

**CO2 recycling accounting and EOR operation
scheduling to assist in storage capacity assessment at
a U.S. gulf coast depleted reservoir**

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Abstract:

From the start of CO₂ injection on July 2008, through August 31, 2011, ~3 million metric tons of CO₂ have been stored in the lower Tuscaloosa Formation at Cranfield, Mississippi. We used the field to illustrate the importance of two operational choices on CO₂ storage capacity: (1) reinjection of CH₄ with the recycled CO₂; and (2) injection rate in the presence of a spill point in the storage structure. The overall amount stored in the reservoir is approximately the amount purchased, corrected for the presence of impurities. We present a procedure to estimate how much CO₂ is stored in an arbitrary volume smaller than that of the reservoir. The mass stored is corrected for CH₄ and accounts for produced and recycled CO₂. The procedure was applied to estimate the amount of CO₂ stored in two Cranfield compartments, which are separated by a non-transmissive fault. We also investigated factors impacting storage capacity in EOR-then-storage and pure-storage contexts, with both being constrained by non-desirable migration of CO₂ out of the reservoir through a spill-point. As expected, the longer the EOR operations continue, the larger the amount stored relative to the pure storage case. Although never large, the 14% gain in a hypothetical simplified model of the Cranfield reservoir, is strongly dependent on the injection/production strategy used.

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