CALIBRATING PERFORMANCE PREDICTION FOR LARGE-SCALE INJECTION

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ABSTRACT

Experience with Carbon Capture and Storage (CCS) has proven its safety and technical feasibility, but planned injection rates of projects currently in development are as much as an order of magnitude larger than previous projects. With most of our experience in CCS associated with CO_2 -EOR and pilot projects, there is little history with large-scale CO_2 injection to calibrate performance predictions for large-scale projects in saline reservoirs.

Being able to calibrate predictions and accurately forecast reservoir performance is important to minimize both technical and economic risks, particularly considering the tight margins most of these projects will be operating with.

To calibrate performance predictions of large-scale injection, we look at historical saltwater injection into non-producing reservoirs of the Texas Gulf Coast as an analog. This area was chosen because it is an area of high interest for CCS due to its proven geology, proximity to large emission sources, and extensive data availability.

Results from the regional study show that 4,805 wells injected ~20.3 billion bbl of saltwater into the onshore Texas Gulf of Mexico from 1990 to 2020, the period for which digital records are available. Analysis of injection well performance shows that large-scale injection is possible in the Texas Gulf Coast. The better wells inject on the order of 1 Megaton of CO_2-equivalent per year, providing some reassurance to regulators and the public of the technical feasibility of planned large-scale projects in the region. However, most wells have low injectivity indexes and show rapid pressure buildup, cautioning both companies and regulators that careful well placement or perhaps more wells will be essential to achieve the planned rates/volumes for most of the CCS projects now in development.

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