Ground-Water Levels in the Upper Three Runs and Gordon Aquifers in the General Separations Area, Savannah River Site, South Carolina, 1996

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
	Length	
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
	Area	
square mile (mi^2)	2.590	square kilometer
	Pressure	
pound per square inch (lb/in^2)	6.895	kilopascal

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level datum of 1929.

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By Larry G. Harrelson, Kevin J. Conlon, and Mary K. Harris[1]

ABSTRACT

On February 27, 1996, synoptic water-level and barometric pressure data were collected in the General Separations Area, Savannah River Site, South Carolina. These data were collected during a 9-hour period. Water levels were measured at 231 observation wells, 19 piezometers, and 16 surface-water sites. An automated data-collection system was used to continuously measure water levels and barometric pressure at the SRS P27 well cluster in Area H. During the measurement period, barometric pressure varied 0.06 pound per square inch and water levels fluctuated 0.06 and 0.09 feet. Water levels did not fluctuate significantly due to barometric pressure changes during the measurement period.

Ground-water recharge to the upper and lower aquifer zones of the Upper Three Runs aquifer occurs in the topographically high interfluve areas of the General Separations Area on the Savannah River Site. The upper aquifer zone is unconfined and the lower aquifer zone is unconfined, semi-confined, and confined. Water levels in the upper aquifer zone are higher than water levels in the lower aquifer zone across the crest of the General Separations Area interfluve, suggesting that the unconfined and semi-confined parts of the lower aquifer zone receive recharge by leakage from the upper aquifer zone. The water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs aquifer resembles the local topography. Two ground-water divides trending approximately east-west and north-south are prominent features in the upper and lower aquifer zones of the Upper Three Runs aquifer. The ground-water divides roughly coincide with the topographically high areas of the interfluve. Both aquifer zones discharge to McQueen Branch, Crouch Branch, and the other tributaries of the Upper Three Runs and Fourmile Branch on the flanks of the General Separations Area interfluve.

Ground-water recharge to the Gordon aquifer is by lateral flow from areas to the east and northeast of the General Separations Area and by leakage from the lower aquifer zone of the Upper Three Runs aquifer. The Gordon aquifer is confined beneath all of the General Separations Area interfluve, except where the Gordon confining unit is breached by the incision of Upper Three Runs to the north and west of Area F. The potentiometric surface of the Gordon aquifer does not resemble the local topography.

INTRODUCTION

The Savannah River Site (SRS), a U.S. Department of Energy (DOE) facility, is located along the Savannah River approximately 60 mi southwest of Columbia, S.C., and about 95 mi from the Atlantic Ocean. The SRS is in the Upper Atlantic Coastal Plain physiographic province and occupies 310 mi^2 in parts of Aiken, Barnwell, and Allendale Counties in South Carolina (fig.1).

[1]Westinghouse Savannah River Company, Inc.

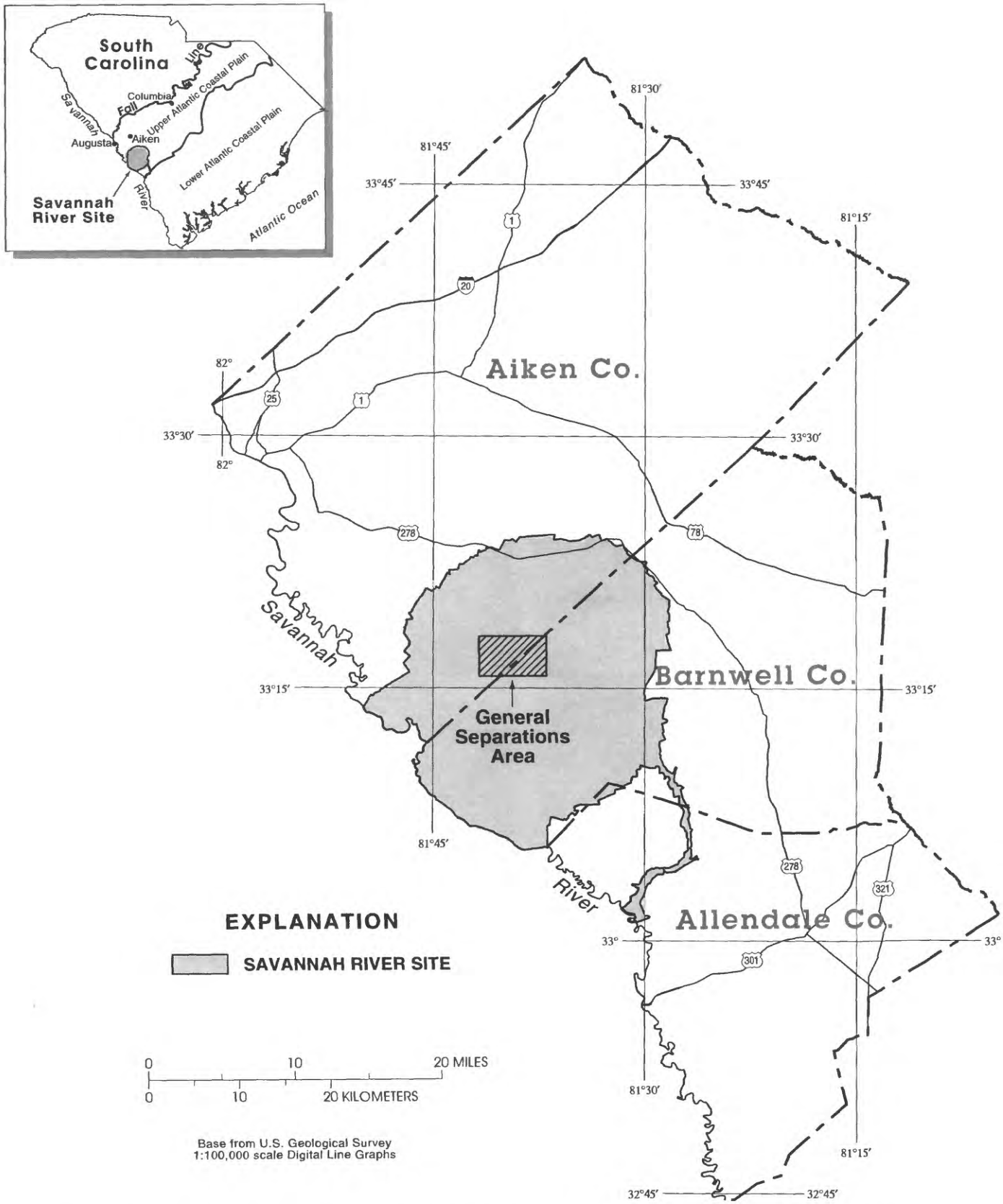

Figure 1. Location of the General Separations Area, Savannah River Site, South Carolina

The General Separations Area (GSA) near the geographic center of the SRS, includes Areas F and H, the Old Radioactive Waste Burial Grounds, the Low Level Radioactive Waste Facility (LLRWF) and the Mixed-Waste Management Facility (MWMF). The DOE plans to install a clay cap over the Old Radioactive Waste Burial Grounds, a soil cover over the LLRWF and the MWMF, and to activate extraction wells for pump-and-treat containment systems near the Area F and H seepage basins (fig. 2). These remedial actions could potentially change the shape of the water table and the potentiometric surfaces of aquifers beneath the GSA, and subsequently change the hydraulic gradients and the direction of ground-water flow in and around the remedial activity areas. In order to evaluate the effects of these remedial actions on the ground-water system beneath the GSA, the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and Gordon aquifers need to be accurately defined prior to the implementation of these remedial actions.

In February 1996, the U.S. Geological Survey (USGS) in cooperation with the DOE investigated the hydrology in the vicinity of the GSA at the SRS. Synoptic ground-water, surface-water, and barometric-pressure data were collected to map the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and Gordon aquifers in the GSA.

Purpose and Scope

The purpose of this report is to describe the configuration of the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and Gordon aquifers in the GSA. The configuration is shown on maps that represent the water-level surfaces prior to the installation of the clay cover over the Old Radioactive Burial Grounds and the soil cover over the LLRWF and the MWMF, and prior to the activation of extraction wells in the containment system for the Area F and H seepage basins. These maps serve as a set of contemporary benchmarks for the GSA relative to these specific remedial activities.

This purpose was accomplished by assembling and evaluating existing geologic data; developing a local hydrologic framework; collecting and evaluating additional hydrologic data from selected observation wells, piezometers, and surface-water sites; and by interpreting the results of the survey.

The total thickness of the Coastal Plain strata beneath the GSA exceeds 800 ft (Marine, 1979); however, only the Tertiary age strata are discussed in this report. The top of the Meyers Branch confining system acts as the major confining unit between the Tertiary age sediments and the underlying aquifers in Cretaceous age sediments; therefore, the Meyers Branch confining system is the vertical limit of this hydrologic investigation. The correlation of the geology and hydrogeology presented for the Tertiary age strata provides the hydrogeologic framework required to describe the configuration of the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and Gordon aquifers in the GSA.

General Description of Study Area

The study area comprises approximately 19 mi^2 in the central part of the SRS (fig. 1) and includes the industrial and waste-management facilities of the GSA. The study area is located on a broad interfluve between Upper Three Runs and Fourmile Branch (fig. 2). The eastern boundary of the study area is McQueen Branch. The western boundary is about half a mile west of Burma Road.

The study area is in the Atlantic Coastal Plain physiographic province. Sediments beneath the study area include Late Cretaceous and Tertiary age strata and are predominantly interlayered sequences of sand and clay (Siple, 1967; Dennehy and others, 1989; Fallaw and Price, 1995). The Tertiary section includes a few thin beds of partially lithified carbonate and silicified carbonate (Thayer, Smits, Parker, and others, 1993).

Previous Investigations

Several regional and SRS-specific reports describe the geology and hydrology of the GSA. Regional reports include Sloan (1908), Cooke (1936), Cooke and MacNeil (1952), Siple (1967), Daniels (1974), Marine and Root (1978), Bechtel Corporation (1982), Colquhoun and others (1983), Faye and Prowell (1982), Huddlestun (1982), Prowell, Christopher, and others (1985), Prowell, Edwards, and Frederiksen (1985), Steele (1985, 1992), Logan and Euler (1989), Nystrom and others (1989, 1991), Aadland and Bledsoe, (1990), Robertson, (1990), Aadland and others (1991, 1995), Fallaw and others (1989), Fallaw, Price,

and Sexton (1992), Fallaw, Snipes, and others (1992), Fallaw and others (1992a), Fallaw and others (1992b), Fallaw and Price (1992, 1995), Harris and others (1993), Laws and others (1992), Price and others (1992), Robertson and Thayer (1992), Snipes and others (1992, 1993), Thayer and Harris (1992), Prowell, (1994), and Harrelson and others (1997). The geology and hydrology of the GSA are described in site-specific reports by Christl (1964), Marine (1979), Root (1980, 1981), D'Appolonia (1981, 1982), Sargent (1984), Cook (1986), Dennehy and other (1989), Bledsoe and others (1990), Harris and others (1992), Westinghouse Savannah River Company (1992), Thayer, Smits, Harris, and others (1993), and Thayer, Smits, Parker, and others (1993). Reports on ground-water flow modeling in the study area include Parizek and Root (1984), Buss and others (1987), Duffield and others (1987), Spalding and others (1987), and Geotrans, Inc. (1988a, 1988b, 1988c, 1988d).

Acknowledgments

The authors thank Mark B. Amidon, Kenneth L. Dixon, Robert (Bob) Hunter, Keith Johnson, and Brian B. Looney of Westinghouse Savannah River Company, Inc., (WSRC) for their invaluable assistance in providing data for this report.

GEOLOGY

The Tertiary strata described in this section include in ascending order the Lang Syne Formation, the Snapp Formation, the Fourmile Branch Formation, the Congaree Formation, the Warley Hill Formation, the Tinker Formation/Santee Limestone, the Clinchfield Formation, the Dry Branch Formation, the Tobacco Road Formation, and the "upland" unit (fig 3). The "upland" unit is the youngest geologic unit in the study area. A comparison with previous stratigraphic nomenclature and lithologies beneath the study area are presented for each unit.

Lang Syne Formation

The type locality of the Lang Syne Formation and its correlation to the SRS are described in Sloan (1908), Padgett (1980), Colquhoun and others (1983), Howell (1985), Muthig and Colquhoun (1988), Colquhoun and Muthig (1991), and Nystrom and others, (1991). This lithologic unit has formerly been termed the Ellenton Formation in the SRS region by Siple (1967), Prowell, Edwards, and Frederiksen (1985), and Dennehy and others (1989). The Lang Syne was raised to a formation by Fallaw and Price (1992), replacing the use of the term Ellenton in the SRS region.

The Lang Syne Formation consists of dark gray and black, lignitic clays with interbeds of poor to moderately sorted micaceous, lignitic muddy quartz sand, and pebbly sand. The clays are predominantly fissile with micaceous silt and fine sand laminae (Fallaw and Price, 1995). The gray and black lignitic fissile clay is interpreted as lagoon or bay deposits. The micaceous, lignitic muddy quartz sand and pebbly sands are interpreted to be upper delta plain sediments in the GSA region of the SRS. Lower delta plain and prodelta facies are present southeast of the GSA (Fallaw and Price, 1995).

Snapp Formation

The Snapp Formation at the SRS is correlative to the Williamsburg Formation, as given by Colquhoun and others (1983), Steele (1985), and McClelland (1987). The Snapp was raised to a formation by Fallaw and Price (1995).

