



CO₂ Sequestration in Saline Formations – II

THE SECARB MISSISSIPPI TEST SITE PROJECT UPDATE



Prepared for:

**Regional Carbon Sequestration
Partnerships:
Annual Project Review Meeting**

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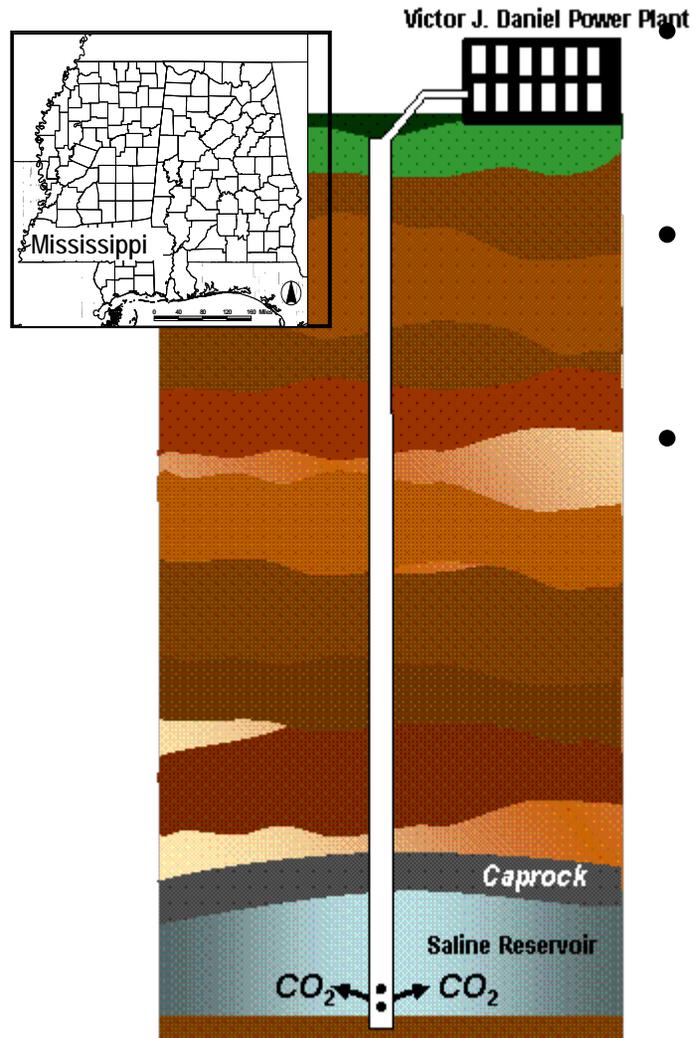
December 13, 2007
Pittsburgh, PA

