGGI participants.

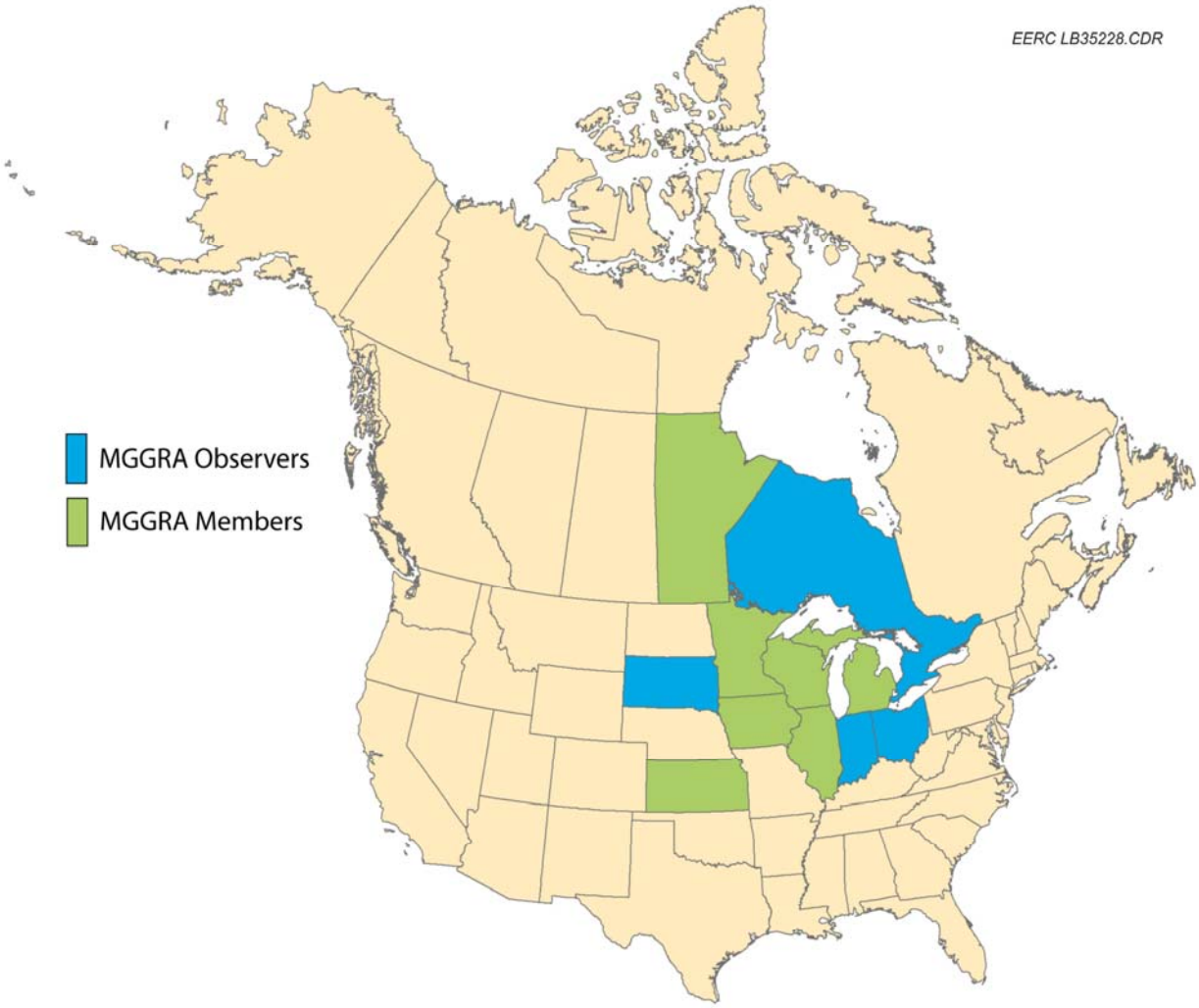

Figure 2. Map of MGGRA participants.