The Snapp lithologies are primarily silty, medium to coarse quartz sand with beds of oxidized clay. Minor lithologies are dark, micaceous, lignitic sand (Aadland and others, 1995). The type section for the Snapp Formation is recognized in the SRS P22 core in the southeastern part of the SRS where it attains a thickness of 50 ft. According to Fallaw and Price (1995), the Snapp Formation accumulated in an upper delta plain environment and appears to pinch out in the central portion of SRS near the GSA.

Fourmile Branch Formation

Fallaw and Price (1995) correlated the Fourmile Branch Formation in the SRS region to the Fishburne Formation as given by Gohn and others (1983). The sand was initially designated the Fourmile Member of the Fishburne Formation (Fallaw and others, 1992b). Fallaw and Price (1995) recognized the Fourmile Branch Formation and described a type section in well MWD 3A near the study area (fig.2).

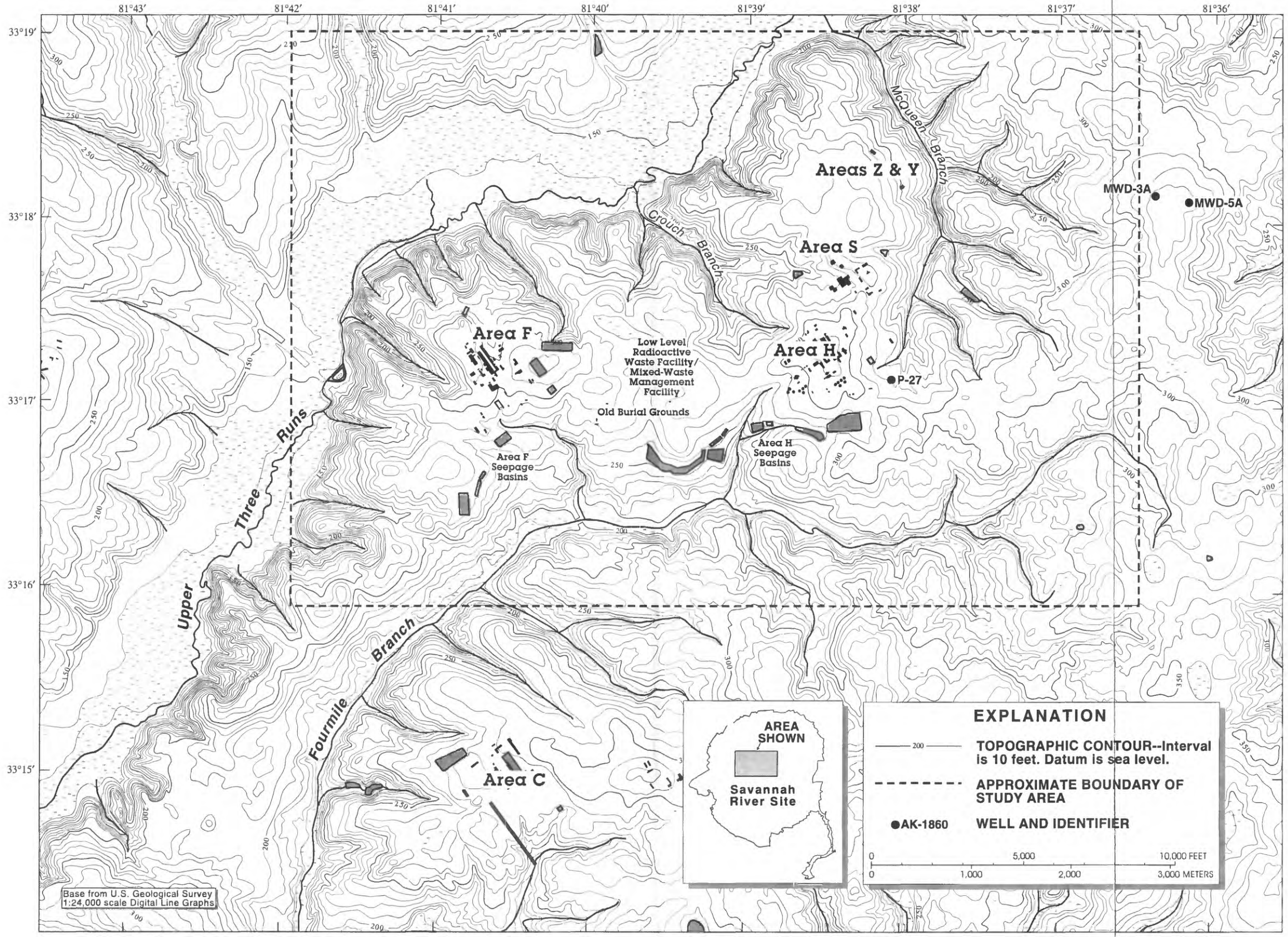

Figure 2. Topography in the vicinity of the General Separations Area, Savannah River Site, South Carolina.

– page 7 follows –

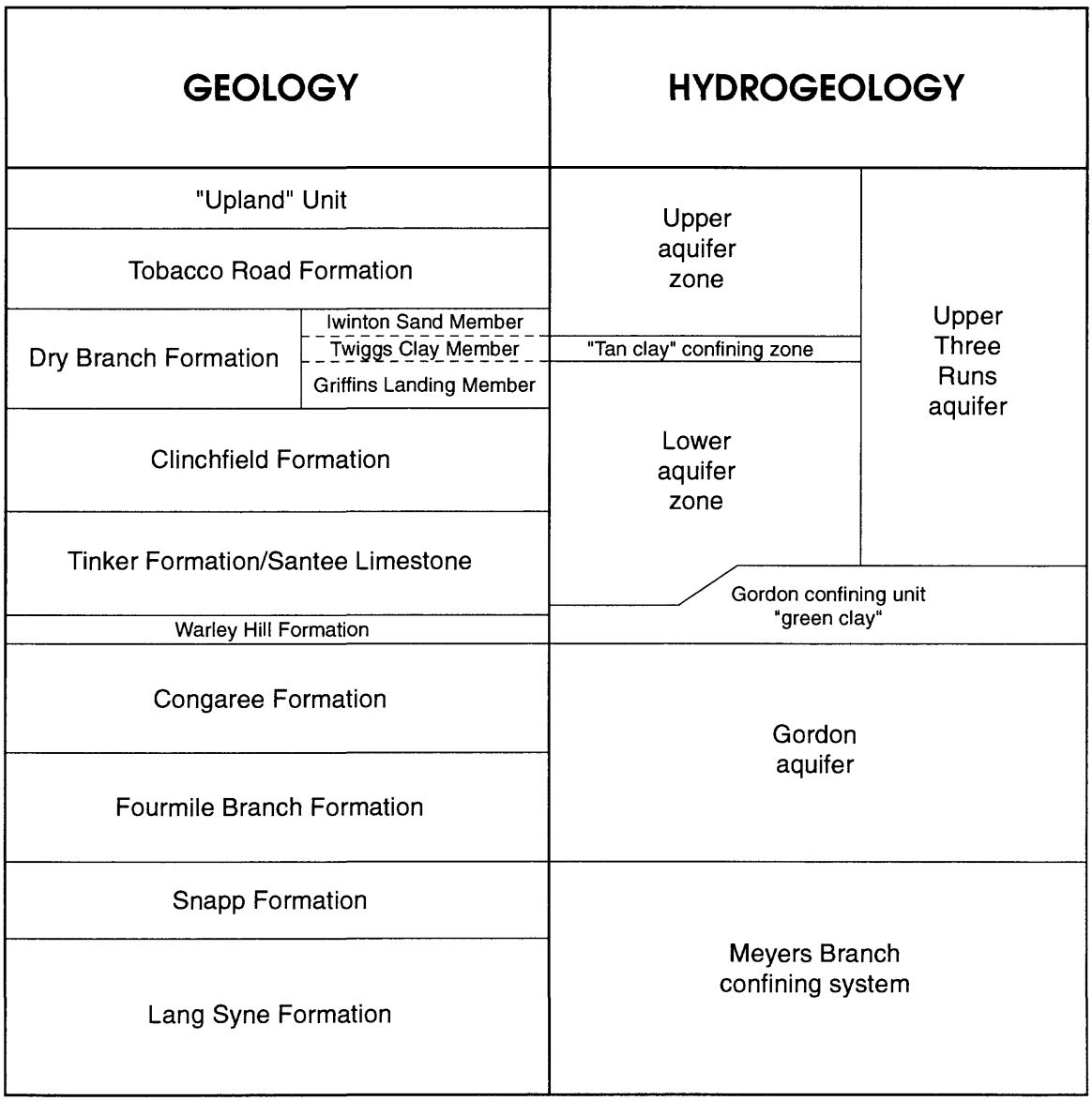

Figure 3. Generalized correlation of the geology and hydrogeology in the General Separations Area, Savannah River Site, South Carolina.

In the SRS, region the Fourmile Branch lithologies are primarily moderately to well sorted sand with clay beds near the middle and at the top of the unit. The sand is very coarse to fine, with pebbly zones, especially near the base. Glauconite, up to 5 percent, and weathered feldspar are present. The Fourmile Branch Formation averages 30 ft in thickness. Glauconite and dinoflagellate indicate that this unit is a shallow marine deposits (Fallaw and Price, 1995).

Congaree Formation

The term "Congaree Phase" was first introduced by Sloan (1908) to describe the shales, sands, and buhrstones of early and middle Eocene age overlying the "Black Mingo Phase" and underlying the "Warley Hill Phase" located at Warley Creek, Calhoun County, S.C. Cooke and MacNeil (1952) assigned the Congaree to the early middle Eocene and raised it to formational rank.

The early middle Eocene Congaree Formation has been traced from the Congaree valley in east-central South Carolina to the SRS area (Colquhoun and others, 1982, 1983). The Congaree crops out along Upper Three Runs near its juncture with Tinker Creek on the SRS (Nystrom and Willoughby, 1982; Willoughby, 1983, 1985, 1986; Nystrom, 1986; Nystrom and others, 1989). Downdip from these outcrops, the Congaree occurs only in the subsurface (Nystrom and others, 1989). At the SRS the unit consists of yellow, orange, tan, gray, and greenish gray, iron-stained, moderately well to poorly sorted, fine to coarse quartz sand with discontinuous lenses of montmorillonitic clay (Colquhoun and Johnson, 1968). Pebbly layers, clay clasts, calcareous sand, and glauconite also are present sporadically. The base of the formation is unconformable. The lower middle Eocene deposits become increasingly calcareous between the SRS and the coast (Colquhoun, and others, 1983; Harris and others, 1992).

The Congaree Formation has been interpreted to be a marine shelf deposit because of the occurrence of marine fossils, phosphate, and glauconite (Robertson and Thayer, 1992). The equivalent of the Congaree to the northwest of the SRS has been mapped as the Huber Formation (Nystrom and Willoughby, 1982). The Huber Formation is more micaceous and poorly sorted, which indicates deposition in fluvial and deltaic environments. The Congaree averages 82 ft thick in the SRS area (Robertson, 1990) and is about 60 ft thick in well MWD 3A (fig. 2) near the study area (Fallaw and Price, 1995). The unit increases in thickness to the north and south. A maximum thickness of 125 ft just south of the SRS was reported by Robertson (1990).

Warley Hill Formation

Sloan (1908) was the first to use the term "Warley Hill Phase." Cooke and MacNeil (1952) applied the name "Warley Hill Marl" for glauconitic beds occurring between the Congaree and McBean Formations. Pooser (1965) considered the term "marl" to be inappropriate for the overall lithology of the unit and proposed the name Warley Hill Formation. Both the glauconitic sand and the clay at the top of the Congaree are assigned to the Warley Hill Formation at SRS (Fallaw and Price, 1995).

The Warley Hill Formation unconformably overlies the Congaree Formation and consists of approximately 15 ft of poorly to well-sorted quartz sand, glauconitic sands, clays, sandy clay, and clayey sands (Fallaw and Price, 1995). The sediments generally have a distinct dark green color due to glauconite. The clay minerals in the matrix include illite and smectite (Dennehy and others, 1989). The green sand and clay beds of the Warley Hill are part of a unit that is informally referred to as the "green clay" in many SRS reports (Fallaw and Price, 1995).

Pooser (1965) considered the Warley Hill clastics to be shallow to deep shelf deposits in the study area, generally forming in deeper water than the underlying Congaree Formation. Fallaw and Price (1995) considered the glauconite and dinoflagellates to be indicative of shallow marine conditions and the muddier sands to represent a lower-energy environment than the Congaree.

Tinker Formation/Santee Limestone

Lyell (1845) was the first to use the term "Santee" for limestones exposed along the Santee River in South Carolina. The terms "McBean Formation" and "Lisbon Formation" have been applied to these sediments, but the term "Santee" of Sloan (1908) is generally accepted. Cooke (1936) coined the term Santee Limestone with formational status.

Cooke (1936) assigned the unit to upper Eocene age, but Cooke and MacNeil (1952) reassigned it to the middle Eocene as the equivalent of the Gulf States' Cook Mountain Formation of the Claiborne Group. The most recent interpretation of stratigraphic units for the Santee Limestone is that this part of the middle Eocene section consists of three laterally gradational units (Fallaw and Price, 1995): the Tinker Formation, the Santee Limestone, and the informally named "Blue Bluff Unit" (Huddlestun and Hetrick, 1985). The Santee Limestone is a downdip calcareous facies, whereas the Tinker Formation represents a correlative facies that occur in the updip part of the SRS. The "Blue Bluff Unit" occurs to the southeast of the SRS and interfingers with and grades into the Santee Limestone (Fallaw and Price, 1995). The "Blue Bluff Unit" is not present in the GSA and is not addressed in this study. The Tinker Formation/Santee Limestone is about 70 ft thick in the center of the SRS (Aadland and others, 1995).