Outline of Presentation

1. Introduction to the Test Site
2. Permitting and Public Outreach
3. Baseline MMV
4. Project Schedule

1. Introduction to the Test Site

Mississippi Saline Reservoir CO₂ Injection Project

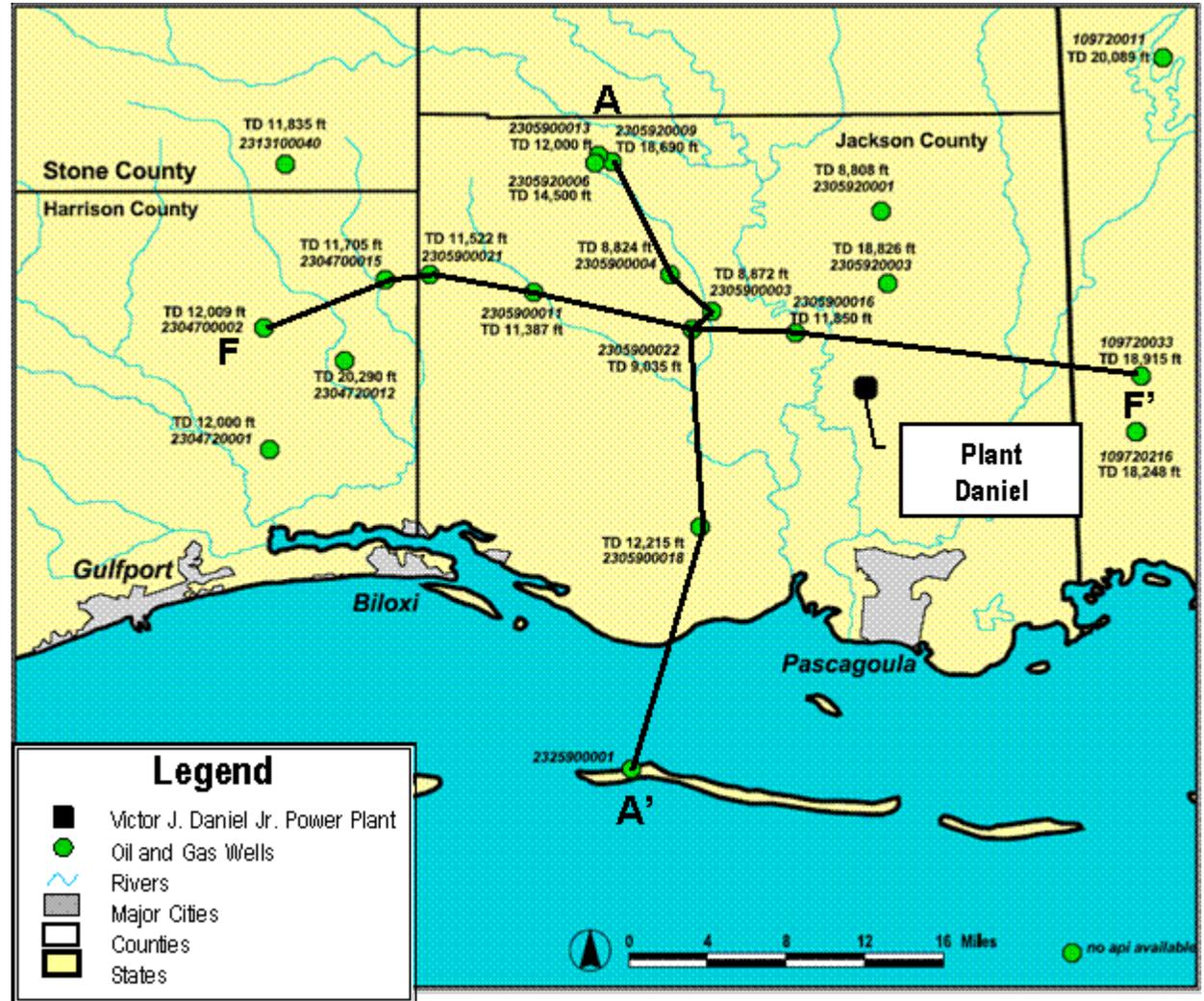


- **Purpose:** Locate and test suitable geological sequestration sites in proximity to large coal-fired power plants in Southeast U.S.
- **Initial Target:** Deep saline reservoirs along MS Gulf Coast with high potential CO₂ storage capacity
- **Objectives:**
 - Build geological and reservoir maps for test site
 - Conduct reservoir simulations to estimate injectivity, storage capacity, and long-term fate of injected CO₂
 - Address state/local regulatory and permitting issues
 - Foster public education and outreach
 - Drill one injection and one observation well
 - Inject 3,000 tons of CO₂
 - Conduct longer-term monitoring

Regional Cross Sections

A total of 24 wells - - 20 oil & gas plus 4 Class II wells - - provided the essential deep subsurface information for the Mississippi Gulf Coast area.

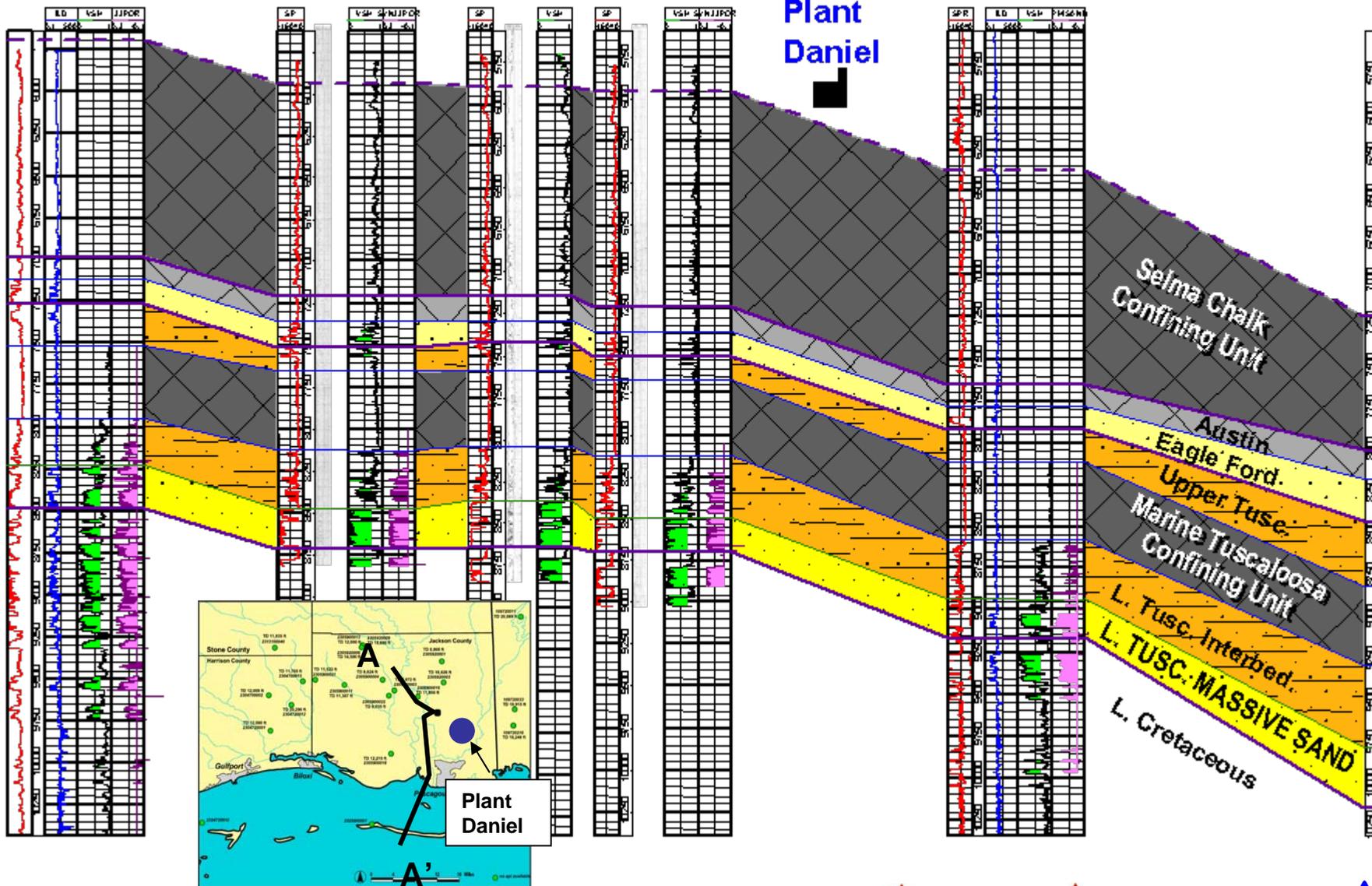
The nearest deep wells are about 5 to 10 miles away, limiting available geologic information for the plant area.