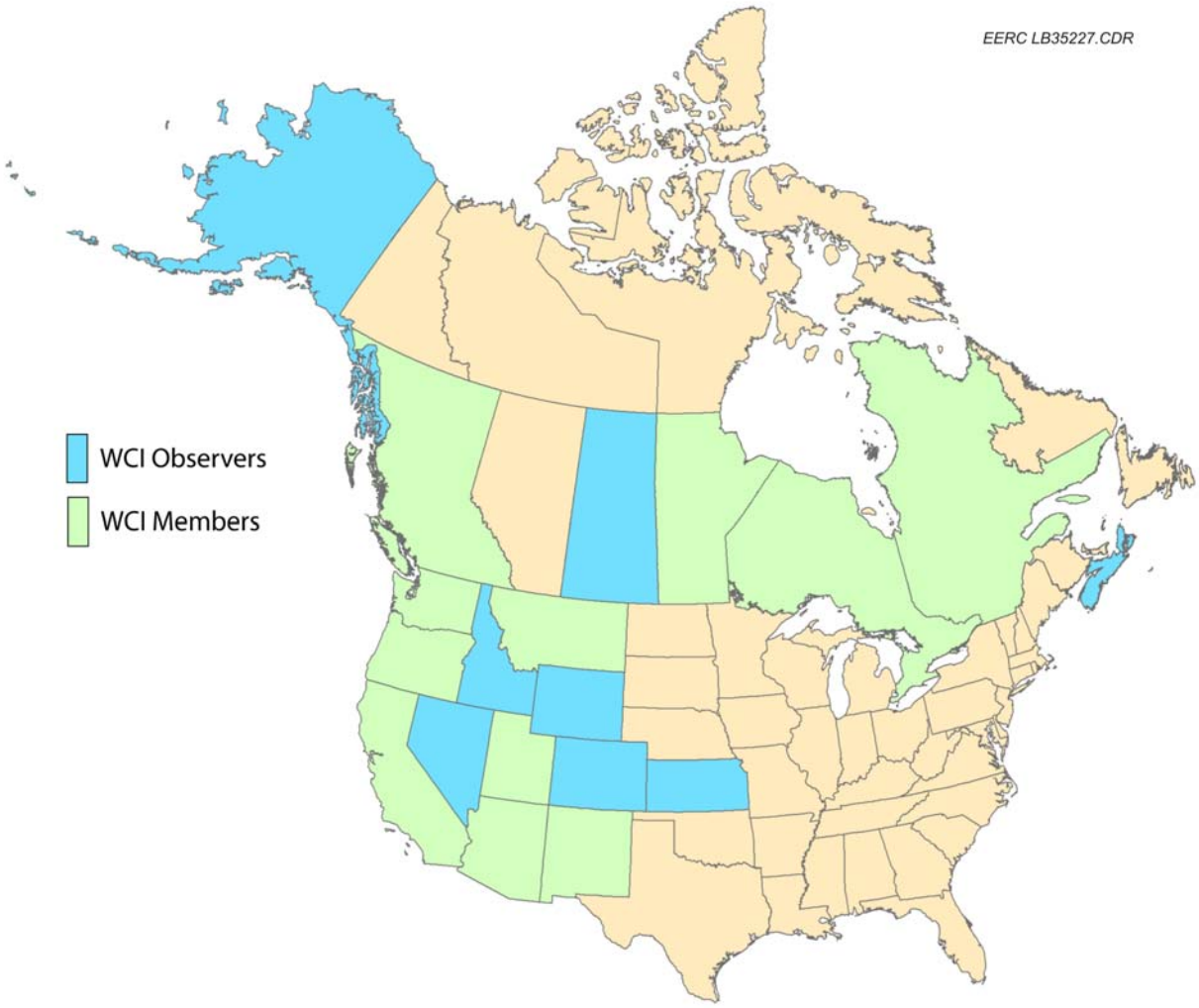

Figure 3. Map of WCI participants.

Table 1. Overview of Greenhouse Gas Regional Initiatives[1]

Initiative	Date Formed	Participants		Industry Sectors	Goals/Mandates
		Members	Observers		
RGGI	December 2007	**States** Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Rhode Island, and Vermont	**States** Pennsylvania **Canadian Provinces** Ontario Quebec New Brunswick	Power plants	• Implement the first cap-and-trade program for CO_2 • Establish CO_2 emission cap from power plants and allow sources to trade emission allowances 1. Initially, cap CO_2 emissions at 2009 levels 2. Reduce emissions by 10% by 2019
MGGRA	November 2007	**States** Illinois, Iowa, Kansas, Michigan, Minnesota, and Wisconsin **Canadian Provinces** Manitoba	**States** Indiana, Ohio, and South Dakota **Canadian Provinces** Ontario	Multisector	• Long-term target: 60% to 80% decrease in CO_2 from current emission levels by 2050 • Develop multisector cap-and-trade system • Develop greenhouse gas emission-tracking system • Develop other policies to aid in reducing emissions, such as low carbon fuel standards • Addresses greenhouse gases as defined by United Nations Framework Convention on Climate Change (i.e., CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride)

1 Information in this section is summarized from the Pew Center on Global Climate change (accessed 2009) and the Snow and Graves ECOS Green Report (2007).