The Tinker Formation consists of fine and medium, tan, orange, and yellow, poorly to well sorted, and slightly to moderately indurated sands with interbedded clays. This unit is slightly glauconitic in places and contains abundant heavy minerals. The sands suggest barrier and inner neritic environments, while the silts and clays were probably deposited in bays, lagoons, and low energy shelf areas (Fallaw and Price, 1995).

The Santee Limestone consists of moderately sorted, yellow and tan sand, calcareous sands and clays, carbonates, and clay. Limestone is much more abundant in the downdip part of the SRS, sporadic and pod-like in the middle of the GSA, and missing in updip sections to the northwest. The carbonates represent shallow open-marine environments.

Clinchfield Formation

The Clinchfield Formation generally consists of medium-grained, well-sorted, poorly consolidated, massively bedded quartz sand (Huddlestun and Hetrick, 1979). At the SRS, this unit has only been identified when the carbonates of the Griffins Landing Member of the Dry Branch Formation and the Santee Limestone are present. According to Fallaw and Price (1995), the sands are tan and yellow, poorly to well sorted, and fine to coarse at the SRS and are only 10 ft thick at well MWD 5A (fig. 2).

Dry Branch Formation

The Dry Branch Formation is divided into the Griffins Landing Member, the Twiggs Clay Member, and the Irwinton Sand Member (Aadland and others, 1995). At the SRS, the formation is approximately 50 ft thick near the northwestern site boundary and approximately 80 ft thick near the southeastern site boundary (Fallaw and Price, 1995). Near the center of the SRS, the Dry Branch Formation is approximately 60 ft thick (Aadland and others, 1995).

The Griffins Landing Member is composed of mostly tan or green, slightly indurated, calcareous quartz sand, and slightly calcareous clay (Fallaw and Price, 1995). The unit is widespread in the southeastern part of the SRS, but becomes sporadic in the center where it pinches out. The Griffins Landing Member appears to have formed in shallow marine to lagoonal environments (Aadland and others, 1995).

The Twiggs Clay Member is not mappable in the area near the SRS, but lithologically similar clay is present at various stratigraphic levels in the Dry Branch Formation. The tan, light-gray, and brown clay is not continuous over long distances. The Twiggs Clay lithology is referred to as the "tan clay" in many SRS reports (Aadland and other, 1995).

The Irwinton Sand Member is composed of tan, yellow, and orange, moderately sorted, quartz sand with abundant interlaminated and interbedded clay in places (Fallaw and Price, 1995). The tan, light-gray, and brown clay beds are discontinuous and, like the Twiggs Clay Member, also are referred to as the "tan clay" in many SRS reports (Aadland and others, 1995).

The Irwinton sand beds and interbedded clays are interpreted as shallow marine deposits, including barrier, lagoonal, and marsh environments (Smith, 1979; Fallaw and Price, 1995).

Tobacco Road Formation

The Tobacco Road Formation is primarily fine to coarse sand and varies from well sorted to poorly sorted with flat quartz pebbles at the base in some places (Fallaw and Price, 1995). Variations of clay, chert, mica, limestone, and heavy-mineral content exist locally (Huddlestun and Hetrick, 1979). Bedding can be massive, burrowed, or bioturbated (Logan and Euler, 1989). Fallaw and Price (1995) interpreted a transitional, low energy marine environment, possibly

a tidal flat, on the basis of the bedding characteristics and presence of *Ophiomorpha*, a trace fossil.

"Upland" Unit

The term "upland" unit has been widely used in the Coastal Plain of South Carolina for the poorly sorted, silty, clayey and pebbly sand, and conglomerates that occur at higher elevations within the study area. At the SRS the "upland" unit has been called the Hawthorn Formation (Siple, 1967), or the Altamaha Formation (Huddlestun and Hetrick, 1988; Nystrom and Willoughby, 1992; Fallaw and Price, 1995). It is believed that the unit is correlative to the Chandler Bridge Formation near the coast (Colquhoun and others, 1994). Because the age of the unit is still controversial, this report uses the informal name "upland" unit.

Colquhoun and others (1994) suggested that the "upland" unit was similar in texture and composition to the Tobacco Road and Dry Branch Formations. They believed that the unit was part of the same transgressive/regressive cycle as the Tobacco Road and Dry Branch Formations.

HYDROGEOLOGY

The hydrogeologic framework for this report is restricted to the upper and lower aquifer zones of the Upper Three Runs aquifer, the "tan clay" confining zone, the Gordon confining unit, the Gordon aquifer, and the Meyers Branch Confining System as defined for the SRS by Aadland and others (1995). The Upper Three Runs aquifer is divided into three units that are informally named the upper aquifer zone, the "tan clay" confining zone, and the lower aquifer zone (Aadland and others, 1995). The Gordon aquifer is separated from the Upper Three Runs aquifer by the Gordon confining unit or "green clay." The underlying Gordon aquifer consists of all saturated strata that occur between the Gordon confining unit and the Meyers Branch Confining System. The top of the Meyers Branch Confining System defines the lower boundary of this investigation (fig. 3).

Each hydrogeologic unit is described in terms of its correlation to the geologic section (fig. 3) (Dennehy and others, 1989; Aadland and others, 1995). The saturation and confining conditions are described for each aquifer and aquifer zone. The units are discussed in descending order.

Upper Three Runs Aquifer

This aquifer includes all sediments from land surface down to the top of the Gordon confining unit (Aadland and others, 1995). In the vicinity of the GSA, the Upper Three Runs aquifer is correlative to the "upland" unit, the Tobacco Road Formation, Dry Branch Formation, Clinchfield Formation, and most of the Tinker Formation/Santee Limestone (fig. 3). The Upper Three Runs aquifer is divided into the upper and lower aquifer zones that are separated by the "tan clay" confining zone.

Upper Aquifer Zone

The upper aquifer zone is part of the Upper Three Runs aquifer between land surface and the top of the "tan clay" confining zone (fig. 3). This unit includes the sediments of the "upland" unit, the Tobacco Road Formation, and part of the Dry Branch Formation. This unit is equivalent to the Barnwell aquifer and aquifer zone IIB_2 (Dennehy and others, 1989; Thayer, Smits, Harris, and others, 1993). The upper aquifer zone includes both a unsaturated and a saturated interval and is unconfined across the GSA (Thayer, Smits, Harris, and others, 1993). In this study, the water-level data collected from this hydrogeologic unit are mapped as an unconfined water-level surface.

"Tan Clay" Confining Zone

The "tan clay" confining zone is correlative to the "tan clay" interval of the Dry Branch Formation as described by Fallaw and Price (1995). Like the other Coastal Plain strata, the "tan clay" and the rest of the Dry Branch Formation generally have a southeasterly structural dip. Outcrops of the Dry Branch Formation are at higher elevations in the Upper Three Runs valley along the north and west sides of the GSA and at lower elevations in the Fourmile Branch valley along the south and southeast sides of the GSA (Prowell, 1994).

The clay is present at various intervals and is not continuous over long distances (Aadland and others, 1992; Harris and others, 1993). Where the "tan clay" is not present, the upper and lower aquifer zones are in direct contact, and therefore, the vertical movement of water is not impeded. Dennehy and others (1989) mapped the "tan clay" confining zone between their Barnwell and McBean aquifers and recognized that the zone was absent in the vicinity of the Area S and McQueen Branch (fig. 2). This zone is equivalent to the IIB_1-IIB_2 confining zone reported by Thayer, Smits, Harris, and others (1993).

Lower Aquifer Zone

The lower aquifer zone is the part of the Upper Three Runs aquifer below the "tan clay" confining zone. This unit includes the sediments of the Dry Branch Formation below the "tan clay," the Clinchfield Formation, and most of the Tinker Formation/Santee Limestone. This unit is equivalent to the McBean aquifer and aquifer zone IIB_1 (Dennehy and others, 1989; Thayer, Smits, Harris, and others, 1993).

This unit is saturated and is either confined, semi-confined, or unconfined. Outcrops of the Tinker Formation/Santee Limestone (McBean Formation) were mapped along the north and west sides of the GSA (Prowell, 1994). Water-level data from this zone of the Upper Three Runs aquifer were mapped as a distinct water-level surface, except in the outcrop area along the Upper Three Runs valley where the upper and lower zones act as one aquifer and discharge into the Upper Three Runs. In this area, the water-level data are interpreted as unconfined. Surface-water elevation measurements were used to map the water-level surface along streams for the upper and lower aquifer zones.

Gordon Confining Unit

The Gordon confining unit is correlated to the "green clay" (Root, 1980; Snipes and others, 1992) and is the hydrogeologic equivalent of the "green clay" confining unit or the IIA-IIB confining unit (Dennehy and others, 1989; Thayer, Smits, Harris, and others, 1993). Fallaw and Price (1995) described the "green clay" interval as part of the Congaree Formation, the Warley Hill Formation, and the Tinker Formation/ Santee Limestone. The Gordon confining unit in the GSA includes the "green clay" and some of the fine grained calcareous beds of the Warley Hill Formation and Tinker Formations.

This unit crops out in the stream bed of Upper Three Runs to the north of Area F and just downstream of the confluence with Crouch Branch (fig. 2). Downstream of the outcrop, the Gordon confining unit is breached by the incision of the Upper Three Runs valley. This unit is not exposed along Fourmile Branch.

Gordon Aquifer

The Gordon aquifer includes sediments of the Fourmile Branch and Congaree Formations, depending on the thickness and stratigraphic distribution of the "green clay" lithology. The Gordon aquifer is equivalent to the Congaree and IIA aquifers (Dennehy and others, 1989; Logan and Euler, 1989; Thayer, Smits, Harris, and others, 1993).

The Gordon aquifer is saturated and confined, except for an area in the downstream reach of the Upper Three Runs below the outcrop of the Gordon confining unit. Water levels from this interval are interpreted as a confined water-level surface.

Meyers Branch Confining System

The Meyers Branch confining system includes the Lang Syne and Snapp Formations (Aadland and others, 1992, 1995). The base of the Gordon aquifer is defined by the top of the clay lithologies of either the Snapp Formation or, in the absence of the clays of the Snapp Formation, the Lang Syne Formation. This unit is equivalent to the Ellenton confining unit and the I-II confining system (Dennehy and others, 1989; Thayer, Smits, Harris, and others, 1993).

METHODS

The entire inventory of wells and several surface-water sites in the GSA study area were reviewed as potential water-level measurement sites. Several of the wells previously inventoried in the GSA (Westinghouse Savannah River Company, 1995; Harrelson and others, 1997) were abandoned before February 27, 1996, and were not available for use during the water-level data collection period. Several other wells in the study area also were eliminated as potential water-level measurement sites because of the presence of hazard-

ous ground-water contamination in the wells. In addition to the ground- and surface-water data, barometric pressure data were collected by the USGS. The WSRC collected water-level data from selected wells in restricted areas, as well as from piezometers in and around the wetlands of Fourmile Branch.

Well-Numbering Systems

Each well in the GSA has been assigned three well identifiers. The three well-numbering systems are used by the USGS, the South Carolina Department of Natural Resources (SCDNR), and the DOE/WSRC.

The USGS and the SCDNR share a common well-numbering system that is called the USGS identifier in this report. Wells inventoried in South Carolina are sequentially numbered in each county using an alphanumeric well designation. The alpha prefix refers to the county and the number refers to the chronological order in which wells were inventoried in that county. Thus, the 435th well inventoried in Barnwell County would be designated BW-435.

The SCDNR identifiers are assigned to wells on the basis of a latitude- and longitude-grid system (Logan and Euler, 1989). This grid system divides South Carolina into a matrix of cells with the dimensions of 5-minutes latitude and longitude. Each of these cells has a corresponding number and upper-case letter(s), for example, 38X. The cells are further divided into 25 cells with dimensions of 1-minute latitude and longitude, each having a corresponding lower-case letter "a" through "y", for example, 38X-n. As wells are located within the 1-minute grid, a sequential number is assigned to each well in the 1-minute grid. Thus, the 63d well inventoried in 38X-n would be assigned the number 38X-n63.

The SRS identifier in this report is the same as the Well Data File code of the SRS (Westinghouse Savannah River Company, 1995). The SRS identifier is an alphanumeric system. An alphanumeric abbreviation is assigned to areas on the SRS (for example, "FSB" is for wells near the Area F Seepage Basin) or special well series (for example, the P-wells for the SRS Baseline Hydrogeologic Investigation). the wells in each area or special well series are sequentially numbered.

In this report each well has three identifiers: a USGS identifier, a SCDNR identifier, and a DOE/WSRC identifier. Thus, BW-435, 38X-n63, and P27D identify the same well. All three well-identifiers are shown in tables 1, 2, and 3 (at end of report). The wells in the tables are organized by the USGS identifier. Piezometers in table 4 (at end of report) are identified and organized by the SRS identifier.

Aquifer Assignments

WSRC provided data for approximately 127 corehole sites to select and map the elevation of the top of the "tan clay" confining zone, the lower aquifer zone of the Upper Three Runs aquifer, the Gordon "green clay" confining unit, the Gordon aquifer, and the Meyers Branch Confining System (Mark B. Amindon, Westinghouse Savannah River Company, written commun., 1995). Each map was digitized and entered in an ARC/INFO (a registered software package of Environmental Systems Research Institute) data base to create a three-dimensional projection in a computerized matrix of a Geographic Information System (GIS). The GIS was used to compare the elevation of the open or screened interval(s) in each well to the elevation of the top of each hydrogeologic unit to determine the aquifer assignment for each well. If a well was screened in more than one aquifer or screened in a confining unit, the well was not used for this study.

