

The Plains CO₂ Reduction (PCOR) Partnership: Carbon Capture and Storage Demonstration Activities

Edward N. Steadman, John Harju, Daniel J. Daly, Charles Gorecki, Melanie D. Jensen, Wesley D. Peck, Steven A. Smith, and James Sorensen

Energy & Environmental Research Center, University of North Dakota, Grand Forks, ND.

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 development of CO₂ capture and storage (CCS) in our region by providing outreach and technical 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 ft; 3) the potential for simultaneous CO₂ sequestration and enhanced coal-bed methane production in a Williston Basin unminable lignite coal seam 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 of CO₂ a year) CCS demonstrations in the region. One of the largescale tests will demonstrate CO₂ storage in a saline formation. In this demonstration, sour CO₂ (a mixture of CO₂ and H₂S) will be injected to a depth of approximately 7200 ft. The PCOR Partnership is providing measurement, verification, and accounting (MVA) for the project.

The second commercial-scale demonstration will be a combined CCS and EOR demonstration that will provide insight regarding the impact of miscible CO₂-flood tertiary recovery on oil production and successful CO₂ storage within a sandstone reservoir. 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.