The Plains CO_2 Reduction Partnership's Phase III
Bell Creek Integrated CO_2 EOR and Storage Project

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ABSTRACT

The Plains CO_2 Reduction Partnership is working with Denbury Resources to evaluate the efficacy of large-scale purposes of injection of carbon dioxide (CO_2) into the Bell Creek oil field for the simultaneous CO_2 enhanced oil recovery (EOR) and long-term CO_2 storage. Discovered in 1967, the Bell Creek Field in southeastern Montana has produced approximately 132 million barrels (MMbbl) of oil from the Cretaceous Muddy Sandstone Formation. Encompassing 21,771 acres, with more than 450 current or past producing wells, the Bell Creek Field is one of the most significant oil fields in Montana. The original oil in place (OOIP) for the field was estimated to be approximately 350 MMbbl of oil. Through primary production (solution gas drive), waterflooding, and two Micellar-Polymer pilot tests, about 37.5% of the OOIP has been produced, leaving an estimated 218 MMbbl of oil in the reservoir. CO_2 flooding has been selected to recover an estimated 35 MMbl of incremental oil, while simultaneously storing large volumes of CO_2 in the deep subsurface, reducing carbon emissions to the atmosphere.

Approximately 50 million cubic feet of CO_2 per day will be captured at the ConocoPhillips Lost Cabin Gas Processing Plant in northeastern Wyoming and transported via a pipeline approximately 230 miles long to the Bell Creek Field. Plans are under way to build compression facilities adjacent to the Lost Cabin Gas Plant to take the CO_2 from 50 to 2200 psi, allowing for delivery to the project site at injection-ready pressure. The CO_2 will then be injected through multiple injection wells into the Muddy Formation at a depth of approximately 4500 feet.

The Bell Creek Integrated CO_2 EOR and Storage Project provides a unique opportunity to develop a set of cost-effective monitoring techniques for large-scale (>1 million tons a year) storage of CO_2 in a mature oil field with simultaneous oil recovery. The results of the Bell Creek project will provide insight regarding the impact of large-scale CO_2 injection on sink integrity (i.e., seal degradation), monitoring techniques, and regional applicability of implementing successful CO_2 storage projects within the context of EOR.