Data Collection

On February 27, 1996, water levels were measured in 231 wells, 19 piezometers, and 16 surface-water sites in the vicinity of the GSA. Calibrated electric and steel tapes, with a resolution of 0.01 ft were used to measure the ground- and surface-water levels, respectfully. The field measuring point, a position on each well head from which depth to water is measured, is a defined height above the concrete well pad or land surface. The height of each measuring point was determined in the field and compared to the published measuring point for verification (Westinghouse Savannah River Company, 1995). The height of the measuring point and the height of the concrete well pad were subtracted from the measured depth to water to determine the depth to water below land surface. The depth to water below land surface was subtracted from the published land-surface elevation at each well to obtain the elevation of the water.

For the 16 surface-water sites, a temporary elevation benchmark was established at each site and used to convert measured water level to elevation of water level. The surface-water elevations were used to map water-level surfaces of the upper and lower aquifer zones for the Upper Three Runs aquifer.

Barometric pressure near the earth's surface can affect the position of water levels in wells that are open to confined aquifers (Ferris and others, 1962). An automated data collection system was used to collect barometric pressure and water levels in selected wells at the SRS P-27 well cluster (fig. 2). The automated data system recorded water levels and barometric pressure every 5 minutes.

GROUND-WATER LEVELS

The ground water that saturates the aquifers and confining units moves in response to differences in hydraulic head. The direction of ground-water flow can be inferred from mapped water-level contour lines. Flow is perpendicular to the contour lines and moves in the direction of declining hydraulic head.

Changes in water levels in the monitored wells at the SRS P27 well cluster (fig. 4) were 0.06 and 0.09 ft during the 9-hour measurement period (fig. 5; table 4 at end of report). The barometric pressure varied only slightly (fig. 6; table 5 at end of report) and fluctuated by less than 0.06 lb/in^2. There were no significant changes in the water levels due to the barometric pressure variations during the study period; therefore, water-level corrections for barometric effects were not applied.

Upper Three Runs Aquifer

A total of 153 water-level measurements were collected from observation wells, piezometers, and surface-water sites (tables 1, 6, and 7 at end of report) in the upper aquifer zone and 61 water-level measurements were collected from observation wells in the lower aquifer zone (table 2 at end of report). The water-level surface for the upper aquifer zone represents the top of the saturated zone and is assumed to be unconfined. The lower aquifer zone is confined to semi-confined and is unconfined in the outcrop areas of the Upper Three Runs and Fourmile Branch valleys.

The configuration of the water-level surface in the upper and lower aquifer zones (figs. 7 and 8) strongly resemble the local topography (fig. 2). The contours suggest that the water levels in both zones indicate lower hydraulic gradients beneath the broad crest of the interfluve and higher hydraulic gradients beneath the flanks of the interfluve in the valleys of Fourmile Branch and Upper Three Runs. The highest water-level elevations observed from both zones were in Area H. The contours indicate two ground-water divides in the upper aquifer zone of the Upper Three Runs aquifer (fig. 7). One of the divides has an east-west trend from Area H to Area F. The other divide has a north-south trend from Area Z and Y to Area S. Ground-water data for the water-level surface in the lower aquifer zone are better defined for the area west of Area H and defines an east-west divide. In areas north of Area H, water levels of both aquifer zones are interpreted as the water table and are presented as an approximation of the water-level surface (fig. 8). Even though based on limited data, the water-level contours are useful for determining the water-level gradient and inferring the location of the north-south trending divide from Areas Z to Area S. The divides on both maps roughly coincide with the topographically high areas of the interfluve. McQueen Branch, Crouch Branch, and many of the smaller, ephemeral creeks intersect the water level in both aquifer zones.

The configuration of the contours suggests that recharge to the upper and lower aquifer zones occurs largely within the interfluve. Both aquifer zones discharge to the north along McQueen Branch, Crouch Branch, and unnamed tributaries along Upper Three Runs and to the south along Fourmile Branch and unnamed tributaries. Where water levels in the upper aquifer zone are higher than water levels in the lower aquifer zone, the semi-confined and confined parts of the lower aquifer zone in this area receive recharge by leakage from the upper aquifer zone. Where water levels in both zones are equal, the lower aquifer zone is considered to be semi-confined to unconfined.

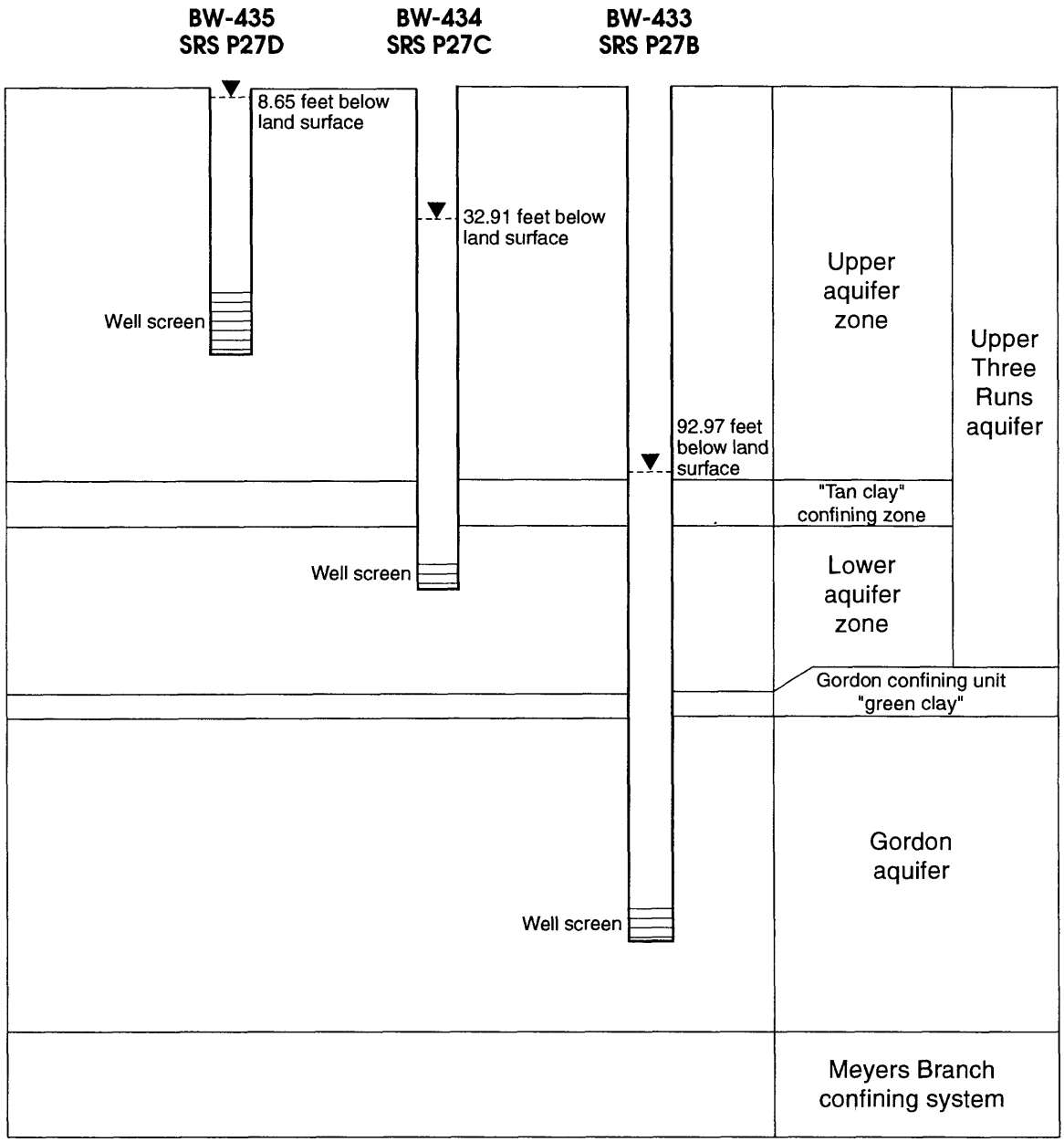

Figure 4. Generalized hydrogeology and beginning water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996.

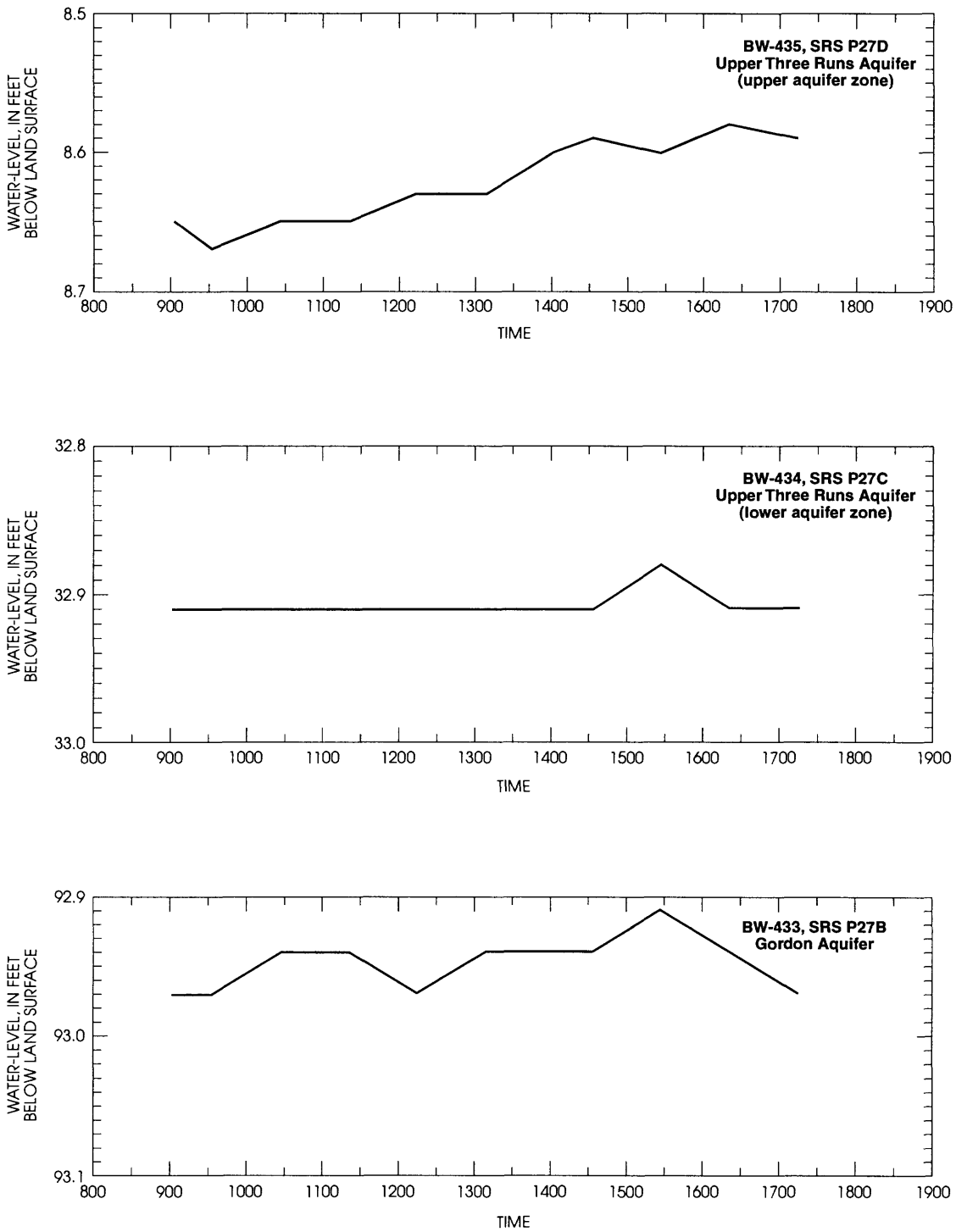

Figure 5. Water-level change in observation wells open to selected aquifers beneath the SRS P27 well cluster, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996.

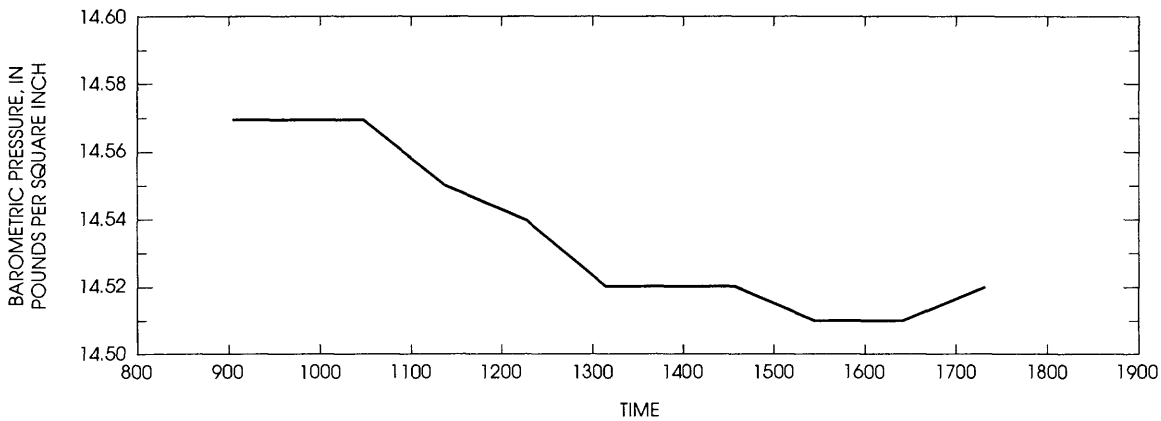

Figure 6. Barometric pressure change at well cluster SRS P27 in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996.

