Pressure Buildup Data Collection and Analysis from the Frio Brine Pilot

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Abstract
As part of the Frio Brine Pilot, downhole pressure measurements were obtained immediately after the injection of the first injection interval. The injection of carbon dioxide (CO2) in the Frio Brine Pilot will be a two-well injection setup. The injection of CO2 will be performed continuously into the injection well, while pressure responses in the observation well will be measured. In this paper, we present a summary of the pressure transient data measured in the injection and observation wells during the first injection interval.

Objectives
The objectives of this study were to:
1. Collect and analyze pressure transient data from the Frio Brine Pilot.
2. Determine the permeability and storativity of the formation prior to CO2 injection.
3. Investigate the effect of CO2 injection on the pressure response in the observation well.
4. Compare the pressure response data with theoretical models.

Pressure transient data from the Frio Brine Pilot

Overview of the Pressure Transient Testing Program
A two-well interference test was carried out to obtain the permeability and storativity of the formation prior to CO2 injection. During CO2 injection, pressure transient data were collected in the injection and observation wells.

Pressure transient data from the injection well

Pressure Buildup During CO2 Injection
The pressure buildup during CO2 injection is shown in Figure 7 and 8. The test took place over 12 days, with 4 separate injection periods. The injection rate was approximately 0.6 x 10^-3 m^3/s, which is much smaller than the capillary pressure head of almost 30000 psi. During CO2 injection, the pressure in the observation well increased slightly due to the increased pressure in the injection well.

Pressure transient data from the observation well

Interpretation of the Multi-Phase Pressure Transient Data
The pressure response data from the injection and observation wells were analyzed using conventional single-rate and multi-rate well test analysis methods. Figures 4, 5, and 6 show the pressure buildup in the injection well and observation well during CO2 injection.

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