

ASSESSMENT OF CO₂ STORAGE POTENTIAL OF THE WILCOX GROUP, ONSHORE TEXAS, USA

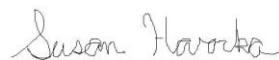
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ABSTRACT

This study assesses for the first time the suitability of the onshore Wilcox Group for carbon dioxide (CO₂) sequestration building on previous extensive study of oil, gas, and water resources in this interval. I use a multi-stage methodology to down-select sites, estimate CO₂ storage capacity and evaluate the economic feasibility of a Carbon Capture and Sequestration (CCS) project. Structural, stratigraphic, and sedimentological analysis combine to define structural compartmentalization and sand presence and continuity. The CO₂ injection window is identified beneath the supercritical depth (800m) and the Underground Source of Drinking Water (USDW), and above the overpressure boundary. Reservoir quality analysis, based on cores and well logs, defines the reservoir properties. CO₂ storage capacity for selected sites is estimated using EasiTool (GCCCBEG software), followed by the selection of a case study project area “site A”. The Fayette coal-fired power plant is chosen for the economic assessment. The results indicate attractive sandy intervals (Delta III, III-2, B and C), with reservoir properties ranging from 0.12 to 0.26 porosity and 5 to 80 mD permeability. Storage capacity of Site A ranges from 289 MMT to 422 MMT assuming closed and open boundaries, respectively. Sensitivity analysis indicates a potential 50% variation in mean capacity scenarios. Capture cost is calculated at \$77.83/tonne, transportation via pipeline at \$0.70/tonne, and storage at \$6.14/tonne, resulting in a total CCS cost of \$84.67/tonne, estimated with Gaffney Cline’s Cost Assessment Tool. The Wilcox geologic study confirms feasibility for carbon storage. Project costs at \$84.67/tonne, with carbon credit at \$85/tonne, suggests near break-even for CCS in the AOI. These research findings offer valuable insights to support decision-making in future CCS projects within the area of interest and contribute to the broader understanding of the CO₂ storage potential in the Wilcox Group onshore Texas.



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