Gordon aquifer

A total of 52 water-level measurements were collected from observation wells in the Gordon aquifer (table 3 at end of report). The Gordon aquifer is confined, except where the Gordon confining unit is breached by the incision of Upper Three Runs to the north and west of Area F. The configuration of the water-level surface (fig. 9) does not resemble local topography, as observed in both zones of the Upper Three Runs aquifer. The contours indicate a decline in head from an area south of Areas Z and Y to Upper Three Runs and indicate that some of the water in the Gordon aquifer arrives by lateral flow from areas to the east and northeast. The elevation of the water-level surface in the Gordon aquifer is lower than the water-level surface for the lower aquifer zone of the Upper Three Runs aquifer, with the exception of the unconfined part of the Gordon aquifer along Upper Three Runs. This suggests that the confined Gordon aquifer receives part of its recharge by leakage from the lower aquifer zone of the Upper Three Runs aquifer.

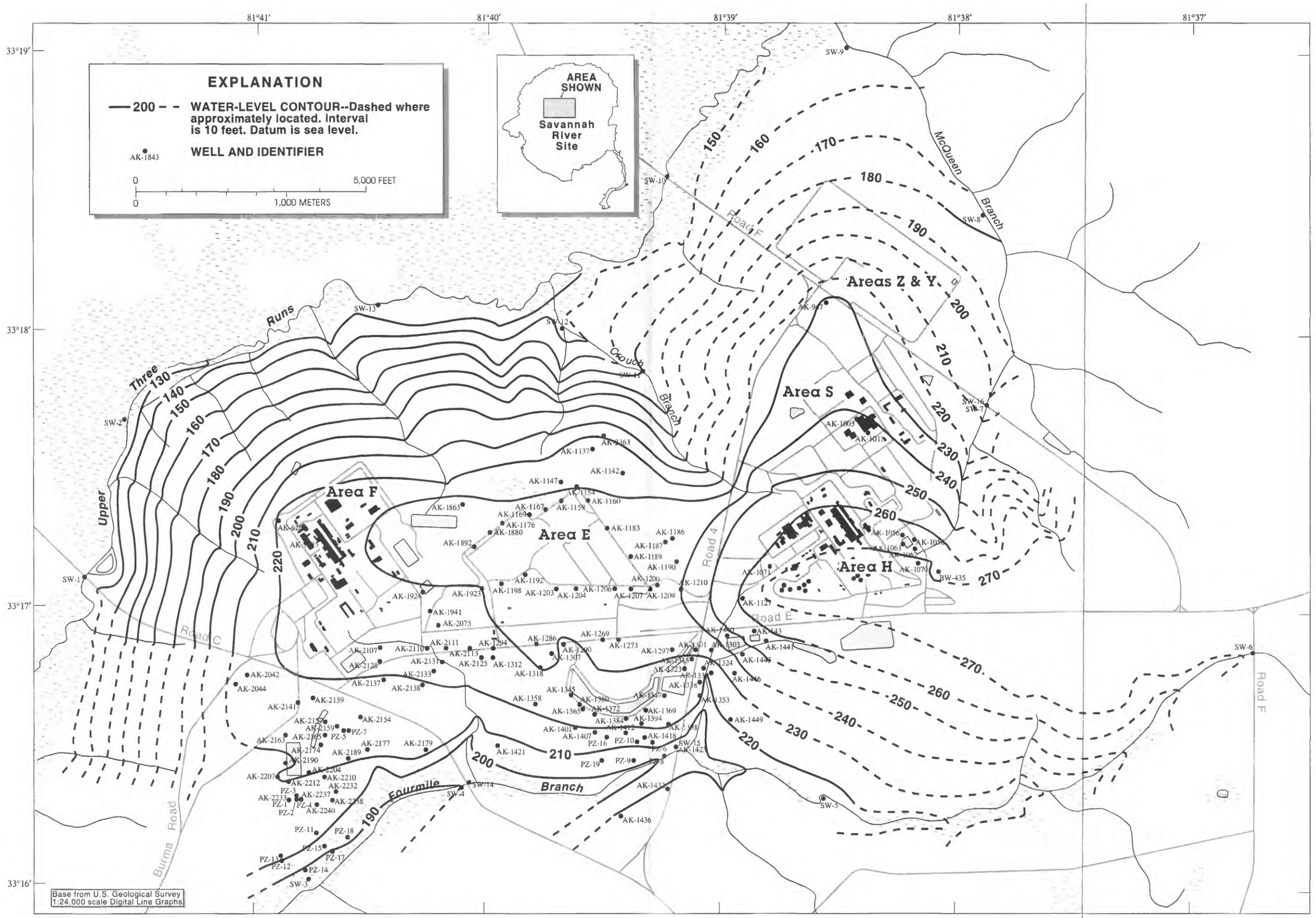

Figure 7. Configuration of the water-level surface for the Upper Three Runs aquifer (upper aquifer zone) beneath the General Separations Area, Savannah River Site, February 27, 1996.

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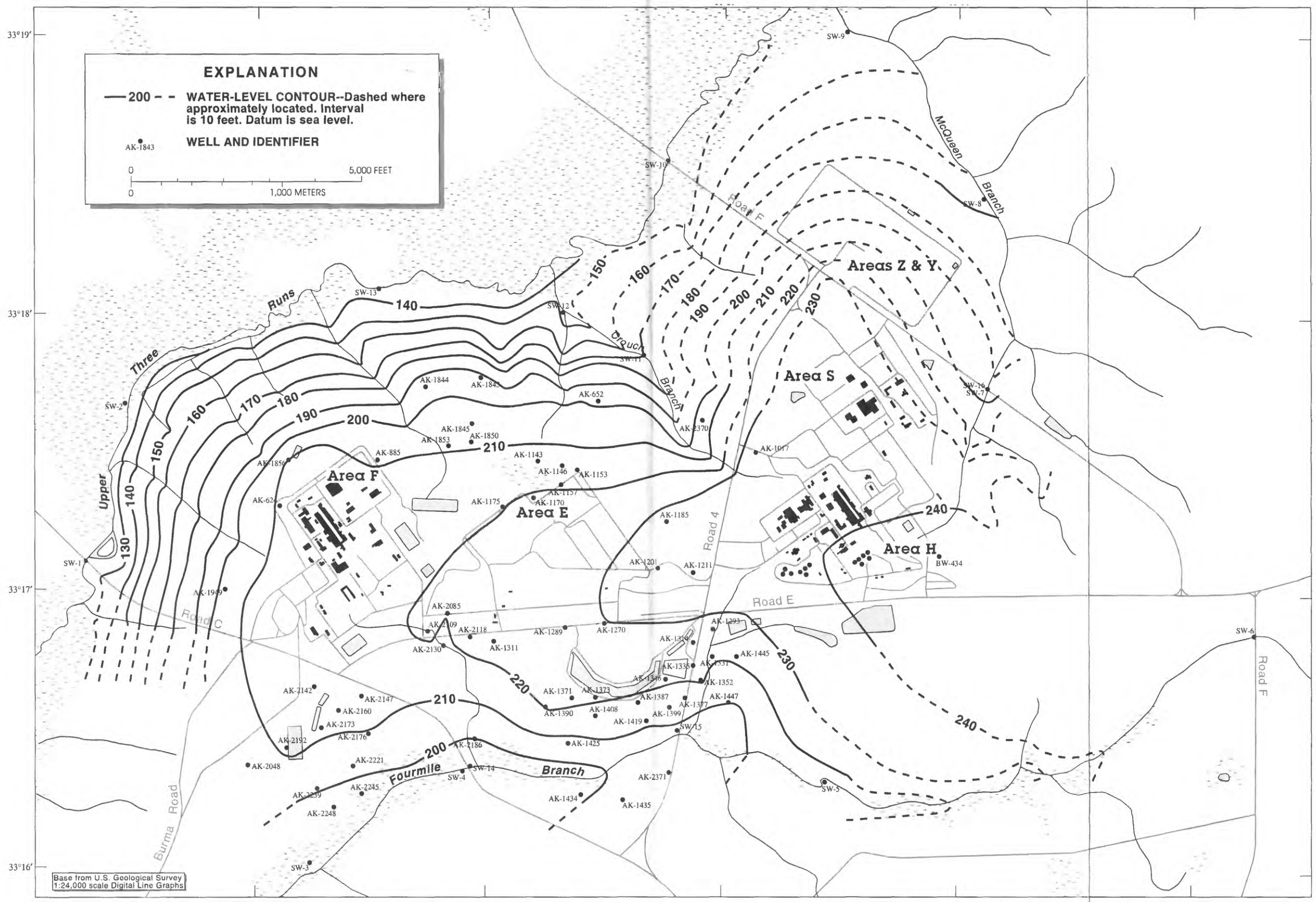

Figure 8. Configuration of the water-level surface for the Upper Three Runs aquifer (lower aquifer zone) beneath the General Separations Area, Savannah River Site, February 27, 1996.

- page 21 follows -

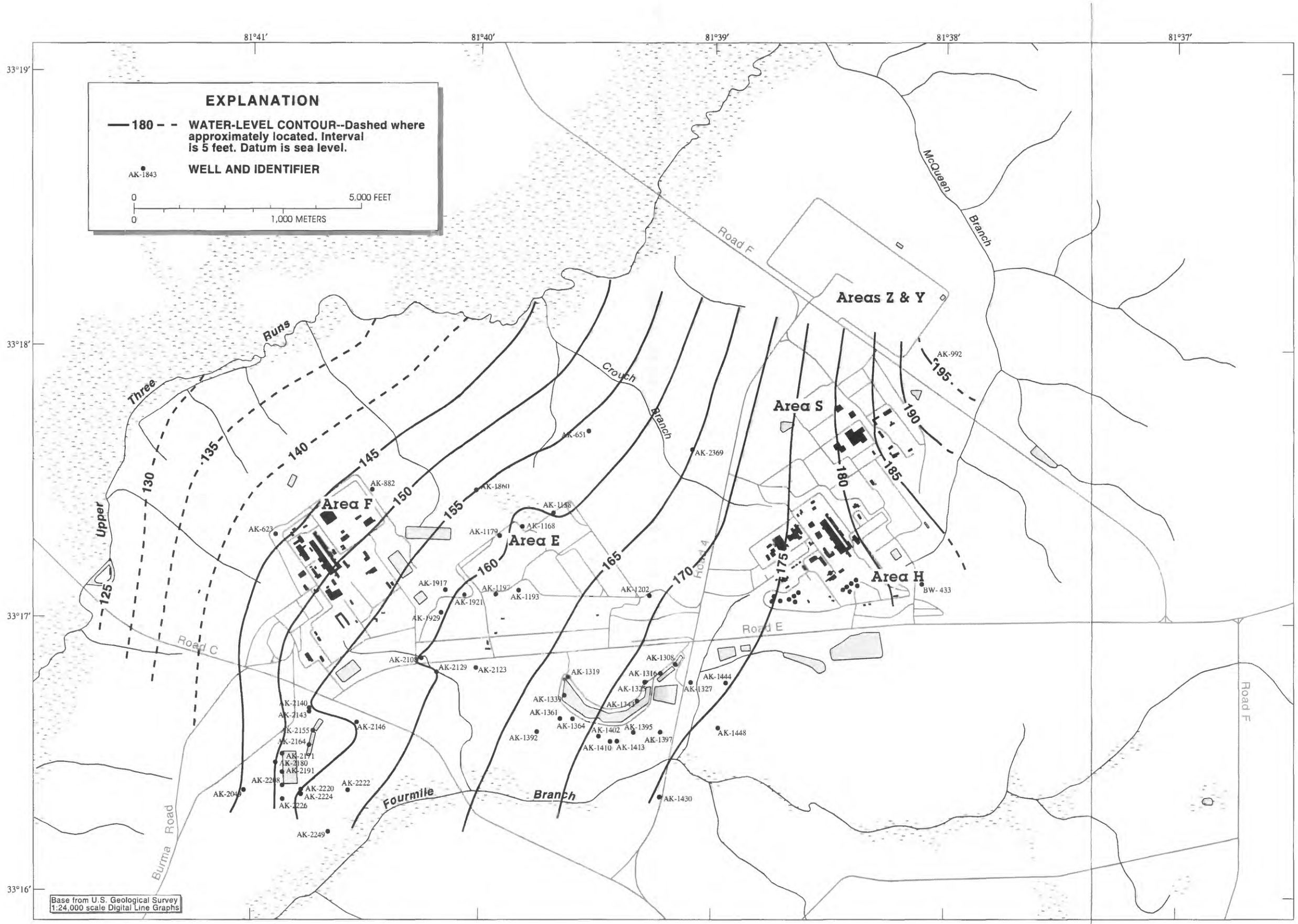

Figure 9. Configuration of the water-level surface for the Gordon aquifer beneath the General Separations Area, Savannah River Site, February 27, 1996.

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SUMMARY

This report presents the results of synoptic ground-water, surface-water, and barometric-pressure data collected on February 27, 1996. The study focused on the Upper Three Runs and Gordon aquifers beneath the GSA, SRS, South Carolina. The construction and activation of a pump-and-treat contaminant system, the placement of a clay cap over the Old Radioactive Burial Grounds, and the placement of a soil cover over the LLRWF and the MWMF could potentially change the shape of the water table and the potentiometric surfaces of these aquifer beneath the study area, and subsequently change the hydraulic gradients and the direction of ground-water flow in and around the sites of remedial activities.

