Subsurface Considerations in the Selection of CO_2 Storage Sites in the Northern Gulf of Mexico

Allen Bertagne[1], Jesus Nevarez[1], Joseph Landry[2], and Tad Smith[2]

[1]BRT Energy Advisors, LLC
[2]Petrophysical Solutions, Inc.

Abstract

Over the last decade, many have recognized the significant potential of the state and federal waters of the Gulf of Mexico for carbon capture and storage (CCUS). While extensive regional "scoping" studies and available databases allow the identification of generally-favorable areas for injection of CO_2, additional work at candidate sites is essential given the potential risks associated with injection and EPA's requirement that detailed analyses be undertaken prior to approving the initiation of CCUS operations.

A comprehensive subsurface understanding of the potential CO_2 injection sites is best achieved through the integration of multi-disciplinary datasets and workflows that include:

(1) extensive mapping of the potential injection intervals from a structural and stratigraphic perspective,
(2) integrated petrophysical analysis of wells to calculate reservoir and seal properties across target intervals and estimate storage capacity,
(3) integration of this information with 3D seismic data to allow the extrapolation of petrophysical data away from wells,
(4) identification of highly faulted areas that could result in leakage of CO_2 to the surface,
(5) estimation of top of the supercritical zone and top of geopressured,
(6) the creation of 3D reservoir models, and
(7) review of orphan and abandoned wells and determination of whether they can act as conduits to the surface.

The above will be illustrated using the data and results of a recent study of the CCUS potential of the offshore Texas federal waters.