Static and dynamic reservoir modeling for geological CO2 sequestration at Cranfield, Mississippi, USA

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Abstract:

Reservoir modeling is an important process for improving our understanding of processes during and after CO2 injection, and traditional rock and fluid characterization is the first step in building a static reservoir model. This model can be further refined by integrating dynamic data as they become available during the life of the project. Such data could improve the static model such that the field could be simulated and its future behavior predicted—especially CO2 plume size and amount of reservoir pressurization. Cranfield is an active CO2 flooding field with a focused research area in the water leg of the reservoir. One injection and two observation wells at a depth of >3000 m with spacing <80 m in this area are used to assess storage potential. Integrating various dynamic data into the initial static model provides a unique and challenging modeling opportunity. These data include well-test data, reservoir saturation tool (RST) measurements, pressure and temperature data both in and above the injection zone, U-tube samples from bottom-hole fluids, etc. Integration of all these data into a single numerical model helps to reduce the uncertainty of model parameters.

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