Offshore CO₂ Storage Resource Assessment of the Northern Gulf of Mexico (Upper Texas-Western Louisiana Coastal Areas)

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U.S. Department of Energy
National Energy Technology Laboratory
Mastering the Subsurface Through Technology, Innovation and Collaboration: Carbon Storage and Oil and Natural Gas Technologies Review Meeting
August 16-18, 2016
Conceptual Overview
Project Overview: Goals and Objectives

• The objective of this study is to conduct an offshore carbon storage resource assessment of the Gulf of Mexico, Texas – Louisiana study area. This will be completed by:
  
  – Assessing the CO₂ storage capacity of depleted oil and natural gas reservoirs utilizing existing data (well logs, records and sample descriptions from existing or plugged/abandoned wells, available seismic surveys, existing core samples, and other available geologic and laboratory data) from historical hydrocarbon industry activities in the heavily explored portions of the inner continental shelf portions of the Texas and Louisiana Gulf of Mexico coastal areas; and
  
  – Assessing the ability and capacity of saline formations in the region to safely and permanently store nationally-significant amounts of anthropogenic CO₂ using existing data. Additionally, the study will identify at least one specific site with potential to store at least 30 million tons of CO₂ which could be considered further for a commercial or integrated demonstration project in the future.

  – The project will also engage the public and other stakeholders for the region through outreach activities to apprise them of the study objectives and results.
Milestone D – Quick-Look Report Summarizing the Selection of Well Data for Regional Correlation

Map of the study area including wells and primary 3D seismic dataset. Location of the primary 3D seismic dataset (“TexLa Merge”) is highlighted in orange.

- 11,817 wells in the study area, 5250 of which have wireline well log raster data only (black dots);
  Of those, 4337 raster logs were purchased from vendor, MJ Systems.
- 900 wells have digital SP curves (green dots);
- 74 have digital gamma ray (red rhombs) and
- 7 wells have whole core (olive-green squares).
- The cyan colored dots represent wells currently without raster or LAS data.
Milestone C - Map of Completed Selection of Seismic Data for Regional Correlation

3D P-Cable Survey
2D Lines
TXLA 3D Seismic Survey
Additional 3D Seismic Surveys

50 Miles
Subtask 2.3 – Develop Structural Closure Mapping for Reservoirs
Co-rendered sweetness and semblence timeslice (532 ms below MSL) of the southern portion of the 3D volume showing the complex geomorphology preserved in the dataset.

Semblence highlights edges and continuity. Change in sweetness signals a change in lithology or fluid.
### Core Details

<table>
<thead>
<tr>
<th>API Number</th>
<th>Well ID</th>
<th>Location</th>
<th>Lease Name</th>
<th>Top Depth (ft)</th>
<th>Bottom Depth (ft)</th>
<th>Sample Type</th>
<th>Reservoir</th>
<th>LON</th>
<th>LAT</th>
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<tbody>
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<td>OCS-G-3496</td>
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<td>13074</td>
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<td>30645</td>
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<td>SOUTH GILLOCK UNIT #94</td>
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<td>9181</td>
<td>SLABBED CORE</td>
<td>GILLOCK S</td>
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</table>

**Subtask 2.4 – Assess Seal Interval Characteristics**
Core description of OCS-G-3496 A-3, West Cameron Block 205, Louisiana

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Well</th>
<th>Sample depth (ft)</th>
<th>Lithology</th>
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<tbody>
<tr>
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<td>OCS-G-3</td>
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Eleven samples (above) were taken from the core for further analyses, such as scanning electron microscope (SEM), X-ray diffraction (XRD), mercury intrusion capillary pressure (MICP), etc.

Four have been polished by state-of-the-art ion milling and examined using SEM.
The majority of the observed pores are secondary pores derived from mineral dissolution and later partially filled with diagenetic minerals (chlorite, calcite).

The silty claystone is dominated by extra-basinal siliciclastic detrital grains of quartz, illite, chlorite, mica, and small amounts of plagioclase and K-feldspar.
Accomplishments to Date

– A website, was established for the project: http://www.beg.utexas.edu/gccc/osra.php
– Map of Completed Selection of Seismic Data for Regional Correlation
– Quick-Look Report Summarizing the Selection of Well Data for Regional Correlation
– List of Identified Core/Wells for Analyses
– Initial Structural Map of the LM2 Surface
– Initial 3D Fault Network Mapping
– Core identified, sampled, analyzed
Summary

– **Key Findings:** LM2 surface, Fault polygons, Seal Characterization.

– **Lessons Learned:** Integration of 2D-3D seismic and well logs; Seal material scarce but useful.

– **Future Plans:**
  - Local Prospect Resource Assessment
  - Development of Comprehensive Data Set of Reservoir Properties
  - (Sub)Regional Capacity Assessment
  - Structural Closure Mapping for Reservoirs
  - Pressure Decline Analysis