OVERVIEW OF THE BELL CREEK COMBINED CO_2 STORAGE AND CO_2 EOR PROJECT

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The Plains CO_2 Reduction (PCOR) Partnership, led by the Energy & Environmental Research Center, is working with Denbury Onshore LLC (Denbury) on a combined carbon dioxide (CO_2) enhanced oil recovery (EOR) and CO_2 storage demonstration project in the Bell Creek oil field in southeastern Montana, USA. This project will evaluate the potential for combined CO_2 EOR and CO_2 storage, which will reduce net CO_2 emissions while simultaneously recovering an anticipated 35 million barrels of incremental oil.

The Bell Creek demonstration project will provide a unique opportunity to develop cost-effective monitoring, verification, and accounting (MVA) protocols for a large-scale (>1 million tons a year) combined CO_2 EOR and storage project in a clastic formation. The effectiveness of the MVA activities will be at least partially dependent on developing a thorough site characterization, modeling and simulation, and risk assessment effort. To aid in this effort, a monitoring and characterization well was completed in January 2012. A host of state-of-the-art data and geologic core samples were acquired that will allow for better understanding of the geologic environment and the ability to calibrate historic information to a suite of modern high-resolution data.

Monitoring of the surface, near-surface, and deep subsurface environment is an essential component of any carbon storage project. The primary objective is to obtain critical data to verify site security and assess variances within the predicted injection program. The MVA plan has been divided into separate shallow and deep subsurface monitoring plans. The purpose of the shallow plan is to establish preinjection conditions for naturally occurring CO_2 present in the surface and near-surface environment and to provide a source of data to compare postinjection conditions during the project's lifetime. The goal of the deep subsurface monitoring plan is to track the movement of CO_2 in the reservoir, evaluate the recovery efficiency of the CO_2 EOR program, identify fluid migration pathways, and determine the ultimate fate of injected CO_2. The PCOR Partnership's philosophy is to combine site characterization, modeling, risk assessment, and monitoring strategies into an iterative process to produce descriptive integrated results.