Gulf of México Mapping
NATCARB Atlas
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**GCCC sponsors**
OVERVIEW

I. Previous Work (GCCC)

II. Current Studies
   A. SECARB III – Task 15
   B. Texas Offshore Miocene
      1. Department of Energy
      2. Texas General Land Office
PREVIOUS GCCC EFFORTS

Brine Formations Atlas

• Approach – Critical Constraints
  – Static Parameters
    • Reservoir Depth, Thickness, Mineralogy, $\Phi$
    • Net Sand, Heterogeneity, % Shale
    • Seal Thickness & Discontinuities
  – Dynamic Parameters
    • Formation Pressure, Temperature, Salinity, $k$
    • Brine Age & Chemistry, CO$_2$ Reactions
    • Hydrologic regime, Dissolution, etc.
PREVIOUS GCCC / SECARB EFFORTS

Atlas II

SECARB Deep Saline Formations With CO₂ Storage Potential

Saline Formations:
- Cedar Keys, Lawson Fms
- Gulf Coast
- Mt. Simon Ss
- Potomac Group
- Pottsville Fm
- South Carolina-Georgia
- Tuscaloosa Group

Legend:
- unit 90
- unit 120
- Poor Storage Potential Area
- Woodbine Fm & Paleozoic Ss
Special Acknowledgement

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• Data & Interpretive Contributions From:
  • Gulf Basin Depositional Synthesis Consortium
    – Dr. Bill Galloway, et al.
    Institute for Geophysics
    Jackson School of Geosciences
    University of Texas at Austin
Joint Bureau of Economic Geology / PEMEX Studies of Mexican Basins

- Regional basin studies
  - Burgos Basin Miocene
  - Laguna Madre Tuxpan shelf
  - Veracruz Basin
  - Salina Basin
  - Macuspana Basin

- Reservoir Characterization study
  - Poza Rica – giant carbonate field, well into secondary recovery phase
Joint BEG / PEMEX Studies

Burgos Basin Miocene

Laguna Madre-Tuxpan Shelf

Salina Basin

Veracruz Basin

Macuspana Basin
I. Previous Work (GCCC)

II. Current Studies
   A. SECARB III – Task 15
      1. U.S. Dept. of Energy (DOE)
   B. Texas Offshore Miocene
      1. U.S. Dept. of Energy (DOE)
      2. Texas General Land Office (GLO)
Geologic Database – Petra (IHS)
SECARB III – TASK 15

- Preliminary Wells & Infrastructure Assessment
- Mapping & Preliminary Capacity Assessment
- Integration / NatCarb ATLAS III Update

David Carr, Becky Smyth
OCS / State Waters (LA & MS)
TEXAS OFFSHORE MIOCENE

- DOE FOA-33: Site Characterization
- TX General Land Office
  - (DOE Award Cost Match)
- Task 3 – Capacity Estimates
  - Subtask 3.1: Coordination with NATCARB
Texas Submerged Lands & Adjacent Federal Submerged Lands
Tremendous Capacity in Offshore Wedge

Prograding wedge of fluvio-deltaic sediments in upper Miocene stratigraphy

Brown, 2005, Modified from Bebout and Loucks (1981)
Variety of Trap Types

- Sandstones
- Shale ridge
- Shale and sandstones
- Shales and marls
- Salt/evaporites
Example: 36 square miles
Which geologic formations are suitable?
What is the capacity?
How many wells?
What are the risks?

Not a proposed scenario – For example only.
Examples of Characterization Data

Cores & Core Analysis*

Production & Test Data

Map – Texas State Waters

3-D Seismic Survey**

Well-Logs in a Cross Section

Paleo Data

2-D Seismic Line

2-D Seismic Line

* From Dutton and Hentz (2002)

** From Zeng and Hentz (2004)
Research Development

**AIMS:**
- Identify uncertainties
- Characterize and collect data
- Reduce uncertainties
- Facilitate near-term commercial utilization.

**Years 1-2: Characterization effort & Site Identification**
- Capacity
- Injectivity
- Stratigraphic containment
- Caprock seal capacity
- Brine containment
- Mineralization containment
- Leakage pathways

**Year 3: Uncertainty reduction via additional data collection**
- Test well, core measurements
- Equivalent surface monitoring design and demonstration + modeling & simulation
- Marine survey (shallow seismic / bathymetry / water column)
SUMMARY

• Building on Past Research / Results

• Current Gulf of Mexico Research Aims:
  – Better Quantify Static Capacity
    • Large Volume Brine Saturated Sandstones
  – Understand Limits
    • Leakage Risks
    • Compartmentalization & Pressure Build-up
  – Prepare “Storage Ready” Sites
    • Incentivize Use