North-South Geologic Cross Section

A(N)

A'(S)

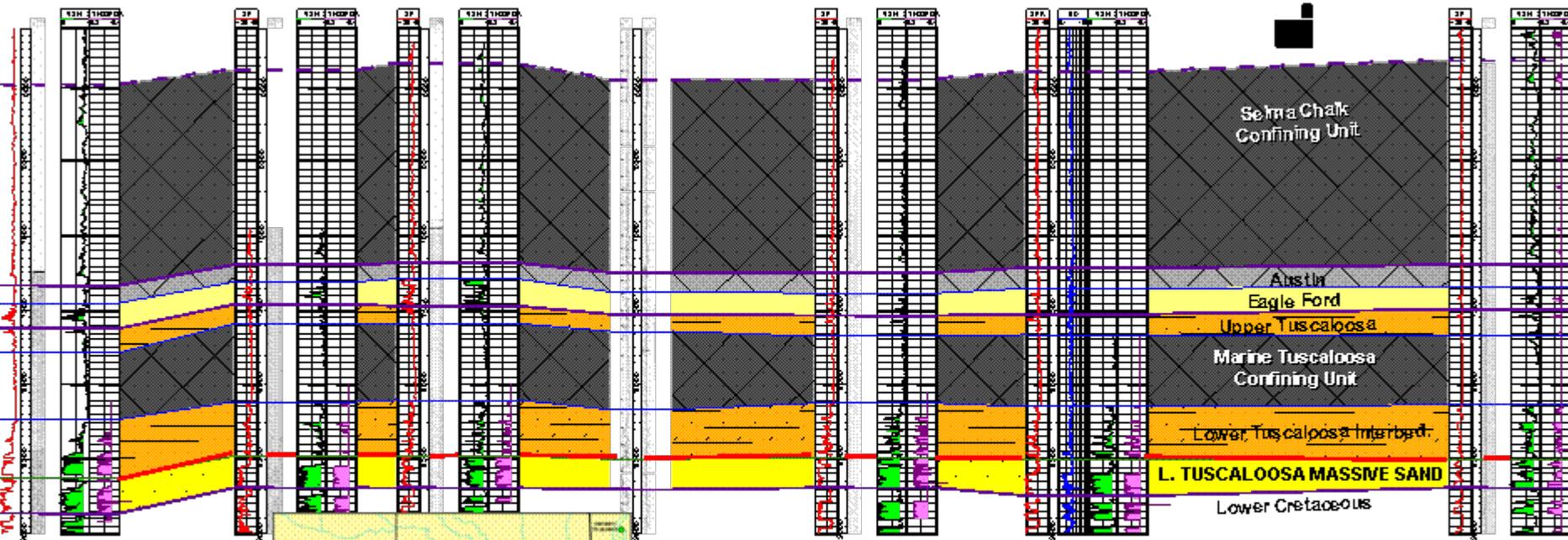


West-East Geologic Cross Section

F(W)

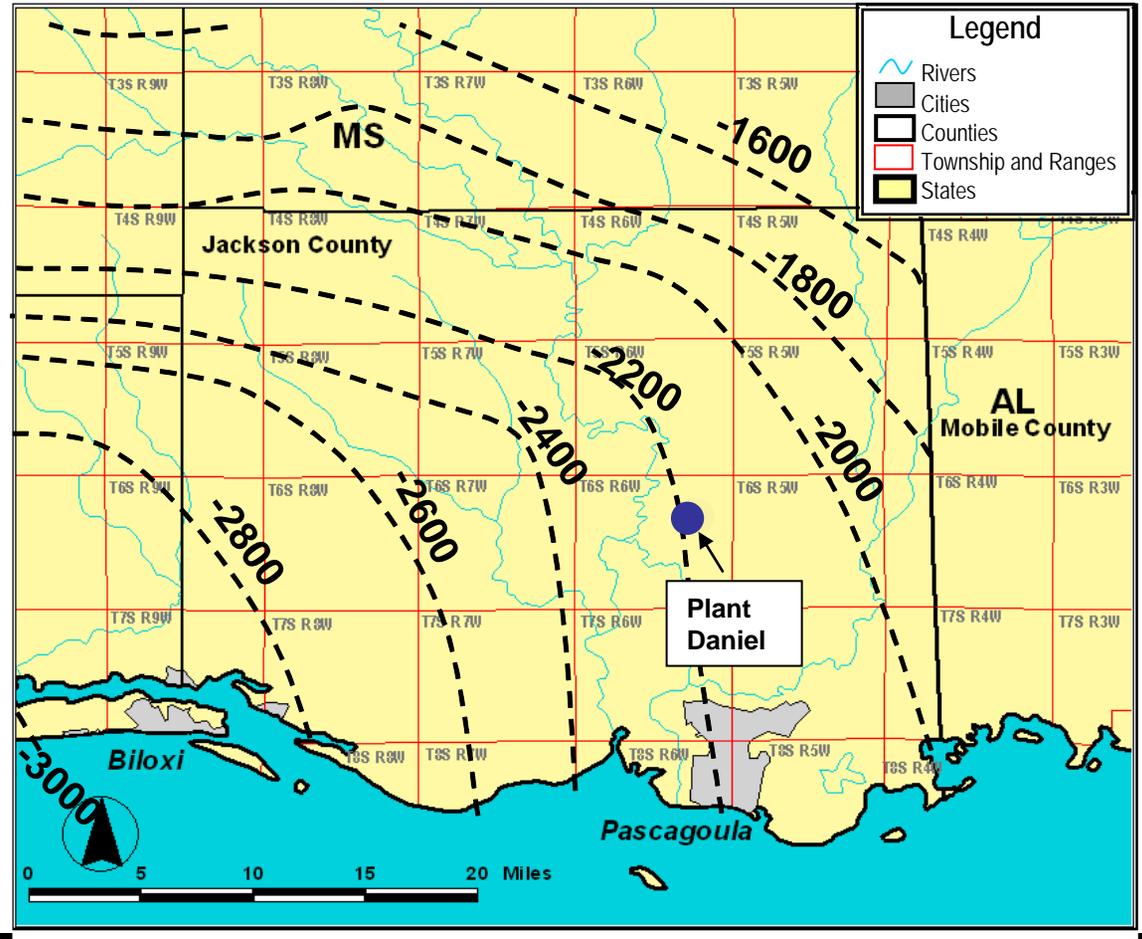
F'(E)

