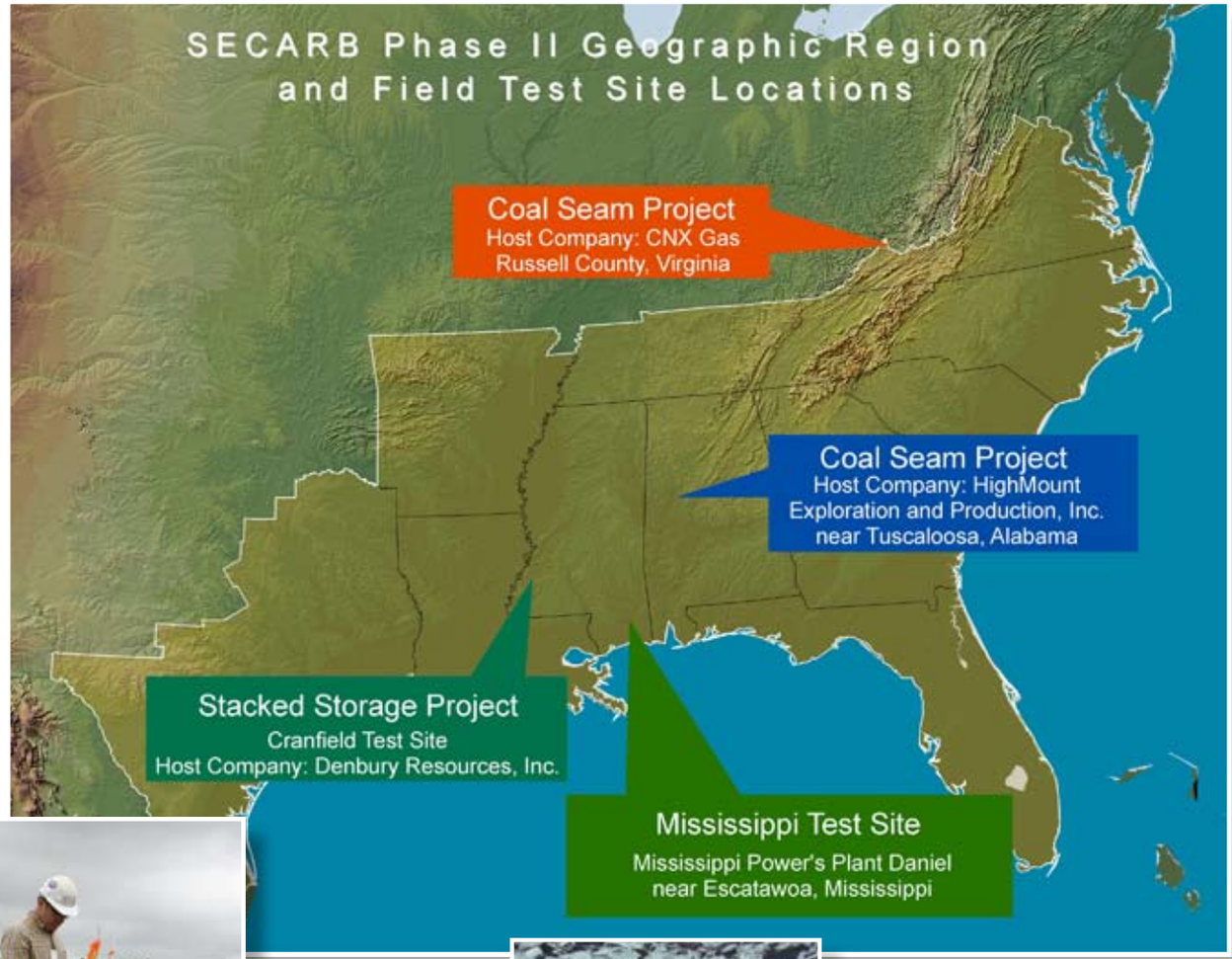


*Coal seam.*

*Drill core and drill chip logging from site characterization at the Mississippi Power test site. Courtesy of Southern Company and ARI.*

*Mississippi Power Company's Plant Daniel.*

# Southeast Regional Carbon Sequestration Partnership

The Southeast Regional Carbon Sequestration Partnership (SECARB), led by the Southern States Energy Board (SSEB), represents the 11 southeastern states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, and Virginia. Additionally Kentucky and West Virginia are collaborating with the Appalachian Coal Seam Project.

SECARB is accomplishing its objectives by conducting four field validation studies in the Region's most promising geologic formations: (1) validating injectivity, capacity and containment; (2) advancing the state of the art in monitoring, measurement and verification techniques and instrumentation; (3) further characterizing geologic formations in the Southeast for future readiness; (4) identifying and addressing issues for sequestration technology deployment; and (5) fostering local, regional, and national public involvement and education programs. The field tests include the following:

- Two Coal Seam Projects for validation of sequestration opportunities in the Black Warrior Basin and the Central Appalachian Basin where $CO_2$ ECBM recovery operations can add economic value and where unmineable coal seams can provide sequestration opportunities.

- The Mississippi Test Site focuses on validating geologic storage in a deep, saline formation. The test is being conducted at Mississippi Power Company's Victor J. Daniel, Jr. coal-fired power plant near Escatawpa, Mississippi.

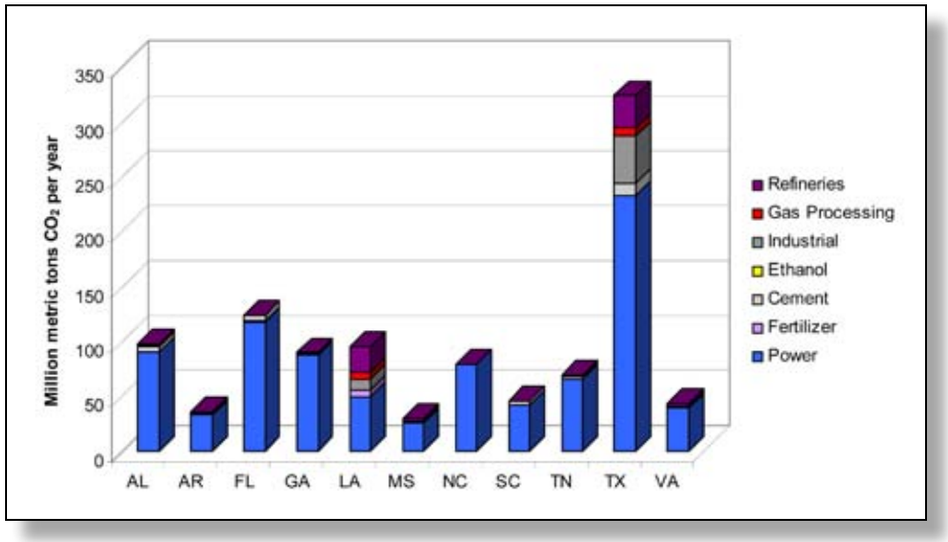
- The Gulf Coast Stacked Storage Project in Cranfield, Mississippi, builds upon the Gulf Coast Carbon Center of the University of Texas Bureau of Economic Geology (UT BEG) experience managing the Frio Basin Project. The field test investigates a stacked sequence of hydrocarbon and brine reservoir intervals, where EOR with $CO_2$ can serve as an economic driver in establishing the $CO_2$ infrastructure for transportation and storage into underlying deep saline formations.

The primary goal of the SECARB Partnership is to develop the necessary framework and infrastructure, conduct field tests of carbon sequestration technologies, and evaluate options and potential opportunities for carbon sequestration in the Region.

