**Abstract**

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Carbon Capture and Storage (CCS) is considered a crucial technology for climate change mitigation. Its primary objective is to reduce CO2 emissions caused by human activities by capturing gas from large point sources, or direct air capture, and injecting it into deep geologic formations. This study focuses on the geological characterizing and carbon storage capacity estimation for an offshore state water site – Chandeleur Sound, Louisiana. Different methods have been used to analyze the reservoir properties. 3-D seismic data was used for fault and horizon picking, stratal slicing and attribute mapping. Three attributes/methods were used in the stratal slices: Sum Negative Amplitude, RMS amplitude, and Spectral Decomposition. The slices gave a qualitative overview of the depositional trends and faulting in Chandeleur Sound and concluded that the ideal storage intervals include the Upper Miocene in the southern area, the upper part of Middle Miocene, and a massive channel system near the top of Upper Miocene which is likely to be the paleo Tennessee River. RMS amplitude was also used for selecting sand-prone geobodies and calculate the reservoir areas. Well log correlation was also done, which helped to identify seven reservoir zones. Detailed reservoir properties were defined for these zones.

Dynamic storage capacity calculations using EASiTool (GCCC-BEG software) for the seven reservoir zones of Chandeleur Sound concluded a total storage capacity of nearly 2 gigatons. However, the number could be optimistic due to reservoir heterogeneities and the absence of a robust trapping mechanism. within the storage interval.

Chandeleur Sound is close to Louisiana Chemical Corridor (LCC) and has plenty of point sources for CO2 supply. The costs associated with carbon capture, transport and storage and were considered. Pipeline is the only transport scenario. Regulatory agencies and regulations of CO2 pipeline were reviewed on both federal and state levels. The capital cost of pipeline from point sources to Chandeleur Sound was calculated using the FECM/NETL CO2 Transport Cost Model. It was concluded that a 30 inches, 112-mile pipeline from the carbon gathering hub to the injection site would have a construction cost of around $231 million in 2023's dollars.

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