

FRONTIER FIELD SERVICES, LLC
an AKA Energy Company
Maljamar, New Mexico

Frontier Maljamar Acid Gas Injection Well #1

Frontier Field Services, LLC (Frontier), a subsidiary of AKA Energy (AKA), retained Geolex, Inc.® (Geolex) to evaluate the potential and feasibility for an Acid Gas Injection (AGI) well in the area of the Frontier Maljamar Gas Plant (Maljamar Plant) located near Maljamar, New Mexico. The Maljamar Plant operated under an Air Quality Permit, restricting flaring to five tons of sulfur per day. This restricted the ability to operate the Maljamar Plant at full capacity because it would have exceeded the air quality control limitations. The installation of the Maljamar AGI #1 allows Frontier to run their plant at full capacity, cease flaring hydrogen sulfide (H₂S) and emitting sulfur dioxide (SO₂) and carbon dioxide (CO₂) to the atmosphere, and reduce consuming significant amounts of natural gas included in the combustion process. Instead, the Maljamar Plant operating at full capacity will permanently sequester approximately 101 tons of CO₂ and 10.7 tons of H₂S per day. Replacing the flare with the AGI well for treated acid gas (TAG) disposal increases both the efficiency and the capacity of the Maljamar Plant. The progression for implementing the Maljamar AGI #1 included:

Phase I – AGI Feasibility Study:

Geolex prepared a detailed geological analysis of the area surrounding the Maljamar Plant to identify potential AGI reservoirs using analyses of well logs and 3-D seismic data. This study also included evaluating land uses in the surrounding properties, existing and potential oil and gas production in the area, and a regulatory and permitting review regarding the requirements for successful application for an AGI well from the New Mexico Oil Conservation Division (NMOCD).

Phase II – Permitting:

New Mexico requires a C-108 application be submitted to the NMOCD for authorization to inject. The permit process for the C-108 includes work produced from the feasibility study and notifications to all operators, oil, gas and mineral lessees, and surface owners within the area. Prior to acceptance of the C-108 application an NMOCD hearing took place where Alberto A. Gutiérrez, president of Geolex, provided testimony as an expert petroleum geologist and hydrogeologist in the required public hearing before the NMOCD and later the New Mexico Oil Conservation Commission (NMOCC) to obtain the permit for injection. In conjunction with the C-108 application a Rule 11 H₂S Contingency Plan was submitted to the NMOCD that addresses all H₂S safety hazards. Additionally, Geolex prepared and obtained approval for all Bureau of Land Management (BLM) permits for the well as a result of the surface and mineral ownership being managed by the BLM for the United States.

Phase III – Well Design, Drilling and Completion:

Geolex was responsible for supervising all drilling and completion activities. Collaboration with the drilling engineers in interpreting geophysical logs and selecting the correct perforation zones was confirmed through reservoir testing; satisfying the reservoirs capacity to accept TAG at the designated rates and injection pressures. Geolex supervised, instructed, and trained plant operators in start-up; and in how to minimize technical problems, in order to safely inject TAG.

Major Project Elements:

Phase I:
AGI Feasibility Study

Phase II:
Permitting and Expert Witness Testimony

Phase III:
Well Design, Drilling and Completion Supervision

Commissioning, Training, and Start-up Oversight

Phase IV:
Ongoing Maintenance, Support, and Compliance for existing AGI wells



Upon start-up Frontier encountered a blockage in the well due to hydrate formation from transients in the compressor system. Geolex developed a remedial strategy to remove the hydrates, and assisted Frontier in designing and installing surface control systems to prevent future hydrate formation. Further well testing showed that additional pressure was required to allow efficient injection. An application was sent to, and approved, by the NMOCD to raise the maximum allowed operating pressure (MAOP) to allow for the desired volume of gas to be injected.

Phase IV – Ongoing Maintenance, Support, and Compliance:

Geolex's ongoing activities include annual mechanical integrity tests, notifying Frontier of any upcoming deadlines, and currently overseeing monitoring and maintenance of Maljamar AGI #1.