# SECARB $CO_2$ Sources

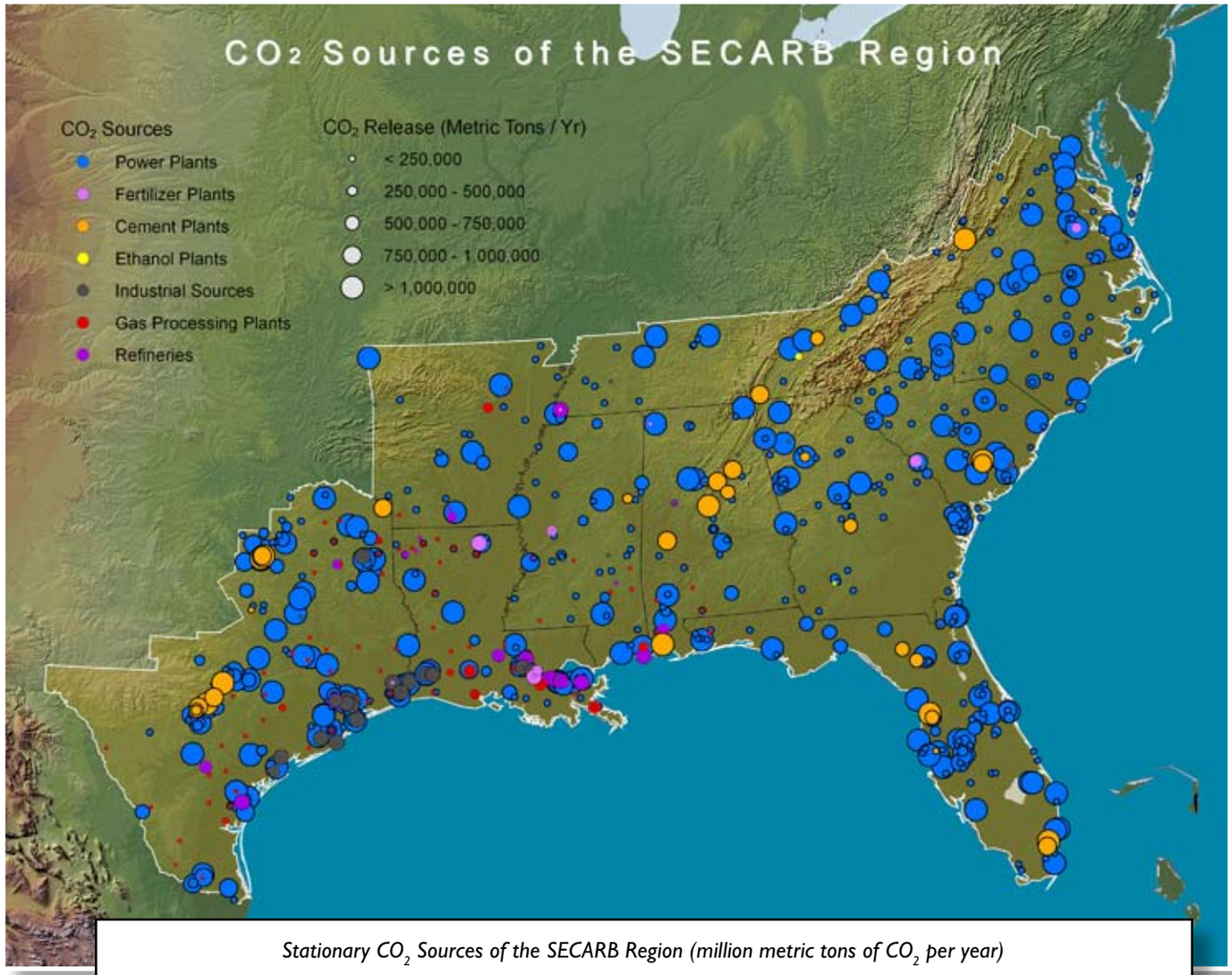
There are more than 900 large, stationary sources of $CO_2$ in the SECARB Region which are potential targets for carbon sequestration. Their total annual emissions are estimated at just over 1 billion metric tons (1.2 billion tons) of $CO_2$. Fossil-fuel (coal, oil, and gas) power plants are the largest contributors, accounting for approximately 83 percent of the total $CO_2$ emissions (see graph).

The SECARB Region is also host to a number of non-power related stationary sources of $CO_2$. These include, in descending order of contribution of $CO_2$: refineries, ethylene plants, cement plants, gas processing plants, iron and steel plants, and ethylene oxide plants.




*$CO_2$ emissions for the SECARB Region are displayed in the chart (right) and map (above) by location, source type, and quantity.*

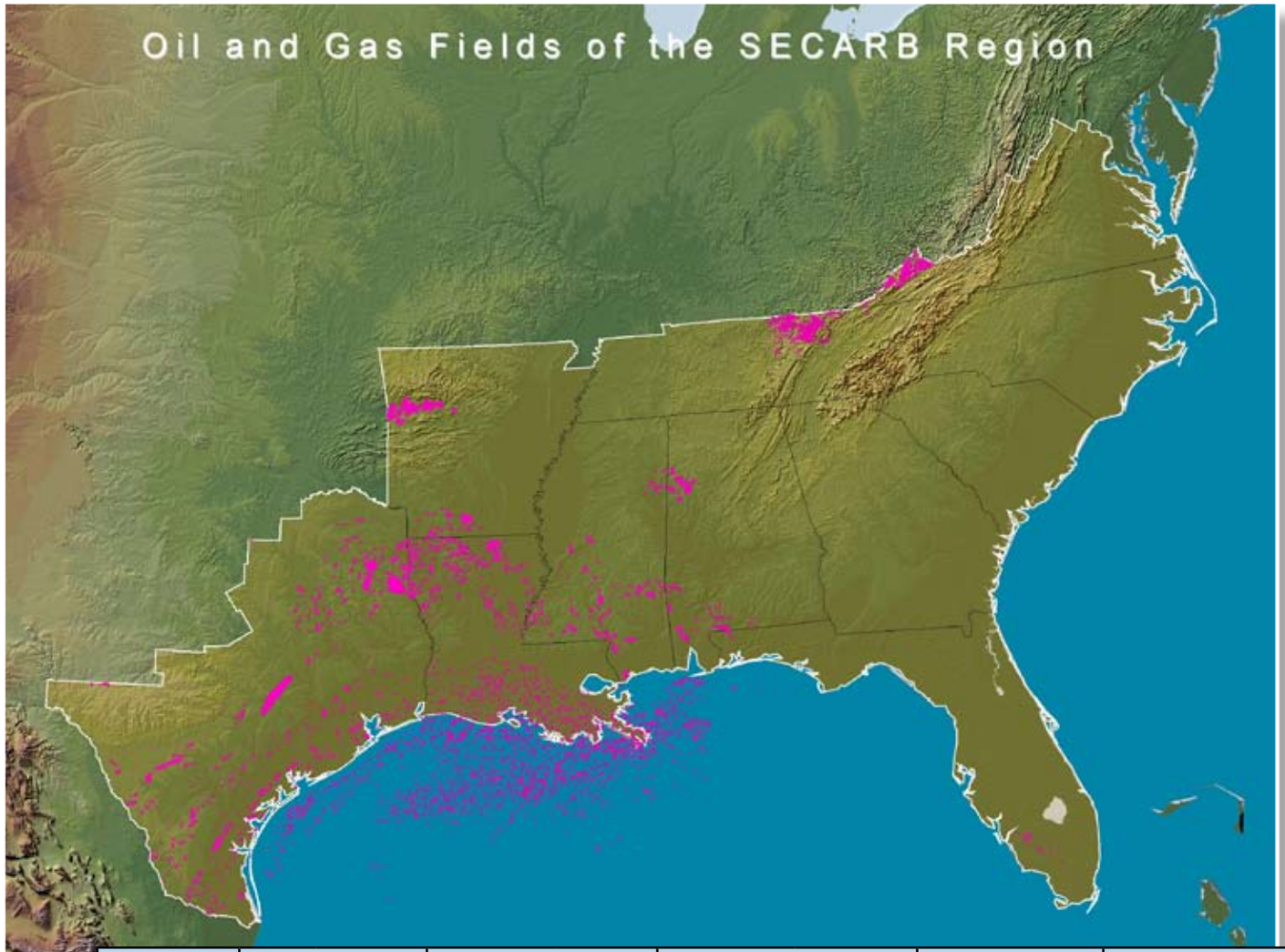
*Scherer Coal fired power plant in Juliet, Georgia produces over 25.6 million tons of $CO_2$. per year. (Source: Georgia Power)*




*Stationary $CO_2$ Sources of the SECARB Region (million metric tons of $CO_2$ per year)*

| State | Electric Generation* | Fertilizer* | Cement Plants * | Ethanol* | Industrial* | Petroleum/ Natural Gas* | Refineries/ Chemical* | Total* |
|---|---|---|---|---|---|---|---|---|
| AL | 71.1 | 0.2 | 5.4 | — | 0.5 | 0.3 | 1.3 | 78.8 |
| AR | 32.9 | — | 0.9 | — | 0.3 | 0.5 | 0.8 | 35.4 |
| FL | 137.0 | — | 5.5 | — | 0.1 | 0.1 | — | 142.7 |
| GA | 88.0 | 0.9 | 1.0 | — | 0.1 | — | — | 90.0 |
| LA | 52.6 | 4.6 | 0.8 | — | 9.6 | 5.9 | 28.3 | 101.8 |
| MS | 28.3 | 0.6 | 0.5 | — | 0.1 | 0.8 | 3.6 | 33.9 |
| NC | 76.7 | — | — | — | 0.1 | — | — | 76.8 |
| SC | 36.1 | — | 3.8 | — | 0.4 | — | — | 40.3 |
| TN | 61.8 | — | 1.5 | 0.4 | 0.2 | — | 1.8 | 65.7 |
| TX** | 237.6 | — | 11.1 | — | 42.5 | 4.8 | 37.2 | 333.2 |
| VA | 44.6 | 0.7 | 1.1 | — | 0.2 | — | — | 46.6 |
| *TOTAL* | 866.7 | 7.0 | 31.6 | 0.4 | 54.1 | 12.4 | 73.0 | 1045.2 |

* Units are all in million metric tons
** Eastern Texas: TRRC Districts 1-6




# SECARB Oil and Gas Reservoirs

The SECARB Region has a rich history of oil and gas production, particularly in the Gulf Coast states of Louisiana, Mississippi, and eastern Texas. As such, considerable information exists about the geologic settings and reservoir properties of these potential $CO_2$ storage sites.

