

ZAMA ACID GAS EOR, CO₂ SEQUESTRATION, AND MONITORING PROJECT

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ABSTRACT

Since October 2005, the Zama Oil Field in northwestern Alberta, Canada, has been the site of acid gas (approximately 70% CO₂ and 30% H₂S) injection for the simultaneous purposes of enhanced oil recovery (EOR), H₂S disposal, and sequestration of CO₂. Beginning in December 2006 and continuing through the present, injection has taken place at a depth of 4900 feet into one of over 800 pinnacle reef structures that have been identified in the Zama Subbasin. To date, over 40,000 tons of acid gas have been injected, resulting in more than 25,000 barrels of incremental oil production. Demonstrating cost-effective monitoring at EOR sites that utilize H₂S-rich acid gas as the sweep mechanism has been the overall goal of the project. The primary issues that have been addressed include 1) cap rock leakage, 2) long-term prediction of injectate fate, and 3) generation of data sets that provide technical support for the development and monetization of carbon credits. To address these issues, activities have been conducted at multiple scales of investigation in an effort to fully understand the ultimate implications of injection. Geological, geomechanical, geochemical, and engineering work has been used to fully describe the injection zone and adjacent strata in an effort to prove 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.