

## Geophysical Characterization and Monitoring for the Frio Pilot Test

Larry Myer, Susan Hovorka, Mike Hoversten, Khaled Fouad, and Mark Holtz

The Frio Pilot test involves injection of approximately 3000 tons of CO<sub>2</sub> into the brine-saturated Frio formation at a depth of approximately 1500 m at a test site located northeast of Houston. The CO<sub>2</sub> is injected from a new well drilled for the test while an existing well provides subsurface access for monitoring. Geophysical data for characterization included 3-D surface seismic and well logs, which were available because of the extensive oil and gas exploration and production in the area. Seismic interpretation coupled with petrophysical analyses and other geologic data showed that the test site is located in a small fault block off the flank of a salt dome. The injection interval consists of alternating layers of sand and shale, with sand layer thickness on the order of 10 m, overlain by the 75 m thick Anahuac shale. Well logs in the new well provide data to confirm test site stratigraphy as well as data needed for interpretation of geophysical monitoring measurements. Geophysical monitoring involves time-lapse measurements, incorporating both surface and borehole techniques. Selection of techniques was aided by modeling in which reservoir simulation predicted fluid distributions, which were then input to geophysical models to predict performance of candidate techniques. Interpretation of crosswell seismic with appropriate rock physics models can potentially provide quantitative information on CO<sub>2</sub> saturation between boreholes. Vertical seismic profiling will be used to map the areal distribution of the plume. Low resolution but inexpensive streaming potential measurements will also be carried out to sense the advancing CO<sub>2</sub> front.