The Region has produced nearly 7 billion $m^3$ (44 billion barrels) of oil and nearly 9.4 trillion $m^3$ (332 trillion $ft^3$) of natural gas. Application of $CO_2$ EOR could add 3.9 billion $m^3$ (24 billion barrels) of oil to these totals. These oil and gas reservoirs provide opportunities for storing $CO_2$, assuming that the saline water occupying the pore space can be efficiently displaced with injected $CO_2$.

The $CO_2$ storage resource offered by the oil and gas fields in the SECARB Region is nearly 31 billion metric tons (34 billion tons). These oil and gas fields can provide excellent sites for securely storing $CO_2$, given the presence of a porous and permeable reservoir overlain by a competent seal. Thus, the SECARB Region offers the potential for integrated application of $CO_2$ EOR and $CO_2$ sequestration, accelerating the storage of $CO_2$ in the Region.

| | Number of Fields | | Cumulative Conventional Recovery | | Conventional $CO_2$ Storage Resource | | Technically Recoverable Oil $CO_2$-EOR | Additional $CO_2$ Storage Resource* $CO_2$-EOR | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Assessed | Oil Million Bbls | Gas Bcf | Million Metric Tons | Bcf | Million Bbls | Million Metric Tons | Bcf |
| Alabama | 133 | 63 | 622 | 1,856 | 344 | 6,504 | 216 | 46 | 864 |
| Florida | 23 | 8 | 556 | <1 | 109 | 2,061 | 348 | 74 | 1,392 |
| Mississippi | 110 | 101 | 1,346 | 5,300 | 399 | 7,549 | 851 | 180 | 3,404 |
| Louisiana | 964 | 331 | 11,847 | 117,697 | 6,781 | 128,153 | 5,573 | 1,179 | 22,292 |
| Arkansas | 42 | 42 | 1,394 | 1,415 | 250 | 4,728 | 577 | 122 | 2,308 |
| Virginia | 49 | 49 | — | 89 | 10 | 180 | — | — | — |
| Tennessee | 213 | 213 | — | — | — | — | — | — | — |
| LA Federal Offshore | 1,337 | 1,001 | 15,843 | 176,466 | 17,754 | 335,550 | 5,227 | 1,106 | 20,908 |
| East Texas** | 678 | 678 | 12,510 | 29,373 | 4,005 | 75,695 | 10,995 | 2,327 | 43,980 |
| *TOTAL* | 3,549 | 2,486 | 44,118 | 332,196 | 29,652 | 560,420 | 23,787 | 5,034 | 95,148 |

* Additional $CO_2$ storage resource calculated by using 4,000 cf of $CO_2$ storage per barrel of technically recoverable $CO_2$-EOR oil
**TRRC Districts 1-6

*Left: Well at theCranfield Test Site. Courtesy of BEG, UT Austin.*

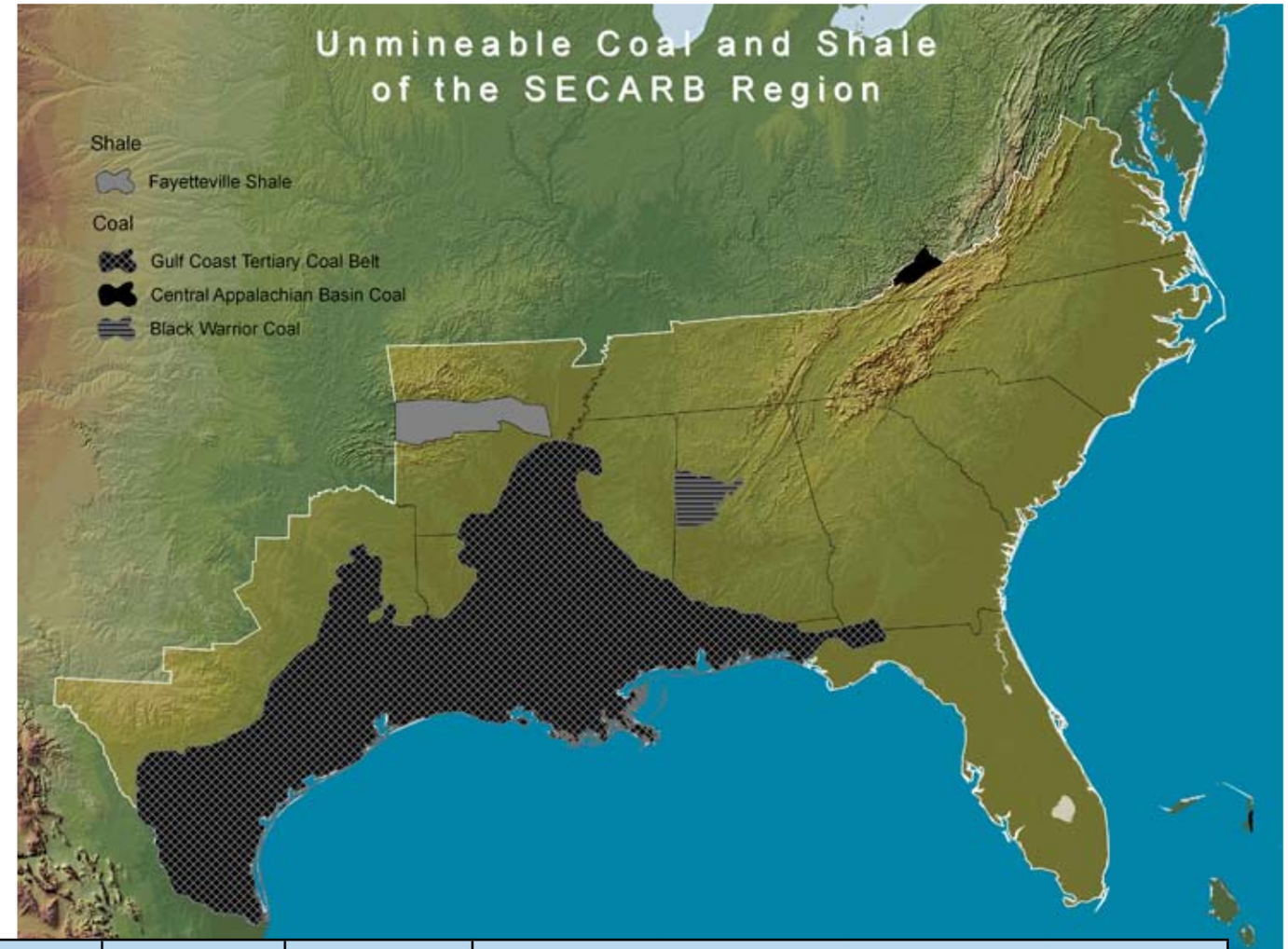
*Below: $CO_2$ injection well, Cranfield Test Site Courtesy of BEG, UT Austin.*

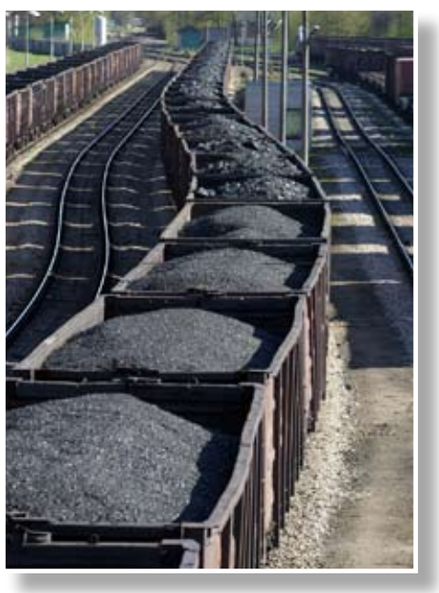
# SECARB Coal Seams and Gas Shales

Three significant coal basins and one gas shale basin have been appraised within the SECARB Region. The first of the coal basins, the Virginia portion of the Central Appalachian Basin, may have the $CO_2$ storage resource for 308 to 818 million metric tons (340 to 902 million tons) of $CO_2$. The Black Warrior Basin in Alabama and Mississippi has potential $CO_2$ storage resource of 0.9 to 1.3 billion metric tons (1.0 to 1.4 billion tons) of $CO_2$. The third coal basin, the areally extensive Gulf Coast Tertiary Coal Belt, may hold from 43 to 60 billion metric tons (47 to 66 billion tons) of $CO_2$. Additional information is needed to more rigorously quantify this large potential $CO_2$ storage option.

