OVERVIEW, STATUS, AND FUTURE OF THE FORT NELSON CCS PROJECT

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The Plains CO_2 Reduction Partnership, led by the University of North Dakota Energy & Environmental Research Center, and Spectra Energy Transmission (SET) are investigating the feasibility of a carbon capture and storage (CCS) project to mitigate carbon dioxide (CO_2) emissions produced by SET's Fort Nelson Gas Plant (FNGP). The FNGP is located near the town of Fort Nelson in northeastern British Columbia, Canada. The gas stream produced by the FNGP will include up to 5% hydrogen sulfide (H_2S) and a small amount of methane (CH_4), and therefore is referred to as a "sour" CO_2 stream. The proposed injection target is a carbonate formation in a Devonian reef complex, with thick overlying shales serving as seals. The Fort Nelson CCS project provides a unique opportunity to develop a set of cost-effective, risk-based monitoring, verification, and accounting (MVA) protocols for large-scale (>1 million metric tons per year) storage of sour CO_2. The results of the Fort Nelson activities will provide insight regarding 1) the behavior of dense-phase sour CO_2 in a deep brine-saturated carbonate reservoir environment; 2) the impact of dense-phase sour CO_2 on the integrity of sink and seal rocks; 3) the effects of large-scale sour CO_2 injection and storage on wellbore integrity; 4) the effectiveness of selected MVA techniques; and 5) the use of an approach that combines iterative site characterization, modeling and simulation, risk assessment, and MVA planning to safely and cost-effectively inject and store large volumes of sour CO_2.

Key technical activities conducted to date include:

- Acquisition and synthesis of previously existing geological data.
- Drilling and testing of an exploratory well.
- Laboratory testing of sink and seal materials.
- Development of static geological models.
- Dynamic modeling and simulations.
- Comprehensive risk assessment.
- Collection of shallow groundwater baseline data.

Results suggest that the geology in the vicinity of the FNGP is amenable to large-scale, geologic storage of CO_2. However, additional work must be done to confirm the integrity and

capacity of the proposed storage reservoir. An iterative update process between site characterization, modeling and simulation, risk assessment, and MVA is being conducted to ensure regulatory compliance and project safety.