

BIOSTRATIGRAPHIC INVESTIGATIONS HELP EVALUATION OF THE GROUND-WATER-FLOW SYSTEM NEAR THE SAVANNAH RIVER SITE, GEORGIA AND SOUTH CAROLINA

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The Savannah River Site (SRS) has produced and disposed of a variety of potentially hazardous materials since the early 1950's; as a result, ground water is contaminated at several locations on the site. In 1991, the U.S. Geological Survey, in cooperation with the U.S. Department of Energy and the Georgia Department of Natural Resources, began a 6-year study to determine if ground water is flowing from aquifers in South Carolina beneath the Savannah River and into aquifers in Georgia and, if not, under what conditions such flow could occur. A conceptual model based on physical data and a digital ground-water-flow model will be developed to better understand the ground-water-flow system in the study area. Biostratigraphic interpretations will be used to help define the hydrogeologic framework for the conceptual and digital models.

The SRS is located in the South Carolina Coastal Plain on the eastern side of the Savannah River, approximately 100 miles upriver from the Atlantic Ocean. In this area, aquifers of Late Cretaceous and Tertiary age are recharged by precipitation. The age and stratigraphic correlation of sediments in the study area have been controversial because existing fossil evidence is sparse, lithologies of adjacent units are commonly similar, and facies changes occur in relatively short distances. These three factors have also complicated understanding of the ground-water-flow system, because clay and silt confining units are more discontinuous updip; therefore identification of ground-water flow paths and delineation of aquifers and confining units are difficult. Detailed biostratigraphy, using marine and nonmarine fossils, is essential to understanding the depositional history of the region and to determining the complex three-dimensional relations of stratigraphic and hydrogeologic units needed for accurate conceptual and ground-water-flow models.

Development of the hydrogeologic framework will require data on the geologic, hydrologic, and water-quality characteristics of coastal plain sediments. To provide these data, clusters of seven to ten wells will be constructed at each of seven sites. At each site, a continuous core will be collected from land surface to basement rock, and monitor wells will be installed in each water-bearing zone. The first three cluster sites are located in Georgia along an updip-downdip transect parallel to the Savannah River. The southernmost of the three sites will serve as a biostratigraphic and lithostratigraphic reference section because it will have the thickest section of sediments and will contain marine facies in which a greater abundance of fossil evidence can be expected. Paleoenvironmental data will help predict the continuity of confining units between cluster sites.