Plant Daniel



Southern Mississippi Hydrogeology

EPA defined “Low Salinity” waters (<10,000 mg/l) are protected and exist at a depth of about 1,600 to 2,800 feet below surface in Jackson County. The freshwater (<1,000 mg/l) zone exists in shallower formations.



(modified from USGS Open-File Report 81-550)

2. Permitting and Public Outreach

Permitting Efforts

- NEPA – Environmental compliance questionnaire. Submitted to US DOE prior to field activities.
- Underground Injection Control (UIC) Permit – Allows underground injection of CO₂. Issued by the MS Department of Environmental Quality (MDEQ).
- Drilling Permit – Allows penetration of the subsurface to access injection zone. Issued from MS Oil and Gas Board (MOGB).
- Financial Assurance Report – Supplied to MOGB to show financial ability of lease owner to properly abandon the test wells.

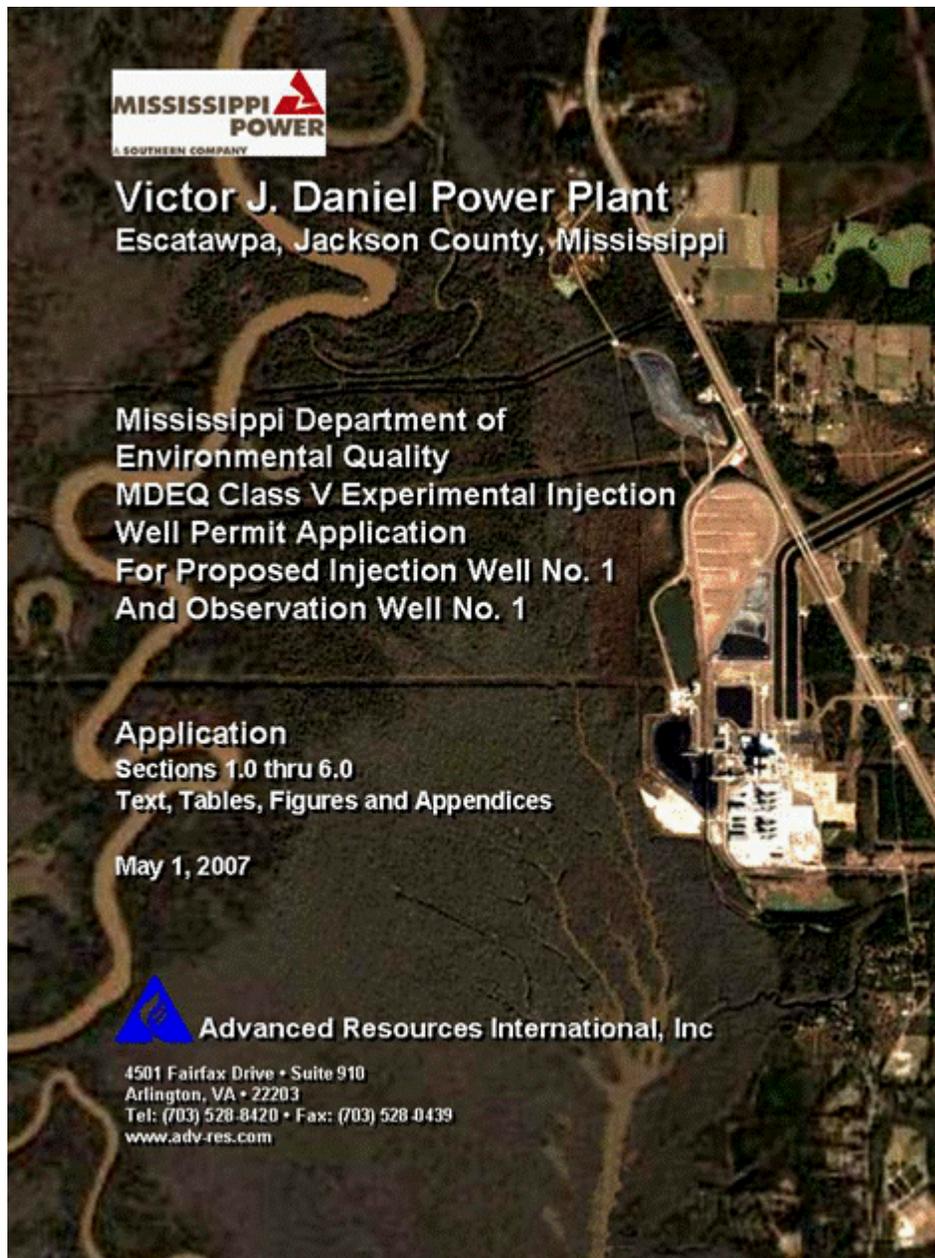
NEPA Status

- Environmental questionnaire was prepared and submitted to US DOE on August 31, 2006.
- A Categorical Exclusion for the project was granted on September 28, 2006:
 - No violation of applicable environmental safety and health requirements.
 - No adverse effects to environmentally sensitive areas.