Continued…

Table 1. Overview Of Greenhouse Gas Regional Initiatives (continued)[1]

Initiative	Date Formed	Participants		Industry Sectors	Goals/Mandates
		Members	Observers		
WCI	February 2007	**States** Arizona, California, New Mexico, Oregon, Washington, Utah, and Montana **Canadian Provinces** British Columbia, Manitoba, Ontario, and Quebec	**States** Alaska, Colorado, Idaho, Kansas, Wyoming, and Nevada **Canadian Provinces** Nova Scotia and Saskatchewan **Mexican Border States** Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas	2012: Focus on electricity generation and large industrial and commercial sources 2015: Include transportation and other residential, commercial, and industrial fuel use.	• Establish regional emission target and market-based system, such as a cap-and-trade program, covering multieconomic sectors to achieve target. 1. Announced regional, economywide greenhouse gas emission target of 15% below 2005 levels, or approximately 33% below "business-as-usual" levels, by 2020 (August 2007) 2. Released design recommendations for cap-and-trade program: a) beginning in 2012, program will cover emission from electricity generation and large (>25,000 metric tons a year of CO_2 equivalents) industrial and commercial sources and b) effective in 2015, emissions from transportation and other residential, commercial, and industrial fuel use will be included. • Mandatory reporting is required in early 2011 for calendar year 2010. Reporting threshold is 10,000 metric tons of direct emissions. • Third-party verification on reporting data required for facilities over the 25,000-metric-ton threshold. • Addresses greenhouse gases as defined by United Nations Framework Convention of Climate Change (i.e., CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride)

1 Information in this section is summarized from the Pew Center on Global Climate change (accessed 2009) and the Snow and Graves ECOS Green Report (2007).

STATE AND PROVINCIAL UPDATES

In addition to the activities listed under the previous section of this report, the following is an update of state and provincial activities related to CCS that was given by each entity's respective regulatory authority at a recently held Regulatory Brainstorming Workshop (June 16 and 17, 2009, Deadwood, South Dakota) sponsored by the PCOR Partnership. While many states appear to be waiting for the conclusion of EPA's rule-making process (see the previous section on EPA Proposed Rules), others are moving forward with the development of their own regulations for CCS projects (see Table 2).

Table 2. Listing of State/Provincial CCS Rulemaking Activity

Province/State	CCS Rules/Regulations In Place or under Development
Alberta	X
British Columbia	X
Iowa	
Manitoba	
Minnesota	
Missouri	
Montana	X
Nebraska	
North Dakota	X
Saskatchewan	X
South Dakota	
Wisconsin	
Wyoming	X

British Columbia

The province of British Columbia is in the process of addressing the issue of CO_2 injection for non-enhanced oil recovery (EOR)-related activities. The update received at the regulatory brainstorming session indicated that existing legislation can be modified slightly to accommodate non-EOR injection and regulatory authority for those initiatives would lie with the British Columbia Oil and Gas Commission.

Alberta

In January 2008, the Alberta Climate Change Strategy was announced. Components of the strategy included a commitment to CCS development activities and provided for the formation of the Alberta Carbon Capture and Storage Development Council. This council provided an interim report entitled "Accelerating Carbon Capture and Storage in Alberta" in December 2008. In order for Alberta to excel at advancing CCS technology implementation, the report recommends a "robust fiscal framework, a clear regulatory framework, and a comprehensive research and development and technology development program" (Alberta Carbon Capture and Storage

Development Council, 2008). To that end, the province has committed $2 billion to fund CCS projects, with the recipients of the funding expected to be announced by the end of July 2009.

While minor modifications may be needed in existing legislation to clarify disposal and tenure rights for long-term CO_2 storage, the Energy Resources Conservation Board (ERCB) is currently prepared to accept applications for CCS projects. The ERCB plans to regulate CCS activities under existing regulations that focus on general technical requirements and by conducting an evaluation of each individual CCS application. Based on the evaluation, the ERCB may apply "approval conditions" on the proposal that would necessitate additional regulatory requirements intended to manage the unique aspects of a specific project (Alberta Carbon Capture and Storage Development Council, 2008).

Saskatchewan

The 2009–2010 Plan for the Ministry of Energy and Resources in Saskatchewan calls for the ministry to support ongoing projects related to CCS. The ministry staff is reviewing existing regulations to determine what changes may be necessary to accommodate CO_2 injection for non-EOR related projects. Ownership of the pore space is one of the current focus areas.

