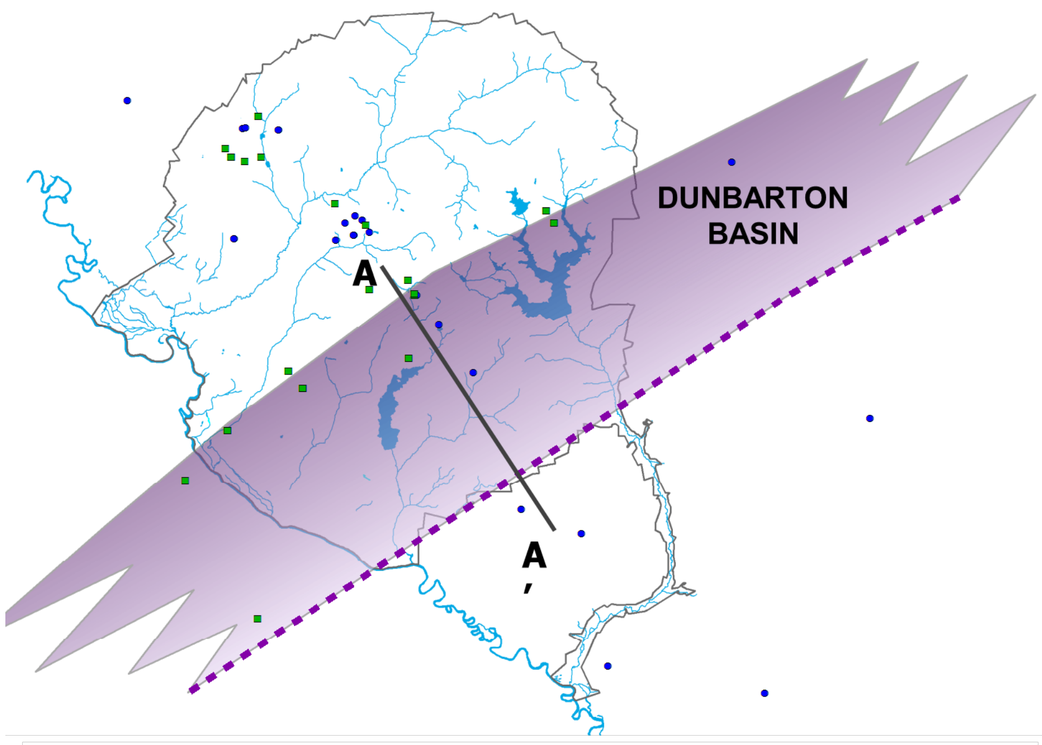
Pre-Cretaceous Rocks

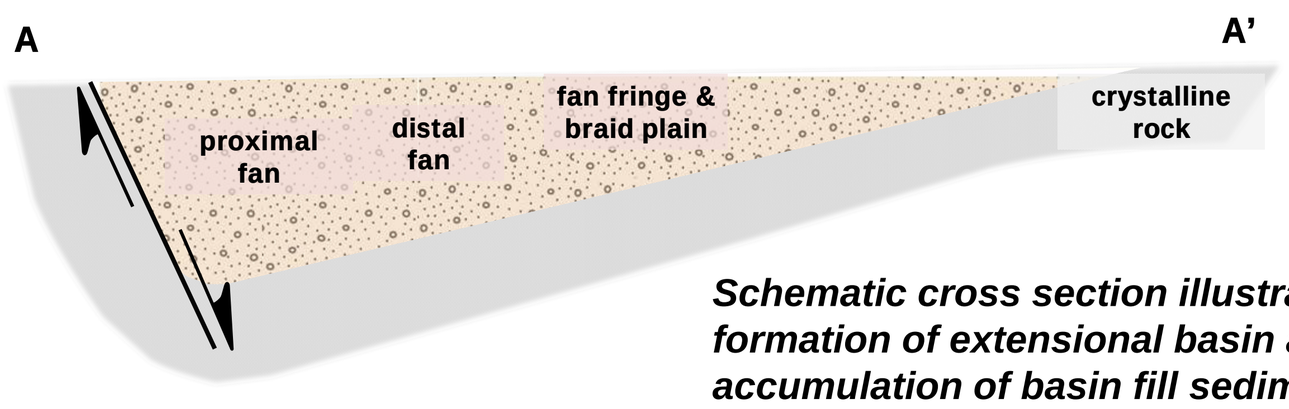
In addition to samples of the entire upper Atlantic Coastal Plain stratigraphic sequence, the SRNL Core Repository houses core from more than 25 boreholes that penetrate into underlying Triassic sedimentary rock or Paleozoic crystalline rock. Due to the cost and difficulty of drilling through more than 1,000 feet of sedimentary cover, pre-Cretaceous rocks are rarely sampled in this region, making these cores especially significant assets.

Triassic Sedimentary Rocks

The Dunbarton Basin is a Triassic-age half-graben -- one of numerous extensional basins formed during the breakup of Pangea and the opening of the Atlantic Ocean. Drilling and geophysical studies indicate that the basin is ~30 miles long and 8 miles wide. Core samples indicate that the basin is filled with lithic arkose, litharenite, mudstone, and conglomerate of the Newark Supergroup. Core samples from the Dunbarton Basin facilitate a more complete understanding of the basin's evolution (age of opening, sedimentation rate and provenance, diagenetic history, etc.) and can also provide a proxy for studying similar buried basins. This and other basins may hold promise as reservoirs for carbon dioxide sequestration.



Boreholes penetrating Triassic basin sediments** (shaded purple) **or Paleozoic crystalline basement.



Schematic cross section illustrating formation of extensional basin and accumulation of basin fill sediments during Triassic period.

Locally metamorphosed sedimentary rocks from the Dunbarton Basin.

A

B

A. Metaplutonic bedrock showing range of textures and metasomatic alteration.

B. Pseudotachylyte formed from metavolcanic bedrock.

All rock photos courtesy of Dr. Allen Dennis, University of South Carolina Aiken

Paleozoic Crystalline Rocks

More than 15,000 feet of basement rock have been recovered from deep boreholes at and near Savannah River Site. Most of this core was collected primarily during 1960s and 1970s drilling campaigns aimed at studying the feasibility of various waste storage/disposal options or during later programs designed to understand the age and capability of local faulting. While no waste was ever emplaced in bedrock, the archived cores are an important resource in understanding the age, lithology, geochemistry, structural behavior, and complex metasomatic history of Appalachian basement rocks.