There is one gas shale basin in this Region appraised to date, the Fayetteville Shale in the Arkoma Basin of Arkansas and Oklahoma. This shale is estimated to have a of $CO_2$ storage resource of 14 to 20 billion metric tons (15 to 22 billion tons).

Considerable uncertainty surrounds the effective utilization of the large, potential $CO_2$ storage resource offered by coal seams and gas shales, particularly with respect to $CO_2$ injectivity and injection well requirements. The two SECARB field tests, in the Central Appalachian and the Black Warrior basins, will help reduce this uncertainty.



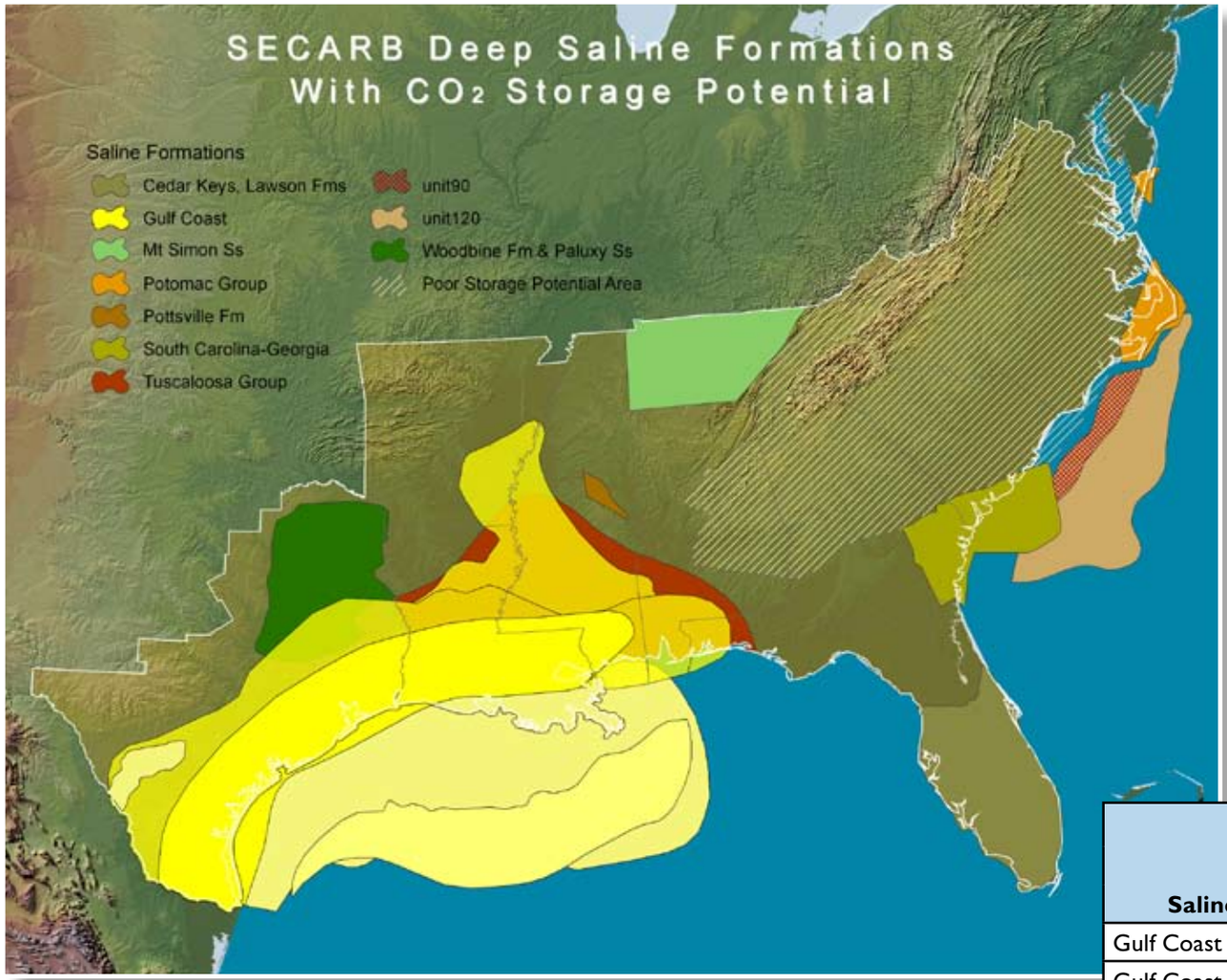



*Above: Coal Train (Source: Governor of Indiana).*

*Right: $CO_2$ storage resource in unmineable coal seams for the SECARB region*

| Basin | State | Status of Development | Area (square miles) | $CO_2$ Storage Resource | | | |
|---|---|---|---|---|---|---|---|
| | | | | Trillion Cubic Feet (Tcf) | | Billion Metric Tons | |
| | | | | High Estimate | Low Estimate | High Estimate | Low Estimate |
| **COAL** | | | | | | | |
| Central Appalachian | Virginia | Mature | 1,269 | 15 | 6 | 0.8 | 0.3 |
| Black Warrior | Alabama | Mature | 4,389 | 24 | 17 | 1.3 | 0.9 |
| Gulf Coast Tertiary Coal Belt | East Texas* | Undeveloped | 71,277 | 505 | 354 | 27 | 19 |
| | Louisiana | Undeveloped | 40,501 | 299 | 209 | 16 | 11 |
| | Mississippi | Undeveloped | 28,195 | 195 | 137 | 10 | 7 |
| | Arkansas | Undeveloped | 7,829 | 57 | 40 | 3 | 2 |
| | Florida | Undeveloped | 6,100 | 46 | 32 | 2 | 2 |
| | Alabama | Undeveloped | 5,915 | 46 | 32 | 2 | 2 |
| | Georgia | Undeveloped | 501 | — | — | — | — |
| | | ***Subtotal*** | **160,318** | **1,148** | **804** | **60** | **43** |
| | | ***TOTAL Coal*** | **165,976** | **1,187** | **827** | **63** | **44** |
| **SHALE** | | | | | | | |
| Arkoma (Fayetteville) | Arkansas | Emerging | 8,610 | 380 | 266 | 20 | 14 |

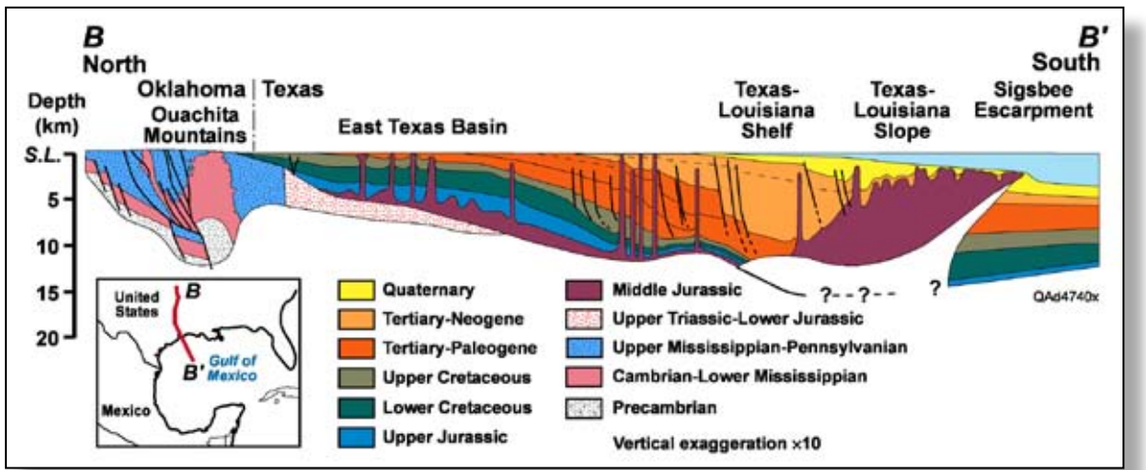
* TRRC Districts 1-6




# SECARB Deep Saline Formations

Much of the capacity of the SECARB Region lies in a thick wedge of sandstones in several sub-basins rimming the Gulf Coast. Sandstones of the Upper Cretaceous Tuscaloosa Formation of Alabama, Mississippi, and Louisiana host the current SECARB field tests. Overlying Tertiary formations extend offshore, and recent reassessment of these units has quantified additional $CO_2$ storage resource. Other Cretaceous formations that provide significant $CO_2$ storage resource include sandstones in Texas, South Carolina, Georgia, the subsea bed in the Atlantic offshore of the Carolinas and Virginia, and carbonates and sandstones in Florida. Initial mapping shows areas of saline $CO_2$ storage resource in Mt. Simon of Tennessee and Pottsville of Mississippi; with further assessment this capacity may be increased, as well as additional $CO_2$ storage resource mapped in southern Georgia and Arkansas. Current assessment shows that the saline formations in the SECARB region have the potential to store 2,275 to 9,100 billion metric tons (2,500 to 10,000 billion tons) of $CO_2$.

