Abstract

EPA UIC Class I Wells as an Analog for Class VI Wells in the Gulf Coast

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Class VI wells under the Underground Injection Control (UIC) program are designed for injection and long-term storage of CO2 in deep geological formations. They are an important tool in mitigating carbon emissions and combating climate change. However, the recency of the development of the Class VI program means there is limited data available on their permitting, operation, and impact. To address this, analogous data from other wells under the UIC program can be used to provide insights on reservoir performance and best practices. In this study, dozens of permits from Class I wastewater injection wells are mined to extract information relevant to Class VI operations. This includes core tests, well logs, and falloff tests as well as injected volumes and pressure buildup over time. Permeability values available from the datasets are upscaled to analyze how well they are able to predict field-scale performance. Data from the total injected volumes, static pressure measurements, and fracture gradients are used to evaluate the injectivity as well as potential CO2 injection rates. The analysis shows that data from core and well log values tend to overestimate the field-scale permeability in the Oligocene injection wells, but tend to fall well within range in Miocene injection wells. Additionally, the injection zones in this study are capable of accepting large volumes of fluid with minimal pressure buildup, have capacity to continuously accept fluid for decades even with decreased injectivity, and have shown that some wells already accept volumes at rates equivalent to 1Mt CO2/year and can potentially accept more.

These insights will help make baseline assumptions for Class VI permits and build confidence in the program.