Public Outreach

- Press release issued early November 2006 announcing project and notifying of public meeting.
- Prior meeting held with local newspapers resulting in two newspaper articles.
- Informal open house held in Moss Point, MS on November 9, 2006.
- No formal statements made by MS Power Company during the event.
- Technical project leads manned informational posters describing the project.
- 20± attendees from local area





MISSISSIPPI POWER
A SOUTHERN COMPANY

Victor J. Daniel Power Plant
Escatawpa, Jackson County, Mississippi

Mississippi Department of
Environmental Quality
MDEQ Class V Experimental Injection
Well Permit Application
For Proposed Injection Well No. 1
And Observation Well No. 1

Application
Sections 1.0 thru 6.0
Text, Tables, Figures and Appendices

May 1, 2007

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MDEQ UIC Process

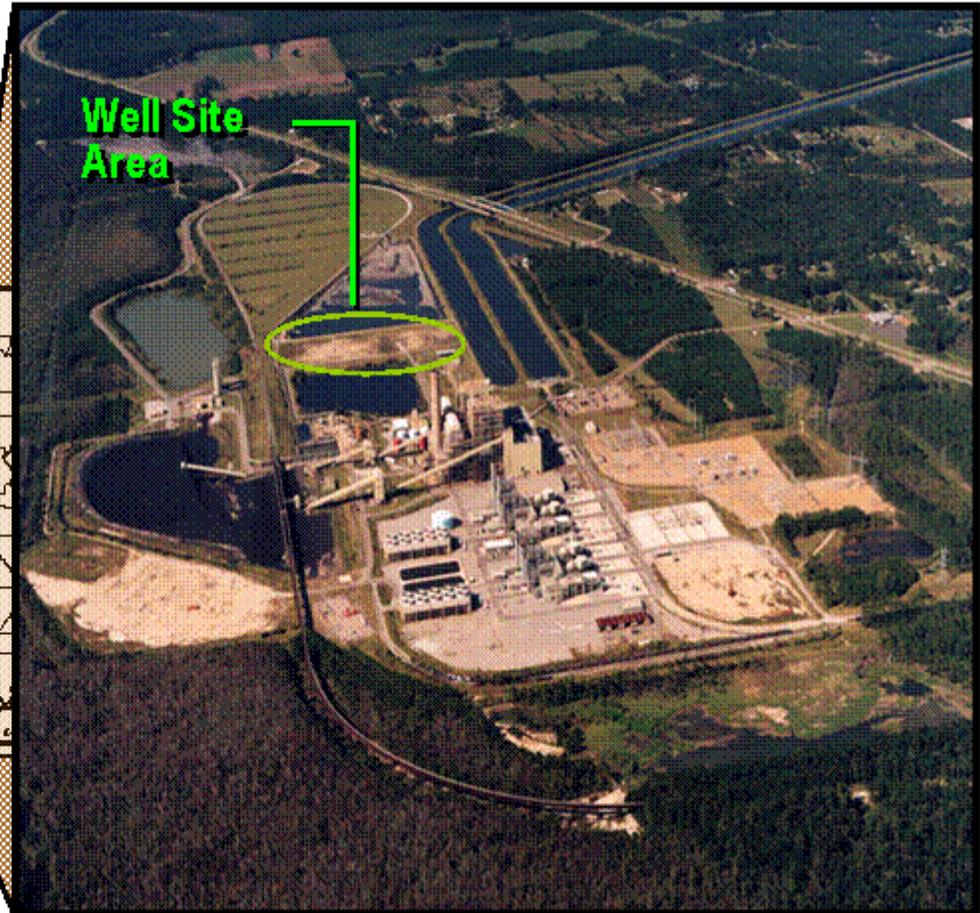
- Initial Draft Submission in January 2007
- Final Permit Submission in May 2007
- MDEQ preparing public notice (30 days)
- Hearing to be held August 16, 2007
- Permit awarded on September 5, 2007

Injection Permit Information

- 1 Administrative Information
- 2 Geology
- 3 Reservoir Modeling
- 4 Area of Review
- 5 Well Construction
- 6 MMV