The storage potential of the Appalachian Piedmont and Blue Ridge areas is poor because the dominant crystalline and metamorphic rocks in these areas provide little pore volume and offer no predictable sealing capacity.




*Geologic cross-section across the Gulf Coast showing the thick wedge of Cretaceous and Tertiary age sediments that offer numerous large capacity saline formations. Source: Modified from: (1) Arbenz (1988), Plate 11, cross section D-D´ and Salvador (1991), Plate 6, cross section B-B´.*

| Saline Formations | State | $CO_2$ Storage Resource | | | |
|---|---|---|---|---|---|
| | | Trillion Cubic Feet | | Billion Metric Tons | |
| | | High Estimate | Low Estimate | High Estimate | Low Estimate |
| Gulf Coast Basins (Pliocene) | Multiple states* | 25,705 | 6,426 | 1,360 | 340 |
| Gulf Coast Basins (Miocene) | Multiple states* | 75,824 | 18,956 | 4,012 | 1,003 |
| Gulf Coast Basins (Oligocene) | Multiple states* | 24,884 | 6,221 | 1,317 | 329 |
| Gulf Coast Basins (Eocene) | Multiple states* | 29,588 | 7,397 | 1,565 | 391 |
| Gulf Coast Basins (Tertiary Undivided) | Multiple states | 3,225 | 806 | 171 | 43 |
| Gulf Coast Basins (Olmos) | TX | 84 | 21 | 4 | 1 |
| Tuscaloosa Group | Multiple states | 1,027 | 257 | 54 | 14 |
| Woodbine and Paluxy Formations | TX | 963 | 241 | 51 | 13 |
| Pottsville Formation | MS | 210 | 53 | 11 | 3 |
| Mt. Simon Sandstone | TN | 95 | 24 | 5 | 1 |
| Potomac Group | Multiple states* | 340 | 85 | 18 | 4 |
| South Carolina-Georgia Basins | Multiple states* | 597 | 149 | 32 | 8 |
| Cedar Keys, Lawson Formations | FL | 2,099 | 525 | 111 | 28 |
| Offshore Atlantic (Unit 120) | Federal | 6,733 | 2 | 356 | 89 |
| Offshore Atlantic (Unit 90) | Federal | 587 | 0.1 | 31 | 8 |
| *TOTAL* | | 171,961 | 41,163 | 9,098 | 2,275 |

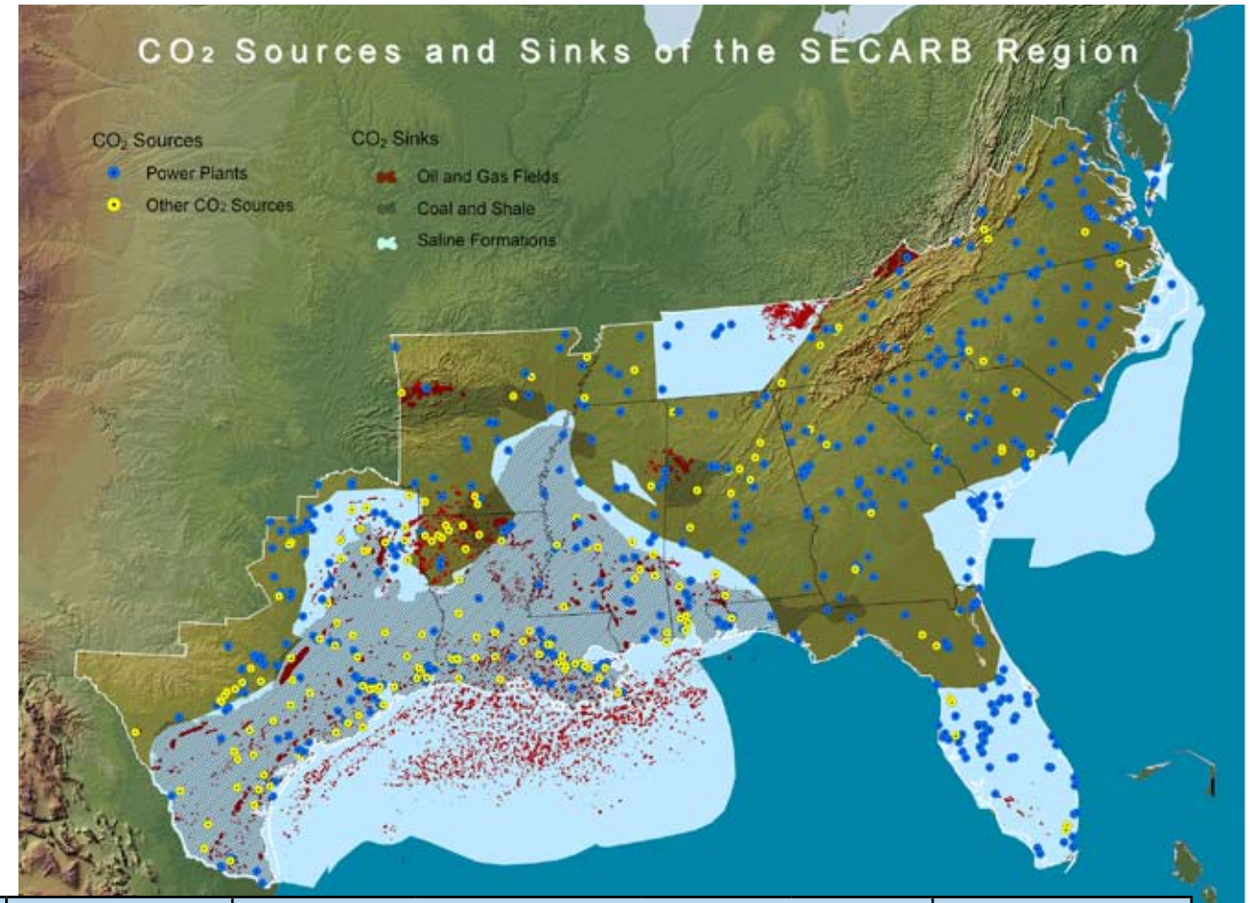
* Including offshore Federal Waters

# SECARB: Composite Map of $CO_2$ Sources and Geologic Storage Formations

The distance between a $CO_2$ stationary source and a geologic storage formation is calculated as the shortest straight-line distance from each source to the nearest geologic storage site. While these results do not give a complete picture of the transportation and infrastructure requirements, they do give a first-order interpretation of the magnitude of the requirements.

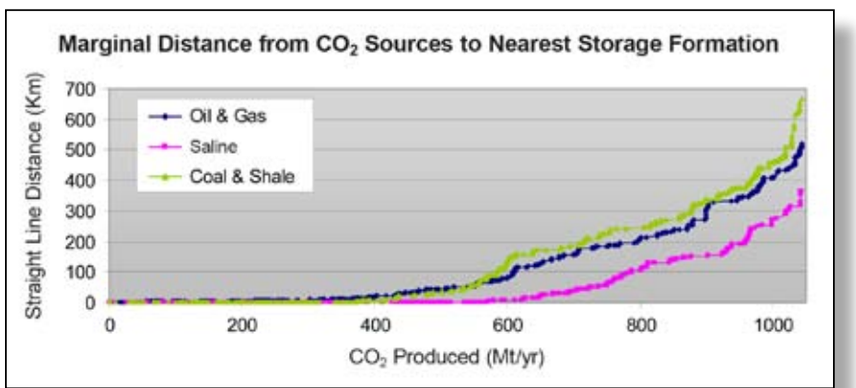
The sources in SECARB match up well with the potential storage reservoirs. For example, more than 70 percent of all sources (by volume) in the SECARB Region are located within 50 km (31 mi) of a storage formation. Approximately 40 percent of the sources are actually co-located with an appropriate storage formation. This especially occurs in the Gulf Coast region where many of the sources overlie saline formations, coal beds, or both.