Montana

In May 2009, the governor of Montana signed Senate Bill 498 which gives authority to regulate CCS projects to the Board of Oil and Gas Conservation. The bill gives the board the authority to seek primacy from EPA for CCS projects, and a majority of the legislation is not in effect until primacy is granted to the state. Additionally, further development of rules is expected to hinge on primacy designation. The bill does state that pore space ownership resides with the surface owner if no one else "owns" it.

Wyoming

Wyoming has passed five bills in the last 2 years that cover the general legislative framework for CCS, pore space ownership, and unitization. Issues related to long-term stewardship are still in development and are expected to be considered by the legislature in 2010. Development of comprehensive rules is also under way, including conducting public meetings, with the process expected to be completed by December 2009. Wyoming is unique in the PCOR Partnership region in that it split the regulatory authority governing CO_2 injection activities. While authority for CO_2 injection for EOR projects resides with the Wyoming Oil and Gas Conservation Commission, authority for non-EOR injection falls under the Wyoming Department of Environmental Quality (DEQ). Additionally, because of the vast amount of federal lands in the state, it is anticipated that following the postclosure period for storage projects, liability will not transfer to the state.

Missouri

Missouri currently does not have regulations directly related to geologic carbon sequestration. The state has a new governor, and the Department of Natural Resources has a new department head; therefore, future policy initiatives are being formulated.

Nebraska

Nebraska Public Power, which is publicly owned, has expressed interest in geologic sequestration of CO_2. While Nebraska does not have legislation or regulations in place for CCS, it is anticipated it would follow IOGCC recommendations.

South Dakota

Currently, South Dakota does not have CO_2 sequestration regulations. Various legislators have expressed an interest in CCS; therefore, the South Dakota DEQ is conducting relevant research activities that would allow for the possibility of legislation being introduced next session.

This past spring saw the signing into law of House Bill 1129 that requires the Public Utilities Commission to regulate CO_2 pipelines.

North Dakota

The North Dakota legislature has passed, and the governor has signed, two bills related to the geologic storage of CO_2. The first deals with pore space ownership and specifies that the surface owner is the pore space owner, while preserving the mineral owners' dominance. Additionally, it does not allow for separation of pore space ownership and surface ownership. The second bill is the CCS bill. It assigned regulatory authority for CCS projects to the North Dakota Industrial Commission's Division of Mineral Resources, the regulatory body that oversees oil and gas activities. The bill defines CO_2 storage projects as separate from EOR projects but provides for the conversion of an EOR project to a storage project. It also allows the Industrial Commission to certify storage that occurs during EOR projects. It also allows for liability transfer to the state after the closure period of the project. Formal rule making is expected to begin in July 2009.

REGULATORY PERMITTING ACTION PLANS FOR PHASE II FIELD VALIDATION TESTS

The PCOR Partnership developed permitting action plans for the Zama, Northwest McGregor, lignite, and terrestrial field validation tests. The action plans provide background information on each project and describe the regulatory and permitting steps taken by the EERC and its partners to conduct the four field validation tests. Additionally, relevant federal, state, and provincial regulatory summaries were provided. The full text of each permitting action plan can be found in the following appendices:

- Appendix B: Zama Field Validation Test
- Appendix C: Northwest McGregor Field Validation Test
- Appendix D: Lignite Field Validation Test
- Appendix E: Terrestrial Field Validation Test

SUMMARY/CONCLUSIONS

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. Additionally, rules are needed to protect the physical, biological, and chemical quality of our nation's resources from irresponsible use. It often takes time to complete environmental reviews and obtain permits for various types of energy development and sequestration projects. Therefore, the PCOR Partnership developed permitting action plans for each Phase II field validation test to assist those conducting the tests in meeting their respective regulatory requirements. Since the plans were developed, numerous relevant initiatives have been under consideration. Currently developing regulatory activities at the federal and state/provincial levels may affect the way similar projects would be permitted in the future.

CCS technology and policy development are taking a prominent position in the climate change debate occurring in the U.S. Congress and in state/provincial legislatures. This debate has spurred federal and state/provincial agencies to start their CCS rulemaking activities. In addition, various regional initiatives have been fashioned across the United States and Canada to develop greenhouse gas emission strategies, in which CCS may play a role as an offset option. As these activities evolve, the PCOR Partnership will continue to evaluate their potential effects on CCS technology development and, where necessary, will provide input and guidance to regulators and those making policy decisions.

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