The Tertiary age strata described in this report includes in ascending order the Lang Syne Formation, the Snapp Formation, the Fourmile Branch Formation, the Congaree Formation, the Warley Hill Formation, the Tinker Formation/Santee Limestone, the Clinchfield Formation, the Dry Branch Formation, the Tobacco Road Formation, and the "upland" unit.

The correlation of the geology and hydrogeology presented in this report provides the hydrogeologic framework required for the interpretation and description of the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and the Gordon aquifers.

The Upper Three Runs aquifer includes all sediments from land surface down to the top of the Gordon confining unit. In the vicinity of the GSA, the Upper Three Runs aquifer is correlative to the "upland" unit, the Tobacco Road Formation, Dry Branch Formation, Clinchfield Formation, and most of the Tinker Formation/Santee Limestone. The Upper Three Runs aquifer is divided into the upper and lower aquifer zones, that are separated by the "tan clay" confining zone.

The Gordon confining unit includes all sediments from the lower most clay beds of the Tinker Formation/Santee Limestone to the upper most clay beds of the Congaree Formation. The Gordon confining unit is the equivalent of the "green clay" confining unit of the Congaree Formation, the Warley Hill Formation, and the Tinker Formation/Santee Limestone.

The Gordon aquifer includes all sediments from the top of the Snapp Formation to the upper most clay beds of the Congaree Formation, depending on the thickness and stratigraphic distribution of the "green clay" lithology near the contact of the Congaree and the Warley Hill Formations. The base of the Gordon aquifer is defined by the top of the clay lithologies of either the Snapp Formation or, in the absence of the clays of the Snapp Formation, the Lang Syne Formation. The Meyers Branch confining system includes all sediments of the Lang Syne and Snapp Formations.

Synoptic ground- and surface-water and barometric-pressure data were collected to map the water-level surfaces of the upper and lower aquifer zones of the Upper Three Runs and Gordon aquifers in the GSA. During 9 hours on February 27, 1996, water levels were collected from 231 wells, 19 piezometers, and 16 surface-water sites. Barometric pressure was monitored. Barometric pressure during the measurement period varied 0.06 lb/in^2. Changes in water levels in the monitored wells at the SRS P27 well cluster was 0.06 and 0.09 ft. No significant change in the water levels from the barometric pressure was observed during the data measurement period.

The upper aquifer zone of the Upper Three Runs aquifer is unconfined and the lower aquifer zone of the aquifer is unconfined, semi-confined, or confined. Water levels in the upper aquifer zone are higher than the lower aquifer zone across the crest of the GSA interfluve and suggest that the semi-confined and confined parts of the lower aquifer zone in this area receive recharge by leakage from the upper aquifer zone. Two ground-water divides trending approximately east-west and north-south are prominent features of the water table in the upper aquifer zone. The east-west trending divide is also observed in the potentiometric surface for the lower aquifer zone. The configuration of the water-level surfaces resemble local topography, and the divides on both maps roughly coincide with the topographically high areas of the interfluve. Both aquifer zones discharge to McQueen Branch, Crouch Branch, and the other tributaries to the Upper Three Runs and Fourmile Branch on the flanks of the GSA interfluve.

The Gordon aquifer receives recharge from lateral flow from areas to the east and northeast of the GSA and leakage from the lower aquifer zone of the Upper Three Runs aquifer. The Gordon aquifer is confined beneath all of the GSA interfluve, except where the Gordon confining unit is breached by the incision of Upper Three Runs to the north and west of Area F. The potentiometric surface of the Gordon aquifer does not resemble the local topography.

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TABLES 1-7

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Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-143	38X-q4	HR3 13	331656	813852	274.5	69.4	234.8	205.1	257.57
AK-626	39X-k15	FC 1D	331719	814054	317.2	100.0	222.2	217.2	223.44
AK-947	38X-g37	ZBG 1	331807	813834	288.9	68.9	240.1	220.0	234.45
AK-1003	38X-n92	SCA 5	331742	813826	286.1	62.4	243.7	223.7	241.47
AK-1011	38X-n100	SCA 6	331739	813823	283.8	62.5	241.1	221.3	242.22
AK-1056	38X-n146	HCB 1	331717	813814	277.6	55.0	252.6	222.6	263.19
AK-1058	38X-n148	HCB 4	331716	813811	275.9	40.0	265.9	235.9	264.25
AK-1061	38X-n151	HCB 2	331715	813814	279.9	40.0	269.9	239.9	267.62
AK-1062	38X-n152	HCB 3	331714	813811	273.6	40.0	263.6	233.6	266.41
AK-1070	38X-n160	ZW 8	331711	813810	272.4	18.3	264.1	254.1	270.52
AK-1071	38X-n161	HTF 17	331710	813848	288.4	50.0	258.4	238.4	261.91
AK-1127	38X-n217	ZW 7	331703	813855	270.1	15.6	264.8	254.5	265.13
AK-1137	38X-o25	BGX 9D	331735	813934	277.4	65.0	232.4	212.4	226.37
AK-1142	38X-o30	BGX 10D	331730	813926	274.8	58.6	236.2	216.2	225.43
AK-1147	38X-o35	BGX 1D	331728	813942	289.2	74.0	234.7	214.7	229.55
AK-1154	38X-o42	BGO 5D	331727	813938	294.2	74.9	239.3	219.3	230.67
AK-1159	38X-o47	BGO 6D	331724	813942	283.2	66.0	237.2	217.2	231.25
AK-1160	38X-o48	BGO 4D	331724	813935	295.6	75.0	240.6	220.6	231.15
AK-1167	38X-o55	BGO 7D	331722	813946	285.2	65.0	240.2	220.2	232.12
AK-1169	38X-o57	BGO 8D	331721	813950	285.6	65.0	240.6	220.6	232.40
AK-1176	38X-o64	BGO 10D	331719	813957	299.5	69.0	250.5	230.5	231.84
AK-1183	38X-o71	BGO 3D	331718	813930	290.8	63.2	247.6	227.6	233.10

Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-1186	38X-o74	BG 108	331716	813913	264.8	47.5	247.3	217.3	237.60
AK-1187	38X-o75	BGX 12D	331715	813915	273.2	49.5	243.7	223.7	237.34
AK-1189	38X-o77	BGO 2D	331712	813924	294.9	76.0	238.9	218.9	237.27
AK-1190	38X-o78	BG 109	331711	813912	283.9	55.5	258.4	228.4	238.90
AK-1192	38X-o80	BGO 18D	331708	813951	292.6	73.0	239.6	219.6	232.13
AK-1198	38X-o86	BGO 16D	331706	813957	302.3	85.0	237.3	217.3	231.00
AK-1200	38X-o88	HSB 85C	331706	813917	292.0	77.8	224.2	214.2	238.25
AK-1203	38X-o91	BGO 20D	331705	813943	281.3	65.0	236.3	216.3	234.63
AK-1204	38X-o92	BGO 21D	331705	813938	283.0	65.3	237.7	217.7	234.70
AK-1206	38X-o94	BGO 23D	331705	813928	287.0	65.0	242.0	222.0	235.55
AK-1207	38X-o95	BGO 24D	331705	813924	291.0	70.0	241.0	221.0	236.58
AK-1209	38X-o97	BGO 1D	331705	813919	293.0	68.0	245.0	225.0	238.02
AK-1210	38X-o98	BG 110	331705	813911	291.8	67.5	254.3	224.3	240.62
AK-1269	38X-p52	BGO 37D	331654	813931	285.1	59.0	246.1	226.1	238.28
AK-1273	38X-p56	BGO 38D	331654	813927	289.3	67.0	242.3	222.3	234.90
AK-1286	38X-p69	BGO 34D	331653	813948	272.7	60.0	232.7	212.7	232.66
AK-1290	38X-p73	BGO 35D	331653	813941	271.4	52.0	239.4	219.4	227.86
AK-1294	38X-p77	BGO 32D	331652	813959	279.5	65.0	234.5	214.5	227.56
AK-1297	38X-p80	HSB 65	331652	813913	270.4	58.0	242.4	212.4	231.16
AK-1301	38X-p84	HSB 100D	331652	813907	257.9	41.0	236.9	216.9	232.86
AK-1303	38X-p86	HSB 133D	331652	813903	253.1	44.6	228.5	208.5	234.62
AK-1307	38x-p90	BGO49D	331651	0813944	269.50	51.0	238.5	218.5	233.10
AK-1312	38X-p95	BGO 48D	331650	813959	275.0	73.0	212.0	202.0	225.60

Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-1315	38X-p98	HSB 101D	331650	813908	256.4	40.3	236.1	216.1	229.94
AK-1318	38X-p101	HSB 147D	331648	813947	265.2	50.0	235.2	215.2	230.10
AK-1323	38X-p106	HSB 102D	331648	813910	256.3	40.0	236.3	216.3	227.54
AK-1324	38X-p107	HSB 150D	331648	813905	236.9	30.0	226.9	206.9	225.62
AK-1330	38X-p113	HSB 132D	331647	813903	238.5	32.0	226.5	206.5	220.54
AK-1338	38X-p121	HSB 67	331645	813906	235.7	35.0	230.7	200.7	223.04
AK-1345	38X-p128	HSB 116D	331642	813939	254.5	40.0	234.5	214.5	224.11
AK-1347	38X-p130	HSB 106D	331642	813915	250.7	40.0	230.7	210.7	224.94
AK-1353	38X-p136	HSB 134D	331642	813906	235.9	30.1	225.8	205.8	221.54
AK-1358	38X-p141	HSB 138D	331640	813948	250.1	42.0	228.1	208.1	222.60
AK-1360	38X-p143	HSB 115D	331640	813937	266.9	53.0	233.9	213.9	222.72
AK-1365	38X-p148	HSB 86D	331639	813936	260.7	54.1	236.6	206.6	222.22
AK-1369	38X-p152	HSB 108D	331639	813920	264.0	52.0	232.0	212.0	222.50
AK-1372	38X-p155	HSB113D	331638	813933	258.7	42.0	236.2	216.2	221.56
AK-1384	38X-p167	HSB110D	331637	813925	253.4	42.0	231.4	211.4	221.20
AK-1394	38X-p177	HSB 68	331636	813921	248.3	35.0	243.3	213.3	221.00
AK-1398	38X-p181	HSB 139D	331636	813914	231.7	25.0	226.7	206.7	221.34
AK-1401	38X-p184	HSB 137D	331635	813938	234.3	29.0	225.3	205.3	220.98
AK-1407	38X-p190	HSB 136D	331634	813933	225.7	25.5	220.2	200.2	219.40
AK-1412	38X-p195	HSB 69	331634	813925	234.0	35.0	229.0	199.0	218.72
AK-1418	38X-p202	HSB 127D	331633	813920	223.8	26.0	217.8	197.8	217.54
AK-1421	38X-p205	HSB 151D	331631	813958	211.6	14.0	207.6	197.6	206.44
AK-1423	38X-p207	HSB 126D	331631	813912	210.5	20.0	200.5	190.5	204.80

Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-1432	38X-p216	HSB 140D	331622	813914	234.1	40.0	214.1	194.1	211.58
AK-1436	38X-p220	HSB 148D	331616	813926	249.1	51.0	218.1	198.1	212.31
AK-1440	38X-q5	HR8 11	331655	813859	257.4	49.5	237.6	207.9	245.42
AK-1441	38X-q6	HR3 11	331654	813849	269.6	69.2	230.0	200.4	258.21
AK-1443	38X-q8	HR8 14	331651	813855	251.8	49.5	231.9	202.3	243.46
AK-1446	38X-q11	HSB 141D	331647	813857	252.8	35.0	237.8	217.8	237.96
AK-1449	38X-q1	HSB 146D	331637	813858	251.1	47.1	224.1	204.0	221.00
AK-1863	39X-k61	ZW 4	331723	814007	270.2	41.0	239.7	229.2	231.57
AK-1880	39X-k78	BGO 11D	331717	814000	303.3	87.0	236.3	216.3	231.22
AK-1885	39X-k83	FCA 16A	331715	814044	310.4	95.3	235.1	215.1	225.46
AK-1892	39X-k90	BGO 12D	331714	814004	311.8	94.0	237.8	217.8	220.58
AK-1923	39X-k121	BGO 15D	331705	814002	296.7	78.0	238.7	218.7	230.02
AK-1924	39X-k122	FCB 6	331704	814017	308.4	93.3	235.1	215.1	229.06
AK-1941	39X-k139	BGO 40D	331700	814015	286.4	69.8	226.5	216.6	221.52
AK-2042	39X-s2	BRR 1D	331646	814102	293.8	93.4	220.4	200.4	216.74
AK-2044	39X-s4	BRR 2D	331644	814105	289.6	93.5	216.1	196.1	215.22
AK-2075	39X-t27	BGO 45D	331657	814013	276.6	67.0	229.6	209.6	225.84
AK-2107	39X-t59	FET 1D	331652	814028	268.0	61.1	226.9	206.9	223.53
AK-2110	39X-t62	BGO 29D	331652	814016	263.5	55.0	228.5	208.5	225.40
AK-2111	39X-t63	BGO 28D	331652	814011	275.1	65.0	230.1	210.1	225.36
AK-2113	39X-T65	BGO31D	331652	814005	271.6	60.0	231.1	211.1	225.98
AK-2125	39X-t77	BGO 47D	331650	814002	265.4	62.0	213.4	203.4	225.22
AK-2128	39X-t80	FET 4D	331649	814028	284.7	79.6	225.1	205.1	222.75

Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-2131	39X-t83	BGO 50D	331649	814012	254.0	46.0	228.0	208.0	223.96
AK-2133	39X-t85	FSS 2D	331647	814014	259.4	55.0	224.4	204.4	222.12
AK-2137	39X-t89	FSS 4D	331645	814027	289.8	87.2	222.6	202.6	218.82
AK-2138	39X-t90	FSS 3D	331644	814017	255.8	50.0	225.8	205.8	219.98
AK-2139	39X-t91	FSB 76	331641	814045	292.0	95.0	227.0	197.0	217.98
AK-2141	39X-t93	FSB 108D	331640	814049	295.8	92.0	223.8	203.8	217.64
AK-2154	39X-t106	FSB 114D	331637	814033	250.2	52.5	217.8	197.7	216.16
AK-2157	39X-t109	FSB 89D	331636	814042	278.9	77.0	221.9	201.9	215.52
AK-2159	39X-t111	FSB 111D	331635	814039	274.4	72.7	221.7	201.7	215.40
AK-2163	39X-t115	FSB 109D	331633	814052	290.8	85.0	225.8	205.8	213.70
AK-2165	39X-t117	FSB 90D	331633	814042	276.1	71.0	225.1	205.1	215.92
AK-2174	39X-t127	FSB 91D	331631	814043	276.9	76.0	220.9	200.9	213.30
AK-2177	39X-t130	FSB 123D	331630	814031	236.1	42.0	214.1	194.1	211.30
AK-2179	39X-t132	HSB 143D	331630	814016	220.9	24.0	216.9	196.9	212.10
AK-2189	39X-t142	FSB 118D	331628	814036	241.3	50.0	211.3	191.3	210.80
AK-2190	39X-t143	FSB 98D	331627	814052	282.3	82.0	220.3	200.3	208.70
AK-2204	39X-t157	FSB 93D	331625	814046	273.9	76.0	217.9	197.9	210.28
AK-2207	39X-t160	FSB 105D	331624	814054	283.7	80.0	223.7	203.7	210.30
AK-2210	39X-t163	FSB 119D	331624	814042	252.1	59.0	213.1	193.1	207.54
AK-2212	39X-165	FSB 95DR	331623	814051	282	95.0	207.0	187.0	209.44
AK-2232	39X-t185	FSB 106D	331621	814039	232.9	30.0	222.9	202.9	205.41
AK-2233	39X-t186	FSB 150PD	331619	814051	257.2	81.0	221.3	176.2	207.66
AK-2237	39X-t190	FSB 100PD	331619	814048	250.6	75.5	215.2	175.1	207.24

Table 1. Water-level measurements in observation wells open to the Upper Three Runs aquifer (upper aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-2238	39X-t191	FSB 117D	331619	814040	228.7	39.0	209.7	189.7	204.28
AK-2240	39X-t193	FSB 110D	331618	814044	232.6	41.5	211.1	191.1	205.05
AK-2363	38X-o113	BG 104	331738	813931	283.3	67.5	245.8	215.8	230.35
BW-435	38X-n63	P 27D	331709	813805	274.5	75.0	219.5	199.5	265.84

Table 2. Water-level measurements in observation wells open to the Upper Three Runs aquifer (lower aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-624	39X-k13	FC 1B	331719	814054	316.8	165	156.8	151.8	211.78
AK-652	38X-o9	HC 8C	331742	813933	262.3	75	192.3	187.3	198.32
AK-885	39X-k33	FC 2E	331729	814029	286.9	98	193.9	188.9	209.20
AK-1017	38X-n106	HC 11B	331731	813852	263.8	112	154.8	151.8	232.55
AK-1143	38X-o31	BGX 2D	331729	813948	289.1	108	191.1	181.1	215.02
AK-1146	38X-o34	BGX 1C	331728	813942	289.3	113.3	186	176	216.45
AK-1153	38X-o41	BGO 5C	331727	813938	294.2	111	193.2	183.2	215.32
AK-1157	38X-o45	BGO 6C	331724	813942	283.5	125.5	168	158	219.85
AK-1170	38X-o58	BGO 8C	331721	813949	285.8	111.5	184.3	174.3	223.28
AK-1175	38X-o63	BGO 10C	331719	813957	299.3	142	167.3	157.3	219.36
AK-1185	38X-o73	BGX 12C	331716	813915	273.1	99	184.1	174.1	233.78
AK-1201	38X-o89	HSB 85B	331706	813917	292	158.8	143.2	133.2	232.70
AK-1211	38X-o99	HC 12B	331705	813908	287.3	110	182.3	177.3	239.50
AK-1270	38X-p53	BGO 37C	331654	813931	284.3	115.5	178.8	168.8	229.80
AK-1289	38X-p72	BGO 35C	331653	813941	271.4	109.5	171.9	161.9	227.68
AK-1293	38X-p76	HSB 133C	331653	813903	253.4	80.1	183.3	173.3	229.96
AK-1311	38X-p94	BGO 48C	331650	813959	274.7	98	186.7	176.7	222.52
AK-1314	38X-p97	HSB 101C	331650	813908	256.3	90	176.3	166.3	224.96
AK-1331	38X-p114	HSB 132C	331647	813903	238.3	69.7	178.6	168.6	220.98
AK-1335	38X-p118	HSB 103C	331645	813908	245.2	86	169.2	159.2	222.98

Table 2. Water-level measurements in observation wells open to the Upper Three Runs aquifer (lower aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-1346	38X-p129	HSB 106C	331642	813915	250.7	92	168.7	158.7	221.08
AK-1352	38X-p135	HSB 134C	331642	813906	236.1	87	159.1	149.1	220.34
AK-1371	38X-p154	HSB 70C	331638	813939	240.9	76	174.9	164.9	221.90
AK-1373	38X-p156	HSB 113C	331638	813933	258.7	107	161.7	151.7	221.04
AK-1377	38X-p160	HSB 145C	331638	813910	233.7	69	174.7	164.7	212.84
AK-1387	38X-p170	HSB 109C	331637	813922	259.4	91	178.4	168.4	218.22
AK-1390	38X-p173	HSB 117C	331636	813946	235.1	70	175.1	165.1	220.12
AK-1399	38X-p182	HSB 139C	331636	813914	231.5	83	158.5	148.5	214.04
AK-1408	38X-p191	HSB 136C	331634	813933	225.6	65.1	170.5	160.5	216.76
AK-1419	38X-p203	HSB 127C	331633	813920	223.4	75	158.4	148.4	210.06
AK-1425	38X-p209	HSB 129C	331628	813940	212.8	65	157.8	147.8	205.56
AK-1434	38X-p218	HSB 130C	331617	813937	215.9	56	169.9	159.9	199.96
AK-1435	38X-p219	HSB 148C	331616	813926	248.9	90	168.9	158.9	201.18
AK-1445	38X-q10	HSB 141C	331647	813857	252.7	98	164.7	154.7	227.38
AK-1447	38X-q12	HSB 146C	331637	813859	250.3	98	162.3	152.3	209.40
AK-1843	39X-k41	BG 96	331747	814003	242.7	65.5	207.2	177.2	196.52
AK-1844	39X-k42	BG 93	331745	814017	256	75.5	210.5	180.5	198.46
AK-1845	39X-k43	BGX 6D	331737	814005	275	64	211	191	204.87
AK-1850	39X-k48	BGX 5D	331733	814005	283	88	215	195	208.26
AK-1853	39X-k51	BG 122	331732	814011	246	56.1	209.9	189.9	209.52
AK-1856	39X-k54	FNB 4	331729	814052	289.6	110	209.6	179.6	213.94
AK-1949	39X-l14	FBP 1A	331701	814108	285.8	124	191.8	161.8	206.77

Table 2. Water-level measurements in observation wells open to the Upper Three Runs aquifer (lower aquifer zone) in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-2048	39X-s8	FSB 120C	331623	814102	277.7	127	160.7	150.7	205.34
AK-2085	39X-t37	BG0 27C	331656	814011	273.9	119	163.9	154.9	220.30
AK-2109	39X-t61	BGO 29C	331652	814016	262.8	86	186.8	176.8	222.08
AK-2118	39X-t70	BGO 31C	331651	814005	271.1	94.7	186.4	176.4	224.94
AK-2130	39X-t82	BGO 50C	331649	814012	253.5	91	172.5	162.5	218.00
AK-2142	39X-t94	FSB 76C	331640	814045	291.3	136.5	165.3	154.8	212.60
AK-2147	39X-t99	FSB 114C	331638	814033	250.2	92.2	168	158	212.70
AK-2160	39X-t112	FSB 111C	331635	814039	274	115	169	159	212.10
AK-2173	39X-t126	FSB 91C	331631	814043	277	127.9	159.1	149.1	210.58
AK-2176	39X-t129	FSB 123C	331630	814031	236.3	81	165.3	155.3	209.68
AK-2186	39X-t139	HSB 142C	331629	814004	201.6	40	171.6	161.6	198.32
AK-2192	39X-t145	FSB 98C	331627	814052	282.4	134	158.4	148.4	211.38
AK-2221	39X-t174	FSB 113C	331623	814035	221	67	164	154	202.05
AK-2239	39X-t192	FSB 110C	331618	814044	232.2	95	147.2	137.2	205.05
AK-2245	39X-t198	FSB 102C	331617	814033	198.9	53	155.9	145.9	195.08
AK-2248	39X-t202	FSB 79C	331614	814040	216.6	66.8	159.6	149.8	196.74
AK-2370	38X-o118	HC 10B	331738	813906	228	63.2	169.8	164.8	209.36
AK-2371	38X-p221	HSB 140C	331622	813914	233.6	72	171.6	161.6	205.02
BW-434	38X-n62	P 27C	331709	813805	274.5	134.9	144.6	139.6	241.56

Table 3. Water-level measurements in observation wells open to the Gordon aquifer in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-623	39X-k12	FC 1A	331719	814054	316.7	220	101.7	96.7	143.96
AK-651	38X-o8	HC 8B	331742	813933	262.3	130	137.5	132.5	156.70
AK-882	39X-k30	FC 2B	331729	814029	287.8	209	83.8	78.8	147.94
AK-992	38X-n81	YSC 5A	331758	813803	273.0	157	121.0	116.0	196.18
AK-1158	38X-o46	BGO 6A	331724	813942	283.8	176	117.5	107.5	159.32
AK-1168	38X-o56	BGO 8AR	331721	813950	284.6	190	104.6	94.6	162.60
AK-1179	38X-o67	BGO 10AR	331719	813956	298.5	202	106.5	96.5	158.48
AK-1193	38X-o81	BGO 18A	331707	813951	292.9	193	109.5	99.5	161.35
AK-1197	38X-o85	BGO 16A	331706	813957	302.8	200	112.5	102.5	161.25
AK-1202	38X-o90	HSB 85A	331706	813917	292.1	231	71.1	61.1	169.20
AK-1308	38X-p91	HSB 124A	331651	813910	263.9	171	103.0	93.0	171.92
AK-1316	38X-p99	HSB 123A	331649	813914	263.6	170	103.6	93.6	171.84
AK-1319	38X-p102	HSB 120A	331648	813938	266.0	175	101.0	91.0	166.54
AK-1325	38X-p108	HSB 122A	331647	813918	269.4	184	95.4	85.4	171.70
AK-1327	38X-p110	HSB 83A	331647	813906	234.9	170	76.0	65.2	173.68
AK-1339	38X-p122	HSB 119A	331644	813939	254.8	162	103.3	93.3	167.36
AK-1343	38X-p126	HSB 121A	331643	813920	272.3	184	98.3	88.3	171.96
AK-1361	38X-p144	HSB 118A	331639	813940	245.0	154	101.0	91.0	168.01

Table 3. Water-level measurements in observation wells open to the Gordon aquifer in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-1364	38X-p147	HSB 86A	331639	813937	260.0	197	73.9	63.1	169.00
AK-1392	38X-p175	HSB 117A	331636	813946	234.8	150	94.8	84.8	166.78
AK-1395	38X-p178	HSB 68A	331636	813921	247.4	200	58.0	47.5	172.28
AK-1397	38X-p180	HSB 139A	331636	813914	231.5	144	97.6	87.6	174.02
AK-1402	38X-p185	HSB 144A	331635	813930	233.6	155	88.6	78.6	170.70
AK-1410	38X-p193	HSB 84A	331634	813927	226.7	162	75.9	64.7	172.30
AK-1413	38X-p196	HSB 69A	331634	813925	234.1	151	93.1	83.1	172.58
AK-1430	38X-p214	HSB 140A	331622	813914	234.0	153	91.0	81.0	175.48
AK-1444	38X-q9	HSB 141A	331647	813857	252.6	172	90.6	80.6	174.76
AK-1448	38X-q13	HSB 146A	331637	813859	249.5	164	95.5	85.5	175.86
AK-1860	39X-k58	BGX 4A	331729	814002	288.8	182	116.8	106.8	155.44
AK-1917	39X-k115	BGO 41A	331707	814010	298.3	195	113.3	103.3	158.30
AK-1921	39X-k119	BGO 25A	331706	814005	294.7	191	114.1	104.1	161.44
AK-1929	39X-k127	BGO 26A	331702	814011	285.1	204	91.0	81.0	159.44
AK-2049	39X-s9	FSB 120A	331623	814102	278.0	179	109.0	99.0	145.60
AK-2108	39X-t60	BGO 29A	331652	814016	262.1	160	112.5	102.5	160.12
AK-2129	39X-t81	BGO 50A	331649	814012	253.5	163	100.5	90.5	159.90
AK-2123	39X-t75	BGO 47A	331650	814002	264.8	178	96.8	86.8	162.22
AK-2140	39X-t92	FSB 76A	331641	814045	291.5	255	47.4	36.9	155.50
AK-2143	39X-t95	FSB 76B	331640	814045	291.4	192	109.7	99.2	152.40
AK-2146	39X-t98	FSB 114A	331638	814033	250.0	155	105.0	95.2	155.60
AK-2155	39X-t107	FSB 101A	331636	814044	282.9	190	102.9	92.9	151.88
AK-2164	39X-t116	FSB 100A	331633	814045	283.8	188	105.8	95.8	151.78