The table below identifies how many years storage is possible given the current annual emissions and the known $CO_2$ storage resource.




| Formation Type | Straight-Line Distance to Nearest Formation | | |
|---|---|---|---|
| | < 50 km | 50 -100 km | > 100 km |
| Oil and Gas Fields | 50% | 9% | 42% |
| Saline Formations | 71% | 5% | 25% |
| Coal and Shale | 52% | 4% | 44% |
| All Reservoirs | 76% | 5% | 19% |

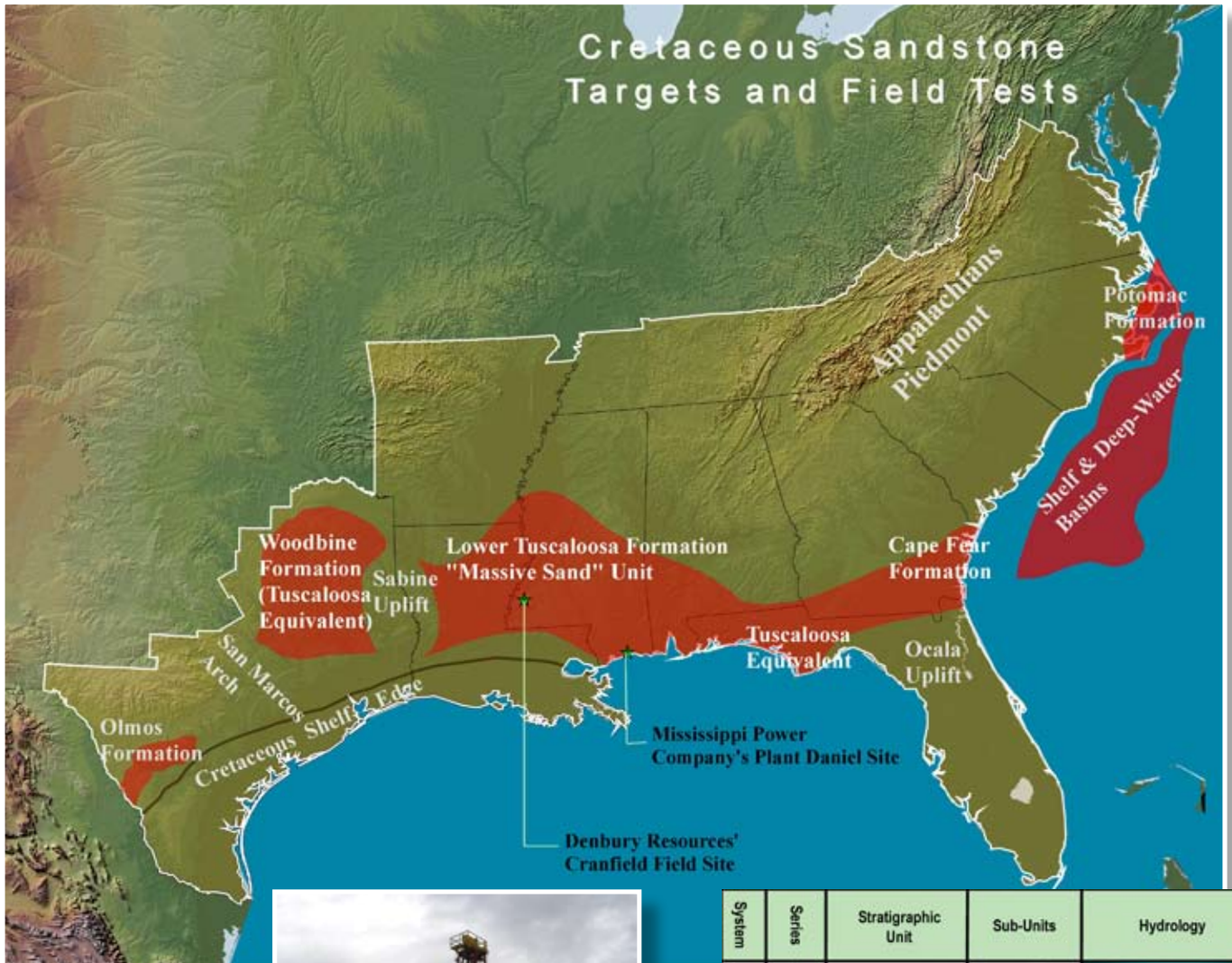
Note: The total annual $CO_2$ storage rate used was 938 million metric tons, which was estimated based on current emissions and assuming 90% capture efficiency.



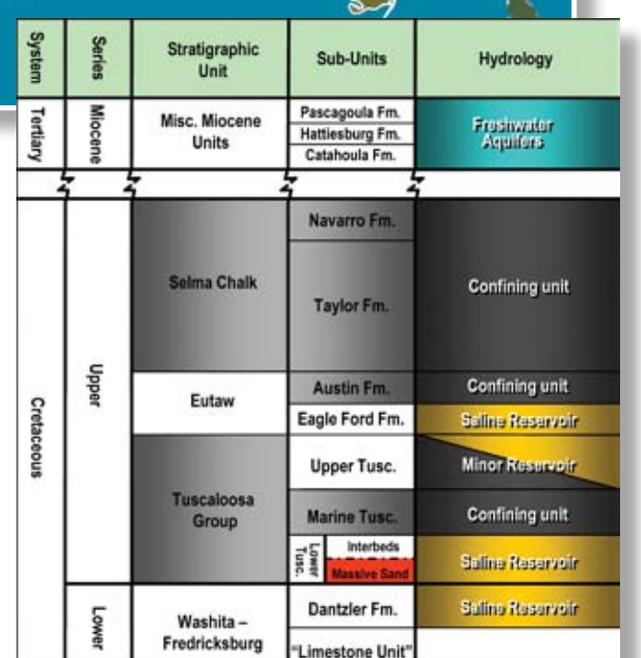

*Above: Marginal distance from all $CO_2$ sources to their nearest storage formation.*

| State | $CO_2$ Sources (million metric tons per year) | $CO_2$ Storage Resource (million metric tons) | | | | Number of Years Storage ** |
|---|---|---|---|---|---|---|
| | Total | Oil and Gas | Coal and Shale* | Saline* | Total | |
| AL | 79 | 390 | 2,592 | 32,250 | 35,232 | 446 |
| AR | 35 | 372 | 16,200 | 23,623 | 40,195 | 1,148 |
| FL | 143 | 183 | 1,700 | 28,950 | 30,833 | 216 |
| GA | 90 | — | — | 3,068 | 3,068 | 34 |
| LA | 102 | 7,960 | 11,100 | 348,744 | 367,804 | 3,606 |
| MS | 34 | 579 | 7,200 | 116,068 | 123,847 | 3,643 |
| NC | 77 | — | — | 3,380 | 3,380 | 44 |
| SC | 40 | — | — | 1,247 | 1,247 | 31 |
| TN | 66 | — | — | 1,250 | 1,250 | 19 |
| TX**** | 333 | 6,332 | 18,700 | 513,870 | 538,902 | 1,618 |
| VA | 47 | 10 | 308 | 398 | 716 | 15 |
| Federal Offshore | — | 18,860 | — | 1,201,741 | 1,220,741 | N/A |
| *TOTAL* | 1,045 | 34,686 | 57,800 | 2,274,589 | 2,367,215 | 2,263*** |

* Low estimates used
** Years of $CO_2$ Storage at the current emission rates ( State $CO_2$ storage resource/ state annual emissions)
*** Average years storage for whole of SECARB area (Total $CO_2$ storage resource/ total annual emissions)
**** Eastern Texas: TRRC Districts 1-6



*Drilling operations at Mississippi Power's Plant Daniel. Courtesy of Southern Company and ARI.*




*Geological Stratigraphy Column of the Mississippi Gulf Coast (Source: Unknown)*

# SECARB Field Tests

SECARB will be conducting four field validation tests for geologic sequestration projects during the Validation Phase.

## Stacked Storage Pilot Test - Gulf Coast Site

The Gulf Coast Stacked Storage project will demonstrate the concept of phased use of subsurface storage volume. This sequestration approach combines the early use of $CO_2$ for EOR followed by subsequent injection into associated saline formations. This results in both short-term and long-term benefits, as there is the immediate commercial benefit of EOR as a result of the injection of $CO_2$ (offsetting infrastructure development costs) followed by large-volume, long-term storage of $CO_2$ in brine-bearing formations. The field test is being conducted in the lower Tuscaloosa Formation in the Cranfield Unit, located in western Mississippi, at a depth of 3,140 m (10,300 ft). The monitoring program observes the pressure in the injection zone and in the overlying monitoring zone in a dedicated observation well real-time via wireline readout and satellite uplink, as well as collecting episodic changes in pressure and saturation in surrounding future producers. Injection rates in the commercial EOR flood are estimated between 91,000 and 450,000 metric tons (100,000 and 500,000 tons) per year of $CO_2$. The Validation Phase injection will be followed by a novel Development Phase large-volume injection into brine-bearing formations down dip of the oil ring.

## Saline Formation Pilot Test—The Mississippi Test Site

Mississippi Power Company's Plant Daniel, a 2,000 MW facility near the town of Escatawpa, in Jackson County, Mississippi, is the site of the saline formation pilot test.

The Project Team has concentrated their efforts on validating the storage capacity of the "Massive" Sandstone Unit of the Lower Tuscaloosa Formation, the target saline formation beneath Plant Daniel. This regionally significant formation could hold 11–43 billion metric tons (12–47 billion tons) of $CO_2$, sufficient to store the $CO_2$ emissions from Plant Daniel and other power plants in the region for decades. Other saline formations present at depths below and above the Lower Tuscaloosa "Massive" sandstone could provide considerable additional $CO_2$ storage capacity in the Region.

