# CHARACTERIZATION OF THE HIGH ISLAND 24L FIELD FOR MODELING AND ESTIMATING $CO_2$ STORAGE CAPACITY IN THE OFFSHORE TEXAS STATE WATERS, GULF OF MEXICO

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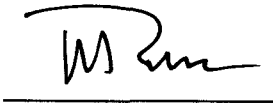
## ABSTRACT

The fundamental purpose of Carbon, Capture, and Storage (CCS) is to reduce anthropogenic $CO_2$ emissions by capturing gas from large industrial point sources, compressing and transporting it via pipeline, and injecting it into deep geologic formations. The potential to develop $CO_2$ storage projects in the offshore Texas State Waters is viable, but the size of storage opportunity at the project level is poorly constrained. This research characterizes the High Island 24L Field, a relatively-large historic hydrocarbon field, that has produced primarily natural gas (0.5 Tcf). The primary motivation for this study is to demonstrate that depleted gas fields can serve as volumetrically-significant $CO_2$ storage sites.

The stratigraphy of the inner continental shelf in the Gulf of Mexico has been extensively explored for hydrocarbon for over fifty years, and is well suited for CCS. Lower Miocene sandstones beneath the regional transgressive *Amphistegina B* shale have appropriate geologic properties (porosity, thickness, extent) and have been characterized utilizing 3D seismic and well logs in this study. Identifying key stratigraphic surfaces, faults, and mapping structural closure footprints illustrates the field's geologic structure. The interpreted stratigraphic framework can then be used to model three different lithologic facies and effective porosity to calculate $CO_2$ storage capacity for the ~ 200 ft (60 m) thick HC Sand (most productive gas reservoir) and the overlying thicker 1700 ft (520 m), but non-productive, Storage Interval of Interest.

Different methodologies are utilized to achieve confidence in the $CO_2$ storage capacity estimates. A storage capacity of 10-20 MT is calculated for the HC Sand and 100-120 MT for the Storage Interval of Interest assuming a 14% efficiency factor. This study evaluates the accuracy of these storage capacity methodologies to better understand the key geologic factors that influence $CO_2$ storage in a depleted hydrocarbon field for CCS.



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