Table 3. Water-level measurements in observation wells open to the Gordon aquifer in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

[USGS, U.S. Geological Survey; SCDNR, South Carolina Department of Natural Resources; SRS, Savannah River Site]

USGS identifier	SCDNR identifier	SRS identifier	Latitude	Longitude	Elevation of land surface (feet, above sea level)	Well depth (feet below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
AK-2171	39X-t124	FSB 99A	331631	814052	285.3	192	102.9	92.9	150.98
AK-2180	39X-t133	FSB 87B	331629	814054	285.5	196	100.5	90.0	150.60
AK-2191	39X-t144	FSB 98A	331627	814052	280.7	196	94.7	84.7	150.58
AK-2208	39X-t161	FSB 97A	331624	814052	283.8	198	95.8	85.8	152.30
AK-2220	39X-t173	FSB 78B	331623	814047	270.8	188	92.8	82.4	155.00
AK-2222	39X-t175	FSB 113A	331623	814035	221.3	140	91.3	81.0	158.74
AK-2224	39X-t177	FSB 78A	331622	814047	270.5	244	37.5	27.0	156.76
AK-2226	39X-t179	FSB 96A	331621	814052	277.7	192	95.7	85.7	151.88
AK-2249	39X-t203	FSB 79B	331614	814040	216.2	136	91.2	80.7	158.74
AK-2369	38X-o117	HC 10A	331738	813906	228.0	114	117.0	114.0	165.03
BW-433	38X-n61	P27B	331709	813806	274.3	200	94.8	74.8	181.36

Table 4. Water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster: BW-435, SRS P27D, Upper Three Runs aquifer (upper aquifer zone); BW-434, SRS P27C, Upper Three Runs aquifer (lower aquifer zone); and BW-433, SRS P27B, Gordon aquifer, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

Time	Depth to water, in feet below land surface		
	Well BW-435, P27D, Upper Three Runs aquifer (upper aquifer zone)	Well BW-434, P27C, Upper Three Runs aquifer (lower aquifer zone)	Well BW-433, P27B, Gordon aquifer
0905	8.65	32.91	92.97
0910	8.64	32.91	92.97
0915	8.66	32.94	92.97
0920	8.66	32.91	92.97
0925	8.67	32.94	92.97
0930	8.67	32.94	92.97
0935	8.65	32.91	92.97
0940	8.65	32.91	92.97
0945	8.66	32.91	92.97
0950	8.66	32.94	92.97
0955	8.67	32.91	92.97
1000	8.66	32.91	92.97
1005	8.66	32.94	92.97
1010	8.64	32.91	92.97
1015	8.65	32.91	92.97
1020	8.67	32.94	92.97
1025	8.66	32.94	92.97
1030	8.67	32.94	92.97
1035	8.64	32.91	92.97
1040	8.66	32.91	92.97
1045	8.65	32.91	92.94
1050	8.64	32.91	92.97

Table 4. Water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster: BW-435, SRS P27D, Upper Three Runs aquifer (upper aquifer zone); BW-434, SRS P27C, Upper Three Runs aquifer (lower aquifer zone); and BW-433, SRS P27B, Gordon aquifer, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

Time	Depth to water, in feet below land surface		
	Well BW-435, P27D, Upper Three Runs aquifer (upper aquifer zone)	Well BW-434, P27C, Upper Three Runs aquifer (lower aquifer zone)	Well BW-433, P27B, Gordon aquifer
1055	8.66	32.91	92.97
1100	8.65	32.91	92.97
1105	8.66	32.94	92.97
1110	8.64	32.91	92.94
1115	8.65	32.94	92.97
1120	8.65	32.94	92.97
1125	8.65	32.91	92.97
1130	8.62	32.91	92.94
1135	8.65	32.91	92.94
1140	8.62	32.91	92.94
1145	8.62	32.91	92.94
1150	8.65	32.91	92.97
1155	8.63	32.91	92.94
1200	8.61	32.91	92.94
1205	8.62	32.91	92.94
1210	8.62	32.91	92.94
1215	8.63	32.91	92.97
1220	8.63	32.91	92.97
1225	8.63	32.91	92.97
1230	8.60	32.91	92.94
1235	8.63	32.91	92.97
1240	8.62	32.91	92.94
1245	8.64	32.91	92.94

Table 4. Water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster: BW-435, SRS P27D, Upper Three Runs aquifer (upper aquifer zone); BW-434, SRS P27C, Upper Three Runs aquifer (lower aquifer zone); and BW-433, SRS P27B, Gordon aquifer, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

Time	Depth to water, in feet below land surface		
	Well BW-435, P27D, Upper Three Runs aquifer (upper aquifer zone)	Well BW-434, P27C, Upper Three Runs aquifer (lower aquifer zone)	Well BW-433, P27B, Gordon aquifer
1250	8.64	32.91	92.97
1255	8.63	32.91	92.94
1300	8.64	32.91	92.97
1305	8.63	32.91	92.94
1310	8.61	32.91	92.94
1315	8.63	32.91	92.94
1320	8.61	32.91	92.94
1325	8.64	32.91	92.94
1330	8.64	32.91	92.94
1335	8.61	32.91	92.94
1340	8.60	32.91	92.94
1345	8.61	32.91	92.94
1350	8.61	32.91	92.94
1355	8.61	32.91	92.94
1400	8.59	32.91	92.94
1405	8.60	32.91	92.94
1410	8.60	32.91	92.94
1415	8.61	32.91	92.94
1420	8.59	32.91	92.94
1425	8.60	32.91	92.94
1430	8.59	32.91	92.94
1435	8.60	32.91	92.94
1440	8.60	32.91	92.94

Table 4. Water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster: BW-435, SRS P27D, Upper Three Runs aquifer (upper aquifer zone); BW-434, SRS P27C, Upper Three Runs aquifer (lower aquifer zone); and BW-433, SRS P27B, Gordon aquifer, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

Time	Depth to water, in feet below land surface		
	Well BW-435, P27D, Upper Three Runs aquifer (upper aquifer zone)	Well BW-434, P27C, Upper Three Runs aquifer (lower aquifer zone)	Well BW-433, P27B, Gordon aquifer
1445	8.59	32.91	92.94
1450	8.56	32.91	92.94
1455	8.59	32.91	92.94
1500	8.60	32.91	92.94
1505	8.61	32.91	92.94
1510	8.61	32.91	92.94
1515	8.61	32.91	92.94
1520	8.59	32.91	92.94
1525	8.59	32.91	92.94
1530	8.59	32.91	92.94
1535	8.61	32.91	92.94
1540	8.59	32.91	92.94
1545	8.60	32.88	92.91
1550	8.61	32.91	92.94
1555	8.59	32.91	92.94
1605	8.59	32.91	92.94
1600	8.59	32.91	92.94
1610	8.58	32.91	92.94
1615	8.59	32.91	92.94
1620	8.60	32.91	92.94
1625	8.59	32.91	92.94
1630	8.59	32.91	92.94
1635	8.58	32.91	92.94

Table 4. Water-level measurements in observation wells open to selected aquifers beneath the SRS P27 well cluster: BW-435, SRS P27D, Upper Three Runs aquifer (upper aquifer zone); BW-434, SRS P27C, Upper Three Runs aquifer (lower aquifer zone); and BW-433, SRS P27B, Gordon aquifer, in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996--Continued

Time	Depth to water, in feet below land surface		
	Well BW-435, P27D, Upper Three Runs aquifer (upper aquifer zone)	Well BW-434, P27C, Upper Three Runs aquifer (lower aquifer zone)	Well BW-433, P27B, Gordon aquifer
1640	8.58	32.91	92.94
1645	8.59	32.91	92.94
1650	8.59	32.91	92.94
1655	8.59	32.91	92.94
1700	8.58	32.91	92.94
1705	8.58	32.91	92.94
1710	8.59	32.91	92.94
1715	8.58	32.91	92.94
1720	8.58	32.91	92.94
1725	8.59	32.91	92.97
1730	8.58	32.91	92.94
1735	8.59	32.91	92.94
1740	8.59	32.91	92.94
1745	8.59	32.91	92.94
1750	8.59	32.91	92.94
1755	8.59	32.91	92.94
1800	8.59	32.91	92.94

Table 5. Barometric pressure monitored at well cluster SRS P27 in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

Time	Barometric pressure (pounds per square inch)	Time	Barometric pressure (pounds per square inch)	Time	Barometric pressure (pounds per square inch)	Time	Barometric pressure (pounds per square inch)	Time	Barometric pressure (pounds per square inch)
0905	14.57	1055	14.56	1245	14.53	1435	14.52	1630	14.51
0910	14.57	1100	14.56	1250	14.53	1440	14.52	1635	14.51
0915	14.57	1105	14.56	1255	14.53	1445	14.52	1640	14.51
0920	14.57	1110	14.56	1300	14.53	1450	14.52	1645	14.51
0925	14.57	1115	14.55	1305	14.52	1455	14.52	1650	14.52
0930	14.57	1120	14.55	1310	14.52	1500	14.52	1655	14.52
0935	14.57	1125	14.55	1315	14.52	1505	14.52	1700	14.52
0940	14.57	1130	14.55	1320	14.52	1510	14.52	1705	14.52
0945	14.57	1135	14.55	1325	14.52	1515	14.52	1710	14.51
0950	14.57	1140	14.55	1330	14.52	1520	14.52	1715	14.52
0955	14.57	1145	14.55	1335	14.52	1525	14.51	1720	14.52
1000	14.57	1150	14.55	1340	14.52	1530	14.51	1725	14.52
1005	14.57	1155	14.54	1345	14.52	1535	14.52	1730	14.52
1010	14.57	1200	14.54	1350	14.52	1540	14.52	1735	14.52
1015	14.57	1205	14.54	1355	14.52	1545	14.51	1740	14.52
1020	14.57	1210	14.54	1400	14.52	1550	14.52	1745	14.52
1025	14.57	1215	14.54	1405	14.52	1600	14.51	1750	14.52
1030	14.57	1220	14.54	1410	14.52	1605	14.51	1755	14.52
1035	14.57	1225	14.54	1415	14.52	1610	14.51	1800	14.52
1040	14.57	1230	14.53	1420	14.52	1615	14.51		
1045	14.57	1235	14.53	1425	14.52	1620	14.51		
1050	14.56	1240	14.53	1430	14.52	1625	14.51		

Table 6. Water-level measurements for piezometers in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

[SRS, Savannah River Site; USGS, U.S. Geological Survey]

USGS identifer	SRS identifier	Latitude	Longitiude	Elevation of land surface (feet, above sea level)	Piezometer depth (feet, below land surface)	Elevation of top of screen zone (feet, above sea level)	Elevation of bottom of screen zone (feet, above sea level)	Elevation of water level (feet, above sea level)
PZ 12	FPZ001A	332683	816814	197.9	16.31	184.51	182.01	198.00
PZ 13	FPZ002A	332686	816813	201.2	12.27	191.85	189.35	201.47
PZ 14	FPZ003A	332678	816797	194.0	21.53	187.47	172.47	189.11
PZ 11	FPZ004A	332700	816788	203.1	11.56	194.46	191.96	201.42
PZ 15	FPZ005A	332691	816783	190.9	14.72	179.10	176.60	191.24
PZ 17	FPZ006A	332689	816778	189.4	14.30	178.02	175.52	189.35
PZ 18	FPZ007A	332698	816768	194.5	10.67	186.75	184.25	193.04
PZ 2	FSB025PD	332719	816804	252.3	81.00	216.4	171.3	207.11
PZ 3	FSB050PD	332721	816804	255.7	81.00	219.8	174.7	207.48
PZ 4	FSB100PD	332720	816801	250.6	75.50	215.2	175.1	207.01
PZ 1	FSB150PD	332719	816808	257.2	81.00	221.3	176.2	207.48
PZ 19	HPZ001A	332743	816587	202.4	15.37	194.95	189.95	202.35
PZ 16	HPZ002A	332759	816582	218.8	12.07	212.15	207.15	218.40
PZ 9	HPZ003A	332745	816564	200.5	17.62	185.70	183.20	201.11
PZ 10	HPZ004A	332755	816560	210.7	14.09	199.53	197.03	210.30
PZ 6	HPZ005A	332756	816549	213.8	9.89	206.83	204.33	212.79
PZ 8	HPZ006A	332746	816542	201.7	9.41	197.71	192.71	201.74
PZ 5	HSB050PD	332762	816769	230.3	43.50	216.7	186.8	217.71
PZ 7	HSB100PD	332760	816767	224.0	29.00	214.9	195.0	221.18

Table 7. Surface-water elevation measurements at selected surface-water sites in the General Separations Area, Savannah River Site, South Carolina, February 27, 1996

Study identifier	Latitude	Longitude	Elevation of water level (feet, above sea level)
SW-1	331706	814243	124.88
SW-2	331740	814203	127.16
SW-3	331602	814040	178.40
SW-4	331622	814006	190.11
SW-5	331620	813833	214.57
SW-6	331752	813743	275.82
SW-7	331744	813053	201.14
SW-8	331826	813751	173.86
SW-9	331900	813819	155.18
SW-10	331833	813945	143.24
SW-11	331749	813919	170.09
SW-12	331802	813942	146.94
SW-13	331805	814029	135.06
SW-14	331623	814005	190.64
SW-15	331631	813912	203.96
SW-16	331745	813753	201.19