Two new 2,900 m (9,500 ft) wells have been drilled at the site, allowing the collection of new core, geophysical logs and seismic data. This new information is being used to confirm the estimated storage capacity at the site and is being incorporated into the regional characterization of $CO_2$ storage resource. Injection of $CO_2$ is planned for the fall of 2008.

## Coal Seam Pilot Test

***Central Appalachian Basin***

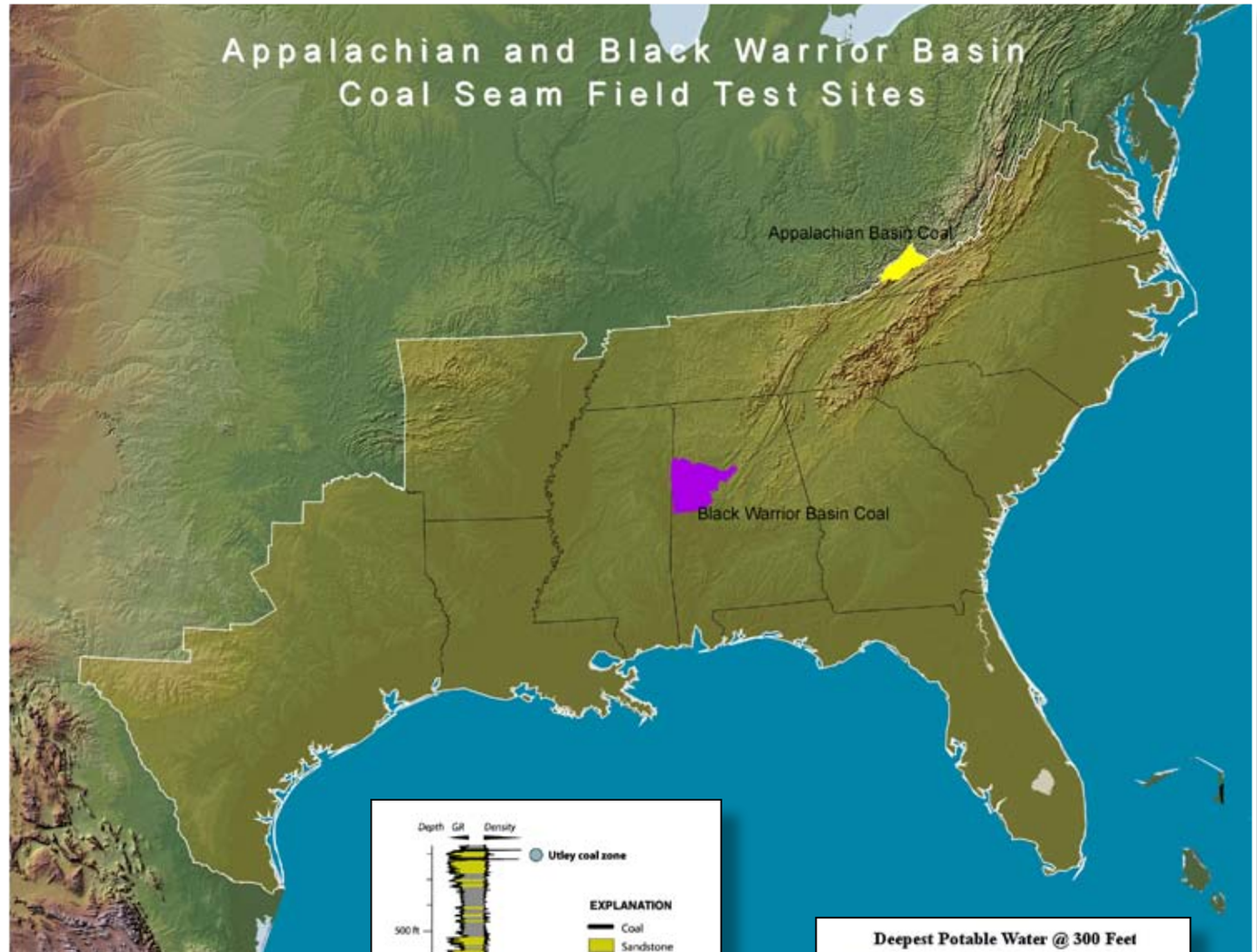
This test will validate sequestration opportunities in the Central Appalachian Basin, a northeast-to-southwest-trending basin encompassing 26,000 km$^2$ (10,000 mi$^2$) in southwestern Virginia, southern West Virginia, and southern Kentucky. The project will test the injection of 900 metric tons (1,000 tons) of $CO_2$ into four coal seams in the Pocahontas Formation and four coal seams in the Lee Formation at depths ranging between 490 and 670 m (1,600 and 2,200 ft). The project also includes coalbed methane recovery operations, adding economic value to the project. The primary project objective is to demonstrate geologic sequestration in unmineable Appalachian coals as a safe and permanent method to mitigate greenhouse gas emissions.

## Coal Seam Pilot Test

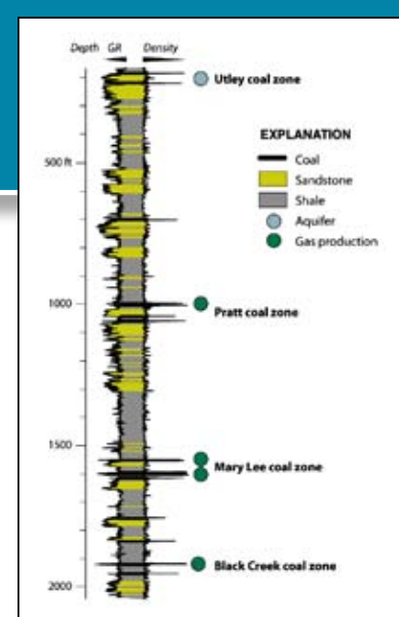
***Black Warrior Basin***

The principal objectives of the Black Warrior Basin coal seam project are to determine if sequestration of $CO_2$ in mature coalbed methane reservoirs is a safe and effective method to mitigate greenhouse gas emissions, and to determine if sufficient injectivity exists to efficiently drive $CO_2$ ECBM recovery.

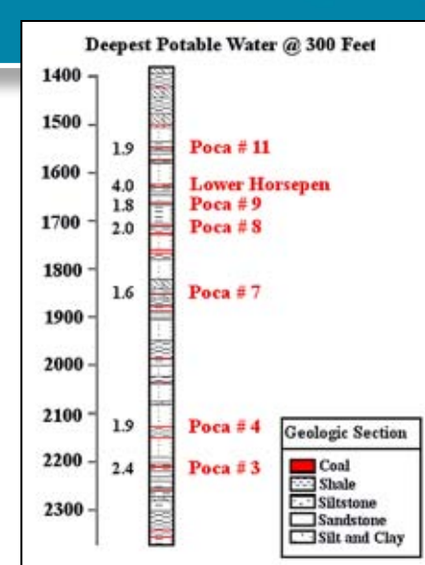
This project will use $CO_2$ injection testing into Black Warrior basin coal seams to determine the capability of these seams to adsorb significant volumes of $CO_2$ for geologic carbon sequestration and ECBM recovery. The test will take place in Tuscaloosa County, Alabama, and the Black Creek, Mary Lee, and Pratt coal zones of the Pennsylvanian-age Pottsville Formation have been selected for testing. Three coal seams will be injected with 900 metric tons (1,000 tons) of $CO_2$ (approximately 300 metric tons [333 tons] per coal seam) at an approximate depth of 460 to 760 m (1,500 to 2,500 ft).



*Central App Well (actual CNX Gas well where injection will take place). Courtesy of SSEB.*

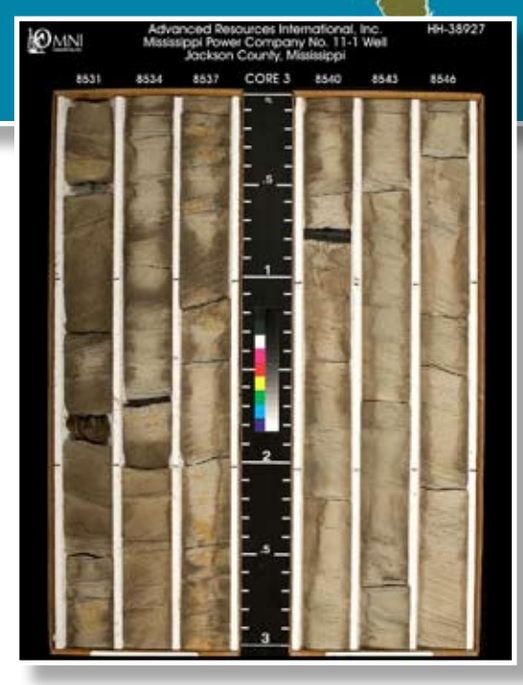



*Well logs showing stacked coal, Alabama (Source: Unknown).*




*Stratigraphic Column from Central Appalachian Coal Beds, showing stacked coals denoted in red. (Source: Unknown).*

*$CO_2$-EOR production wellhead. (Courtesy of BEG, UT Austin.)*




*Drill core collected from Tuscaloosa Formation beneath Plant Daniel. (Courtesy of Southern Company and ARI.)*

# SECARB: Development Phase Project

The Development Phase program has two distinctly different components: The Early Test and the Anthropogenic Test.

