

THE PLAINS CO₂ REDUCTION (PCOR) PARTNERSHIP: DEVELOPING CARBON MANAGEMENT OPTIONS FOR THE CENTRAL INTERIOR OF NORTH AMERICA

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The PCOR Partnership is one of seven regional partnerships established by the U.S. Department of Energy National Energy Technology Laboratory to assess and develop carbon sequestration opportunities. The PCOR Partnership covers an area of over 1.4 million square miles in the central interior of North America and includes all or parts of nine states and four Canadian provinces. The PCOR Partnership is characterizing the region's stationary CO₂ sources and sinks and evaluating the efficacy of CO₂ capture and storage (CCS) in our region by providing outreach and support for carbon management activities for our industrial, governmental, and other partners and conducting commercially relevant demonstrations.

The PCOR Partnership has conducted four field validation tests thus far: 1) Apache Canada Limited hosted a combined enhanced oil recovery (EOR)/sequestration activity that injected acid gas (approximately 70% CO₂ and 30% H₂S) into a pinnacle reef structure from the Zama, Alberta, gas plant for use as a miscible flood agent; 2) an EOR project in the Williston Basin demonstrated the potential of using CO₂ in a tertiary oil recovery operation in a carbonate formation at depths of approximately 8000 feet; 3) the potential for simultaneous CO₂ sequestration and enhanced coalbed methane production in Williston Basin lignite was investigated; and 4) a terrestrial field validation test developed carbon offsets from the use of alternative land management of wetlands in the Prairie Pothole Region.

The PCOR Partnership has teamed with industrial partners to conduct two commercial-scale (greater than 1 million tons per year) CCS demonstrations in the region. One of the large-scale tests will demonstrate CO₂ storage in a saline formation, while the other will be a combined CCS and EOR demonstration. The sources of CO₂ in both demonstrations are natural gas-processing facilities. The commercial-scale demonstration tests are designed to establish the technical and economic efficacy of CCS in the region, and injections are planned to begin in 2012 for both projects.

The PCOR Partnership region has several seismically stable geologic basins that are ideal storage targets for CCS. These basins have been well-characterized because of commercial oil and gas activities and have very significant CO₂ storage capacities. The region's energy industry is evaluating carbon management options including CCS. Many of the region's oil fields could develop CO₂-based EOR projects if CO₂ were more readily available. CO₂-based tertiary EOR projects offer a means of developing the expertise and infrastructure required to make geologic CCS a commercial reality.

The PCOR Partnership has developed a regional vision for the widespread commercial development of CCS. The PCOR Partnership regional vision includes several key elements: 1) targeting relatively low-cost anthropogenic CO₂ sources such as gas-processing facilities and ethanol plants; 2) employing tertiary EOR opportunities as initial sink targets whenever the

economics and geology are favorable; 3) using the existing oil and gas regulatory structure and agencies for oversight; 4) developing a protocol for the establishment of geologic sequestration units that is based on the standard oil field practice of unitization; 5) developing rigorous site selection criteria that will allow for the adoption of commercially viable monitoring, verification, and accounting (MVA) procedures; 6) developing integrated risk management, MVA, and simulation project plans that continue to evolve as the project progresses and more data become available; and 7) ultimately developing the information needed for our commercial partners to monetize carbon credits to reduce the costs of CCS projects. The realization of this vision will result in the development of both saline formation injection and EOR-based opportunities in our region, which has very favorable geology and socioeconomic conditions for the widespread adoption of CCS.