PLAINS CO_2 REDUCTION (PCOR) PARTNERSHIP (PHASE III) WILLISTON BASIN TEST SITE GEOLOGICAL CHARACTERIZATION DATA COLLECTION INITIATED – MILESTONE M7

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PROJECT DESCRIPTION

Activities will be conducted in an oil field in the U.S. portion of the Williston Basin to evaluate the potential for geological sequestration of CO_2 in an oil reservoir for the dual purposes of CO_2 sequestration and enhanced oil recovery (EOR). Phase I studies indicated that the Williston Basin oil fields may have over 500 million tons of CO_2 storage capacity associated with potential EOR operations. It is likely that the target injection zone for the project will be located at a depth of between 6000 and 12,000 ft.

BRIEF SUMMARY OF THE GEOLOGICAL CHARACTERIZATION WORK PLAN

The goal for the PCOR Partnership activities at the Williston Basin site is to develop and implement a monitoring, mitigation, and verification strategy that establishes the integrity of the selected oil field with respect to large-volume CO_2 injection and storage. To accomplish that goal, a thorough understanding of the geological characteristics of the test site is necessary. Geological characterization activities conducted for the Williston Basin test will include determining the following:

- Baseline geology
- Rock mineralogy and composition of formation water
- Baseline hydrogeology
- Mechanical rock properties and stress regime
- Nature of geochemical interactions between formation and injected fluids and reservoir rock and cap rock
- Nature of wellbore integrity and leakage potential

Key geological characteristics affecting the long-term mobility and fate of the injected acid gas stream will be evaluated at three different scales:

- Reservoir scale (few kilometers in radius from the injection site)
- Local scale (tens of kilometers in radius from the injection site)
- Regional or subbasin scale (hundreds of kilometers in radius from the injection site)

Work at the **reservoir scale** will focus on an area within a few kilometers in radius of the injection site, with a focus on the key underlying and overlying units.

Work at the **local scale** will cover an area tens of kilometers in radius from the injection site (exact area to be determined based on the location of the actual site with respect to key geological features such as anticlines or lineament zones). Stratigraphically, the entire sedimentary succession from the basement to the surface will be evaluated at the local scale.

Work at the **regional**, or **subbasin scale**, will evaluate relevant data and information on key geological formations over a large portion of the Williston Basin (i.e., the Northeast Flank, the South Heart area, etc). Hydrogeological systems and the regional continuity of key sealing formations will be the focus of studies at this large scale.

In addition, the flow regime in target injection formations may be examined at the **basin scale** to determine long-term flow characteristics and the potential for discharge over geologic time (>10,000 years).

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A series of activities have been initiated to develop geological characterization data at the basin scale and the regional, or subbasin, scale. The initial region of focus is an area in southwestern North Dakota referred to as the South Heart Study Area. There are a number of oil fields in the South Heart Study Area which may be considered to be candidate sites for the Phase III Williston Basin demonstration. While the specific site has not yet been selected, the PCOR Partnership team has decided that it is appropriate at this time to initiate non-site-specific regional baseline characterization activities. These activities have included the acquisition of well log data in the South Heart Study Area and the development of geologic maps, including structure, stratigraphy, hydrogeology, and tectonic features such as faults, fracture zones, and lineaments.