ZAMA ACID GAS EOR, CO_2 SEQUESTRATION, AND MONITORING PROJECT

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ABSTRACT

A comprehensive monitoring, mitigation, and verification (MMV) plan is critical to the success of any geological carbon sequestration project utilized as a method of reducing CO_2 emissions to the atmosphere. Since October 2005, the Zama oil field in northwestern Alberta, Canada, has been the site of acid gas (approximately 70% CO_2 and 30% H_2S) injection for the simultaneous purpose of enhanced oil recovery (EOR), H_2S disposal, and CO_2 sequestration. The Zama project has been designed to address the issue of monitoring CO_2 sequestration at EOR sites utilizing H_2S-rich acid gas as the sweep mechanism, in a cost-effective and reliable manner. The primary issues that have been addressed include 1) cap rock leakage, 2) long-term fate prediction of injected acid gas, and 3) generation of data sets that will support the development and monetization of carbon credits. To address these issues, research activities have been conducted at multiple scales of investigation in an effort to fully understand the ultimate fate of the injected gas. Geological, geomechanical, geochemical, and engineering work has been used to fully describe the injection zone and adjacent strata in an effort to predict the long-term storage potential of this site. Through these activities, confidence in the ability of the Zama oil field to provide long-term containment of injected gas has been achieved. Results obtained from these activities can be applied not only to additional pinnacles in the Alberta Basin, but to similar structures throughout the world.