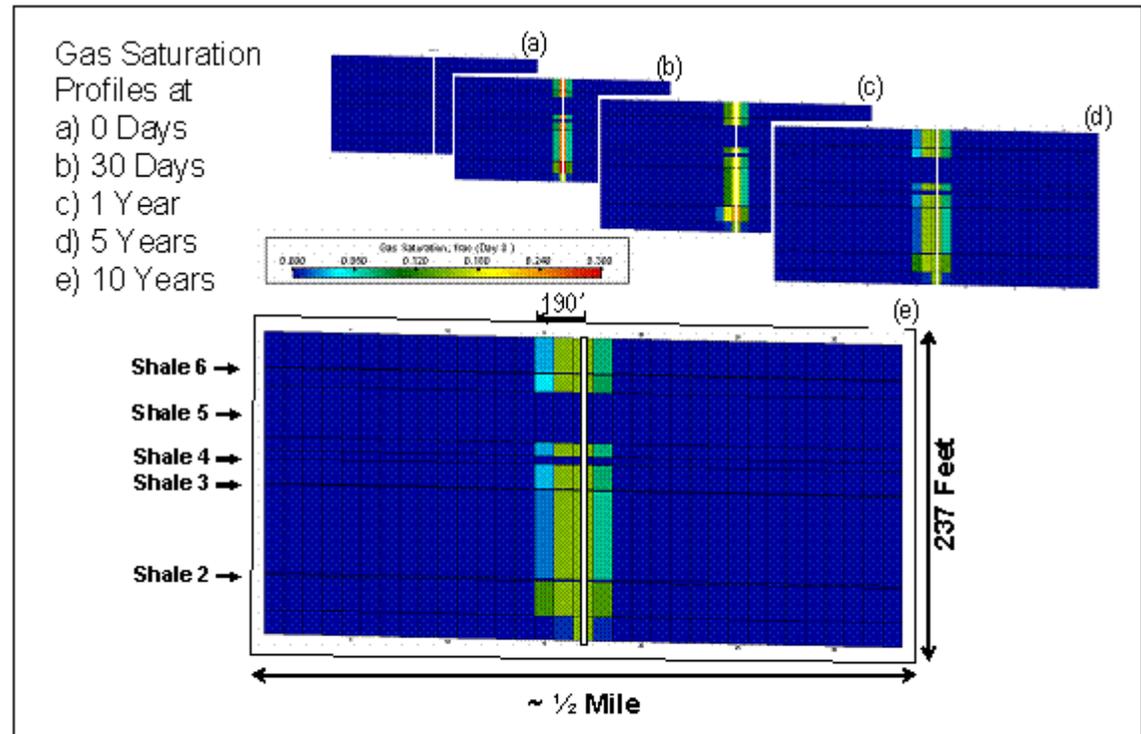


Mississippi Power Company's
Victor J. Daniel Power Plant Location



3. RESERVOIR MODELING

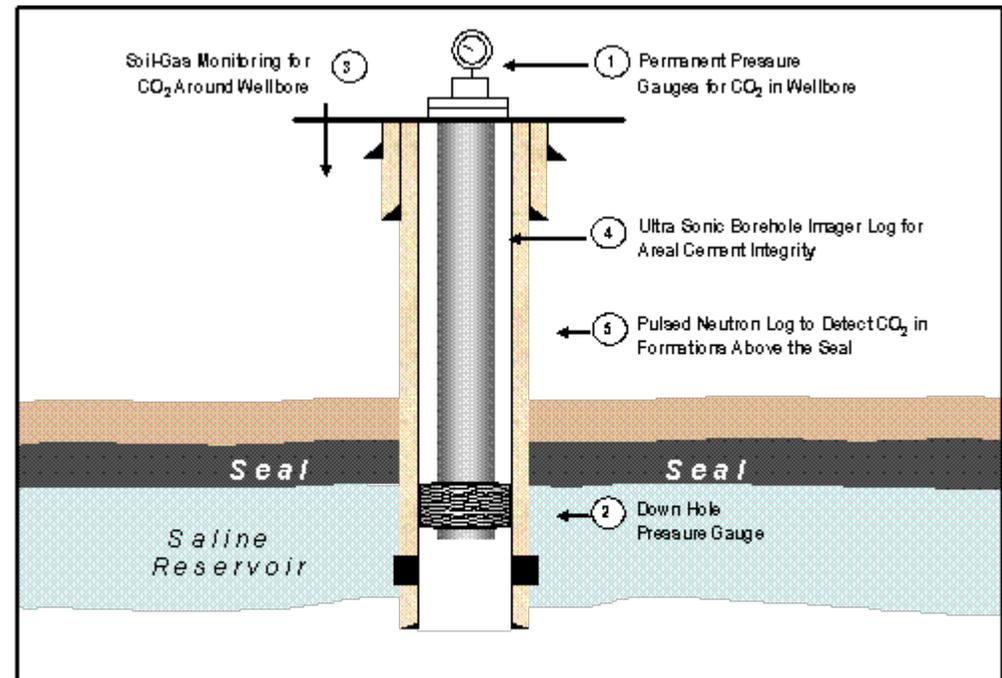
- 3.1 RESERVOIR MODELING OF THE INJECTION ZONE
- 3.2 MODEL DESCRIPTION
- 3.3 INJECTION ZONE STRATIGRAPHY AND LITHOLOGY
- 3.4 MODEL INPUTS
- 3.5 CO₂ TRAPPING MECHANISMS
- 3.6 GEOPHYSICAL SIMULATION RESULTS
- 3.7 LONG-TERM FATE OF INJECTED CO₂
- 3.8 MODELING SUMMARY



Reservoir Modeling CO₂ Injection/Plume
(vertical view)

6. MONITORING, MEASUREMENT, AND VERIFICATION

- 6.1 INTRODUCTION
- 6.2 ASSURING WELL-INTEGRITY
- 6.3 MONITORING RESERVOIR PRESSURE
- 6.4 MONITORING CO₂ PLUME MOVEMENT
- 6.5 MONITOR FOR CO₂ LEAKAGE
- 6.6 ADDITIONAL RESERVOIR CHARACTERIZATION TOOLS