- The Early Test will be conducted in the down dip "water leg" of the Cranfield Oil Field, operated by Denbury Resources, Inc. near Cranfield, Mississippi.
- The Anthropogenic Test will be conducted at or near a Southern Company plant site in the Gulf Coast region following the 2008 Field Test of saline formation storage at the Victor J. Daniel Power Plant in Mississippi.

The Tuscaloosa Formation is the main injection zone. For the Anthropogenic Test the target storage reservoir is the "Massive" sandstone, a thick, regionally extensive, porous and permeable coastal to deltaic-marine sandstone at the base of the lower Tuscaloosa. Regionally the lower Tuscaloosa is overlain by a thick section 90 to 140 m (300 to 450 feet) of shales and mudrocks that were deposed as sea level rose during marine transgression. This low permeability interval provides the major seal above the injection zone, although numerous overlying shale and chalk intervals provide redundancy in $CO_2$ isolation.

Injections will be at a scale sufficient to validate model predictions at high and sustained rates, adding confidence to the estimates of injectivity and capacity for future large-scale commercial sequestration. The $CO_2$ source for the Early Test was selected to provide high injection rates, at low cost and in the near term.

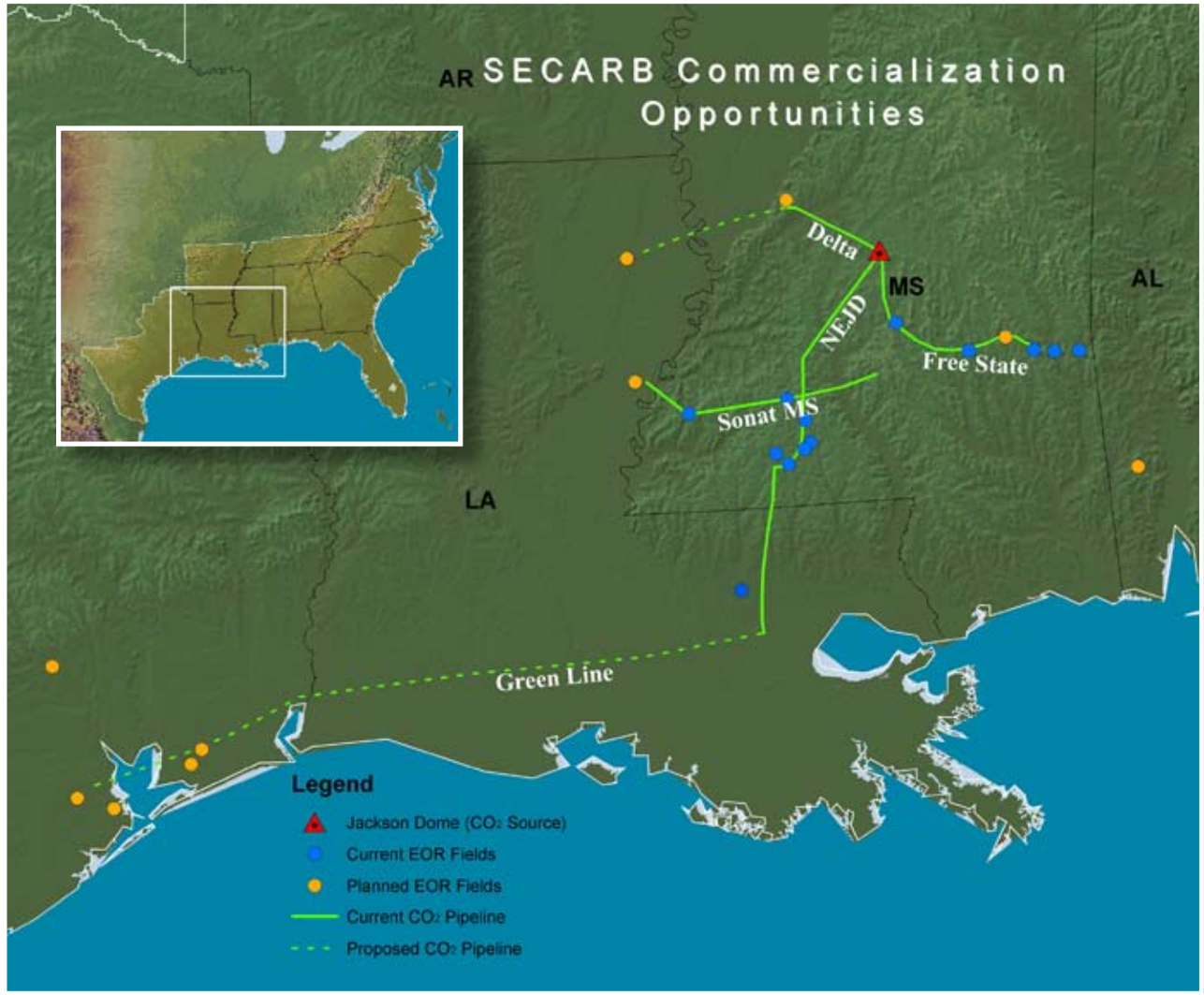
Denbury Resources will provide 0.9 million metric tons (1 million tons) of $CO_2$ per year from a natural source at Jackson Dome (Mississippi) via commercial pipeline. SECARB will conduct rigorous monitoring and model verification during the 10-year project with an array of multiple tools deployed at each site. Monitoring data will be collected to verify the correctness of the models in predicting plume evolution and determining the ultimate fate of the injected $CO_2$.

# SECARB Commercialization Opportunities

Early opportunities for commercialization in the Southeast Region most likely will be associated with an ability to offset the cost of capturing and storing $CO_2$. Utilizing $CO_2$ for EOR is the primary candidate for offsetting costs in several SECARB states. Work conducted by SECARB in Gulf Coast formations will assist in expanding $CO_2$ EOR opportunities. Another candidate is ECBM recovery utilizing $CO_2$. Field tests conducted by SECARB in Central Appalachia and in the Black Warrior Basin of Alabama will assist in determining the technical and economic feasibility of ECBM.

Within the SECARB Region, EOR is in place in Mississippi. Currently, the $CO_2$ that is used for EOR is coming from the Jackson Dome, a natural source of $CO_2$ located near Jackson, Mississippi. Denbury Resources operates a pipeline network that transports Jackson Dome $CO_2$ to oil fields in the Southeast. The Cranfield unit, near Natchez, Mississippi, is one EOR field operated by Denbury Resources, and it is host to a SECARB Validation Phase small-scale injection as well as a Development Phase large-scale injection in the brine formation down-dip of the EOR field.

Denbury Resources is developing and expanding a $CO_2$ pipeline network from the Jackson Dome to potential EOR sites in Mississippi, Louisiana, Texas Gulf Coast, and Alabama. Denbury Resources also is establishing agreements with sources of $CO_2$ that can supplement the volumes of $CO_2$ produced at Jackson Dome. As a result, the Denbury Resources pipeline system has the potential for becoming the regional backbone of an integrated network for $CO_2$.




## Regional Incentives

Two initiatives in the SECARB region will help advance carbon capture and sequestration deployment:

- As part of SECARB Validation Phase field investigation, Virginia Tech, Marshall Miller & Associates (MM&A), and the Geological Survey of Alabama are evaluating the feasibility of capturing $CO_2$ from an industrial source and storing it in unmineable coal seams and associated brine formations in Central Appalachia and the Black Warrior Basin.

- As part of SECARB Development Phase field investigation, the Electric Power Research Institute (EPRI) and Southern Company (with operating units in Mississippi, Alabama, Georgia, and Florida) currently are evaluating $CO_2$ capture and separation technologies. SECARB plans to inject 100,000–250,000 metric tons (110,000–280,000 tons) per year of anthropogenic (power plant) $CO_2$ from 2011 to 2014.

*Pipeline (Source: Denbury Resources).*

| Current EOR Fields | Location | Proposed EOR Fields | Location |
|---|---|---|---|
| Lockhart Crossing | LA | Tinsley Field | MS |
| Little Creek | MS | Lake St. John Field | LA |
| Mallalieu | MS | Heidelberg Field | MS |
| McComb | MS | Delhi Field | LA |
| Brookhaven | MS | Citronelle Field | AL |
| Eucutta | MS | Oyster Bayou | TX |
| Soso | MS | Fig Ridge | TX |
| Martinville | MS | Gillock Fields | TX |
| Yellow Creek | MS | Hastings Field | TX |
| Cyprus Creek | MS | Conroe Oil Field | TX |
| Smithdale | MS | | |
| Lazy Creek | MS | | |
| Cranfield Field | MS | | |