Plains CO₂ Reduction Partnership Initiative to Accelerate Carbon Capture, Utilization, and Storage Deployment (FE0031838)

U.S. Department of Energy National Energy Technology Laboratory
Carbon Storage Virtual Project Review Meeting
September 8, 2020, 11:50 a.m. EDT

Kevin Connors
PCOR Partnership Project Manager
OUR VISION

TO LEAD THE WORLD IN DEVELOPING SOLUTIONS TO ENERGY AND ENVIRONMENTAL CHALLENGES.
REGIONAL CARBON SEQUESTRATION PARTNERSHIPS (RCSP)

RCSP Initiative Goal:
*Identify and address regional storage and transport challenges facing commercial CCUS deployment.*

- Wisconsin, Iowa: Coordinating with Battelle.
- Montana: Coordinating with New Mexico Institute of Technology.
- Missouri: Coordinating with Battelle and the Southern States Energy Board.
PLAINS CO₂ REDUCTION (PCOR) PARTNERSHIP


2005–2008 – PCOR Partnership: Field Validation

2007–2019 – PCOR Partnership: Commercial Demonstration

2019–2024 – PCOR Partnership Initiative: Commercial Deployment
Five key messages relate to:

1. Our engaged membership.
2. Outstanding regional CCUS potential.
3. CCUS works! We have demonstrated:
   a) Low risks of storage.
   b) Successful monitoring, verification, and accounting (MVA).
4. Economic and environmental benefits.
5. Active public engagement and outreach.
The PCOR Partnership Initiative is addressing regional capture, transport, use, and storage challenges facing commercial CCUS deployment. The Initiative is focusing on:

- Strengthening the technical foundation for geologic CO₂ storage and enhanced oil recovery.
- Advancing capture technology.
- Improving application of monitoring technologies.
- Promoting integration between capture, transportation, use, and storage industries.
- Facilitating regulatory frameworks.
- Providing scientific support to policy makers.
ADAPTIVE MANAGEMENT APPROACH

![Diagram showing the adaptive management approach with stages such as Site Screening, Feasibility, Design, Construction/Operation, and Closure/Postclosure, with GO and NOGO decision points. The diagram highlights improved CO₂ storage system understanding.](Image credit – EERC)
PCOR PARTNERSHIP INITIATIVE TASK OVERVIEW

Technical Challenges
- Geologic Characterization
- Storage Performance and Optimization
- MVA Strategies
- Risk Management

Data Collection, Sharing, and Analysis
- NRAP Validation
- Machine Learning
- Risk-Based Area of Review (AOR)

Regional Infrastructure
- Techno-Economic Analysis
- Infrastructure Scale-Up Challenges
- Socioeconomic Impacts
- Public and Industry Outreach

Nontechnical Challenges
- Policy and Regulatory Challenges
- Business Models
- Pathways to Commercial Deployment
TECHNICAL CHALLENGES

• Geologic Characterization
• Storage Performance and Optimization
• MVA Strategies
• Risk Management
DATA COLLECTION, SHARING, AND ANALYSIS

- NRAP Validation
- Machine Learning
- Risk-Based Area of Review (AOR)
REGIONAL INFRASTRUCTURE

• Techno-Economic Analysis
• Infrastructure Scale-Up Challenges
• Socioeconomic Impacts
• Public and Industry Outreach
REGIONAL SOURCES
PCOR PARTNERSHIP: CCUS ACTIVITIES
NONTECHNICAL CHALLENGES

• Policy and Regulatory Challenges
• Business Models
• Pathways to Commercial Deployment
# Underground Injection Control Class VI Primacy

<table>
<thead>
<tr>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
<th>Class V</th>
<th>Class VI</th>
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<tbody>
<tr>
<td>Hazardous and nonhazardous fluids (industrial and municipal wastes).</td>
<td>Brines and other fluids associated with oil and gas production.</td>
<td>Fluids associated with solution mining of minerals.</td>
<td>Hazardous or radioactive wastes. This class is banned by EPA.</td>
<td>Nonhazardous fluids into or above a USDW and are typically shallow.</td>
<td>Injection of carbon dioxide for long-term storage.</td>
</tr>
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</table>

*EPA retains direct implementation authority for class II wells in Florida and Idaho.
North Dakota has legislation in place that addresses pore space ownership and access, and long-term stewardship. Class VI Primacy was granted in April 2018.

Montana has legislation in place for pore space issues and long-term stewardship. Rule development will begin once primacy for underground injection of CO₂ for storage purposes is received from EPA.

British Columbia is reviewing regulatory framework for CCS. Additional legislation may be considered for clarification purposes.

Saskatchewan has adopted existing oil and gas regulations for CO₂ storage.

Wyoming has legislation in place that addresses pore space ownership and long-term stewardship. Class VI Primacy was granted in August 2020.

Alberta has developed regulations for storage, pore space ownership, and long-term stewardship.

Engaged Regulators

Numerous states and provinces in the region have commissioned studies to investigate the potential for CCS in their respective jurisdictions. Additionally, many states and provinces are involved in regional initiatives that are contemplating various solutions, including CCS, as a means to manage CO₂ emissions.
SYNERGY OPPORTUNITIES

• Developing CCUS opportunities in the region
• Catalyst for CCUS projects in the region
• Focused on infrastructure development strategies
• Ethanol Industry in the region accelerating CCUS
• CarbonSAFE Phase III
• Brine Extraction and Storage Test (BEST)
VALUABLE RESULTS
VALUABLE RESULTS MULTIPLIED
PCOR PARTNERSHIP INITIATIVE SUMMARY

Building on over 17 years of applied research in CCUS

Active region developing commercial CCUS projects.

Engaged and motivated partners

Well-equipped project team
THANK YOU
ACKNOWLEDGMENT

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APPENDIX

• These slides will not be discussed during the presentation, but are mandatory.
PCOR PARTNERSHIP: PROJECT GANTT CHART
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<tr>
<th>Task/Subtask</th>
<th>Milestone (M) Title &amp; Description</th>
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<td>M2 – Initial Techno-Economic Framework Established</td>
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<td>M3 – Annual Meeting Scheduled</td>
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<td>M5 – Data Share with National Lab for NRAP Assessment</td>
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## PCOR FUNDING

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