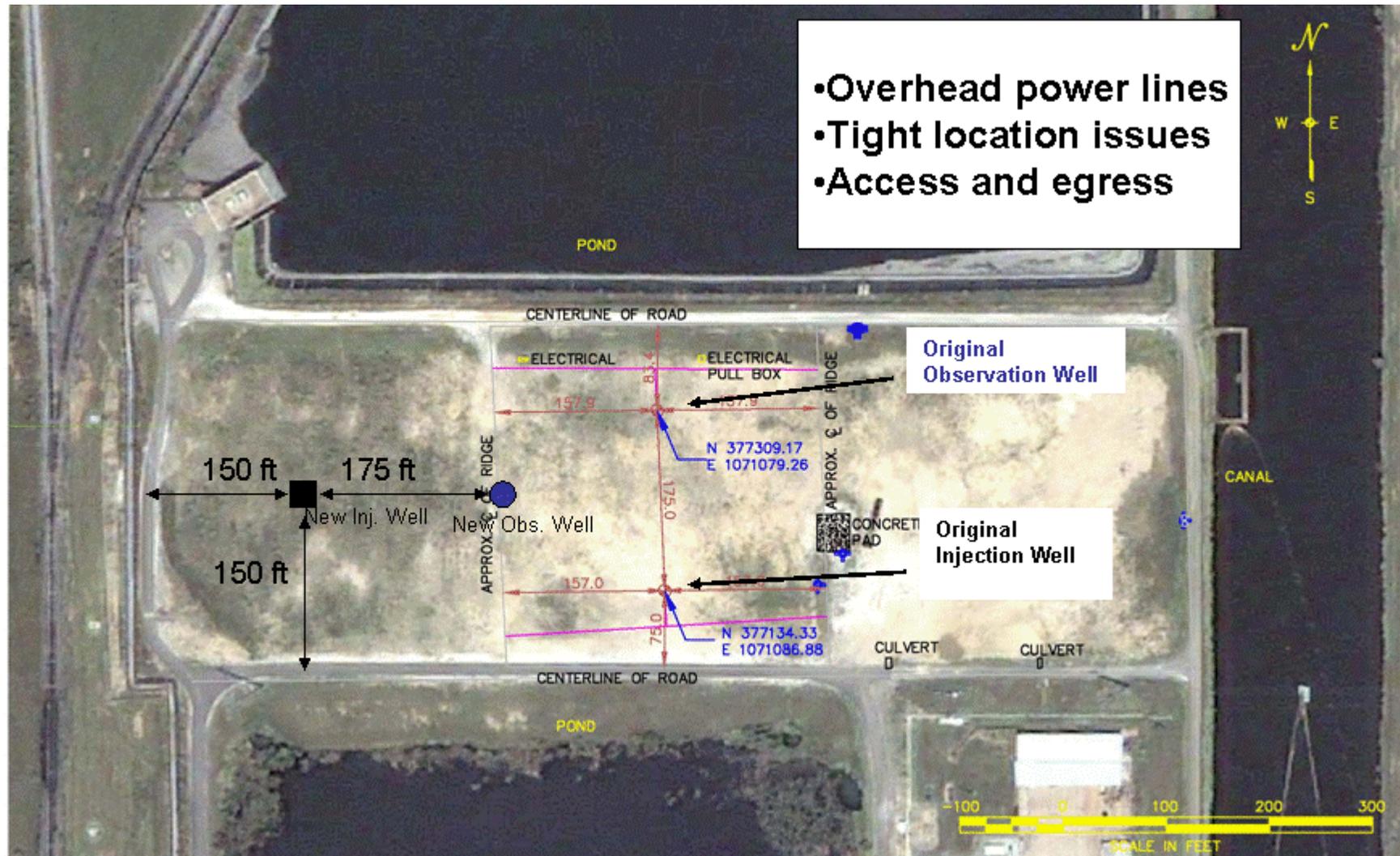


General Measurement, Monitoring, and Verification Protocols to be Employed at the Mississippi Saline Reservoir Test Site

Drilling Permit and Financial Assurance Status

- Submitted two applications to drill to the MOGB in September 2007.
 - Observation well required two day administrative permit
 - Injection well permit required “unexpected” application and 30 day public notice
 - 1 mile Area of Review, detailed completion design, type log, water well locations, detailed abandonment plan, injection fluid description, required in addition to “standard” forms.
- Well drilling activity expected to begin in late December 07 or early January 08.
 - Approximately two month total duration to complete both wells

Well Drilling Locations



3. *Baseline MMV*

Baseline MMV Strategy

Prior to well drilling, a suite of baseline MMV activities are planned:

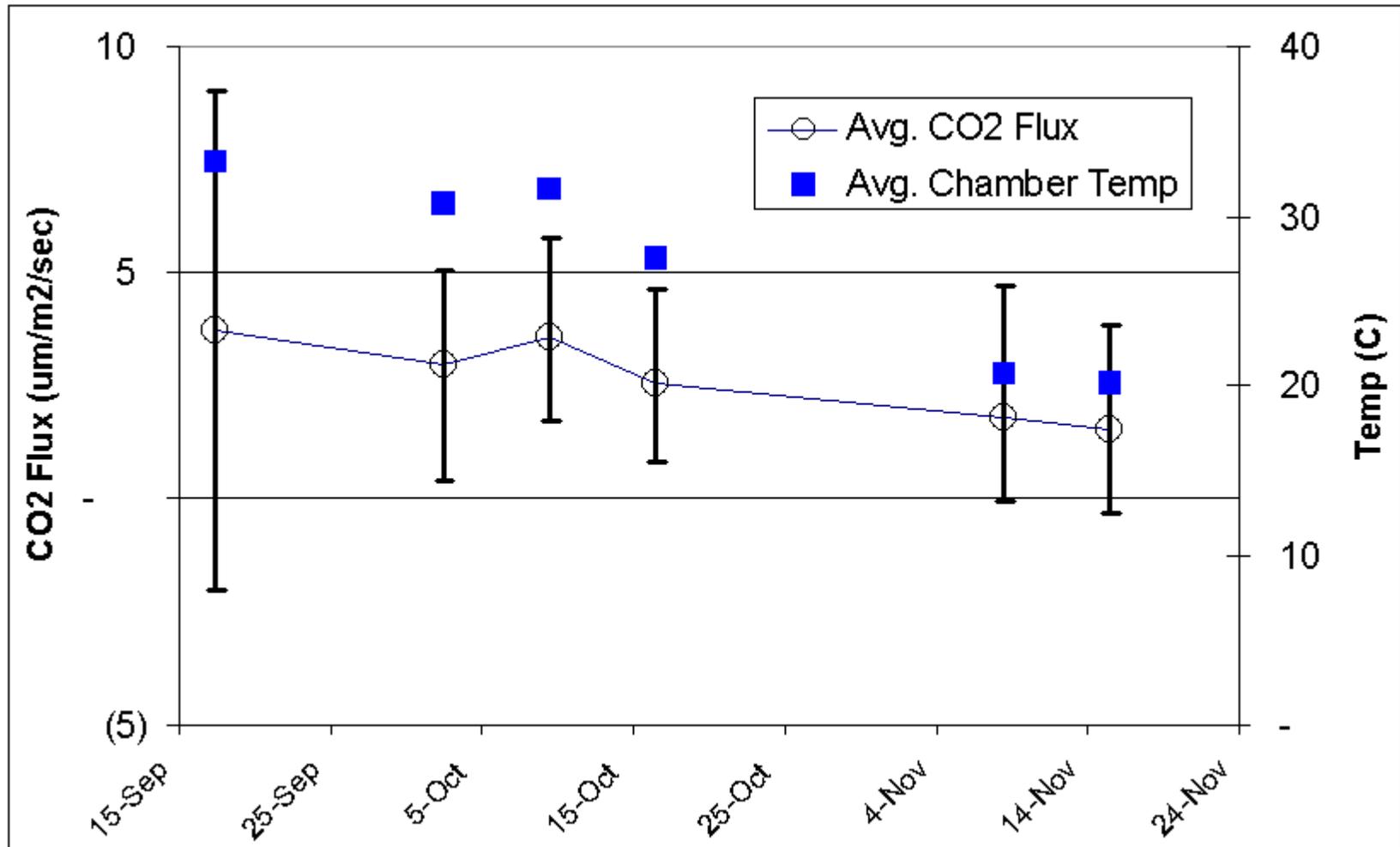
- Bi-weekly soil flux monitoring was initiated in mid-September 2007 at 15 sites on Plant property
- Quarterly sampling of Plant water supply groundwater wells to commence prior to drilling operations
- A pre-drilling Seeper Trace PFT sweep
- A baseline run with the MS State Cavity Ringdown Spectrometer

Soil Flux Monitoring Stations

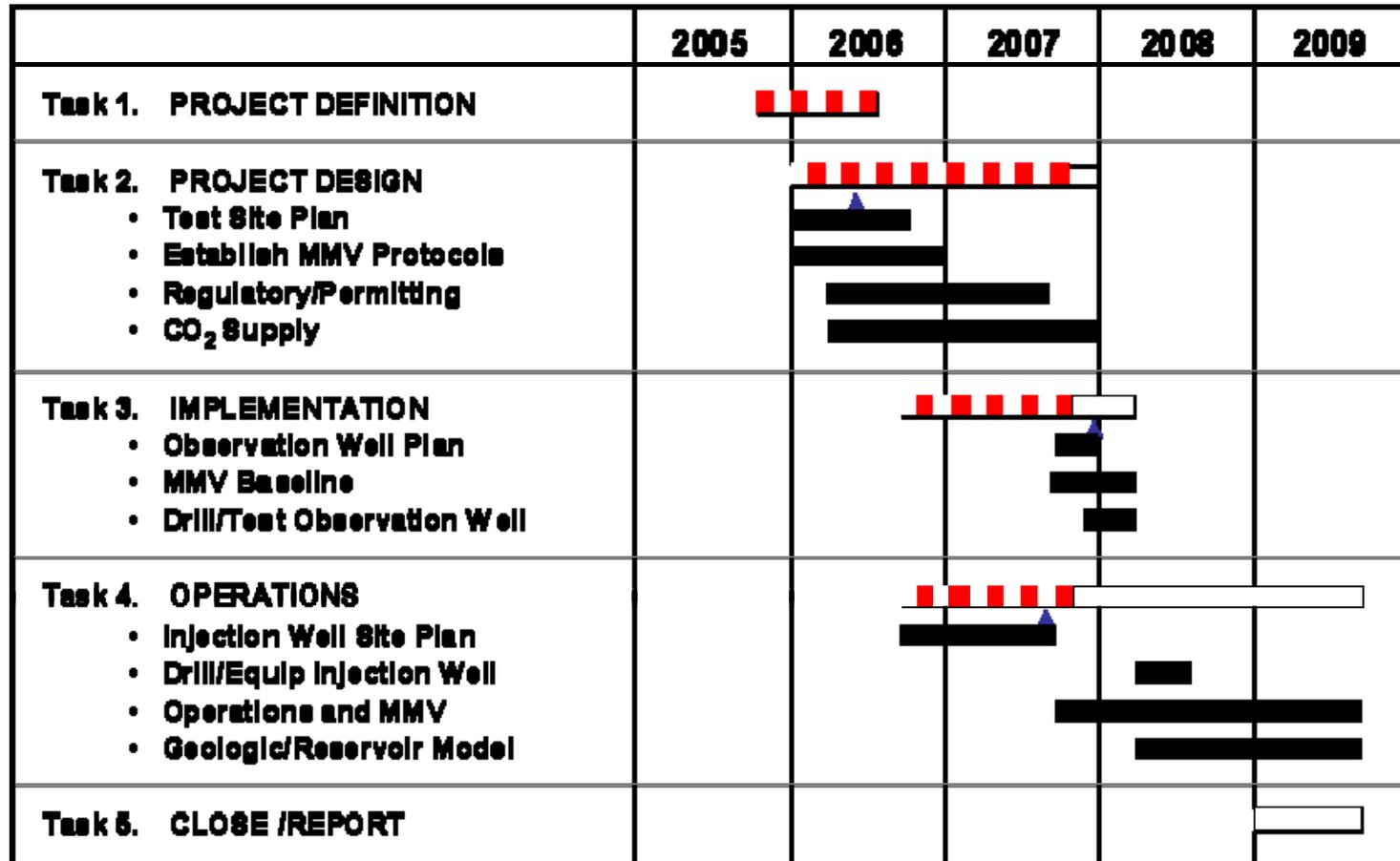
-  Permanent soil monitoring stations
-  Near-well soil monitoring stations (will be affected by drilling/injection operations)
-  Soil monitoring stations within the drilling footprint (may be affected by drilling/injection operations)
-  Control soil monitoring stations



Soil Flux Data



4. Project Schedule



▲ Key Decision Milestones