GROUND-WATER RESOURCES OF PICKENS COUNTY, ALABAMA

A Reconnaissance

GEOLOGICAL SURVEY OF ALABAMA BULLETIN 83

Prepared in cooperation with the U.S. Geological Survey

GEOLOGICAL SURVEY OF ALABAMA

Philip E. LaMoreaux
State Geologist

DIVISION OF WATER RESOURCES

Doyle B. Knowles
Chief Hydraulic Engineer

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By Kenneth D. Wahl

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United States Geological Survey
Water Resources Division

UNIVERSITY, ALABAMA

1965

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University, Alabama
November 23, 1965

Honorable George C. Wallace
Governor of Alabama
Montgomery, Alabama

Dear Governor Wallace:

I have the honor to transmit the report, "Ground-Water Resources of Pickens County, Alabama," by Kenneth D. Wahl, which has been published as Bulletin 83 of the Geological Survey of Alabama.

Abundant quantities of ground water are available for industrial, municipal, and agricultural development in Pickens County. As much as 1 million gallons per day of water can be obtained from individual wells tapping beds of sand and gravel in the Coker, Gordo, and McShan Formations. Small to moderate quantities of water are available from aquifers in the Eutaw Formation, terrace deposits, and alluvium.

Ground water in Pickens County is generally of good chemical quality, but at a few localities it contains excessive amounts of iron. In general, the most favorable area for the development of large quantities of ground water of good chemical quality is the southwestern part of the county.

Respectfully,

Philip E. LaMoreaux
State Geologist

CONTENTS

ILLUSTRATIONS

(Plates in pocket)

CONTENTS

TABLES

GROUND-WATER RESOURCES OF PICKENS COUNTY, ALABAMA

A Reconnaissance

By Kenneth D. Wahl

ABSTRACT

Development of ground-water resources is essential to the economic growth of Pickens County. Wells having a capacity of 700 gpm (gallons per minute) or more can be developed in the Coker, Gordo, and McShan Formations, and adequate water for stock and domestic use (5 to 100 gpm) can generally be produced from the Eutaw Formation, terrace deposits, and alluvium.

Two aquifers supply most of the ground water presently used in the county. These aquifers, the Gordo and McShan Formations, supply about 1.9 mgd (million gallons per day) of a total use estimated at 2.3 mgd.

A third aquifer, the Coker Formation, is not extensively developed because of its depth and the availability of water from shallower aquifers, but it is a potential source of large quantities of ground water. The formation is 900 feet thick in the southwestern part of the county and contains fresh water to an estimated depth of 1,700 feet.

Flowing wells in lowland areas along major streams discharged 2.05 mgd in 1963. It is estimated that 0.024 mgd, or less than 2 percent of this water, is used beneficially.

Ground water in Pickens County generally is of good chemical quality for domestic, industrial, and municipal use, except for a high iron content in some areas which causes objectionable staining and metallic taste. Partial chemical analyses of water from wells in the county indicate the following ranges of chemical constituents and hardness: iron, 0 to 29 ppm (parts per million); bicarbonate, 2 to 254 ppm; chloride, 1 to 300 ppm; and hardness, 2 to 181 ppm.

INTRODUCTION

Ground water, a natural resource vital to the economic development of many areas, is often taken for granted. The increasing demand for more water for domestic, municipal, and industrial use has emphasized the need for water facts to keep abreast of the demand. A reconnaissance report is not intended to answer all water problems of an area, but to provide facts and evaluations that will serve as guides for water-resources planning and development.

The purpose of this report is to provide an evaluation of ground-water information in Pickens County for the use of water managers and water users in answering the following questions: (1) Where is water available and how much do individual wells produce? (2) What is the chemical quality of the water? (3) How much water is utilized? and (4) What problems are present or anticipated and what steps are necessary to solve the problems?

Ground-water studies are being made by the U.S. Geological Survey in cooperation with the Geological Survey of Alabama. The work in Pickens County was done under the direct supervision of W. J. Powell, district geologist of the Ground Water Branch of the U.S. Geological Survey, in charge of ground-water investigations in Alabama.

Pickens County, in west-central Alabama, is bounded by Fayette and Lamar Counties on the north, Tuscaloosa County on the east, Greene and Sumter Counties on the south, and the State of Mississippi on the west (fig. 1).

Pickens County has an area of 887 square miles and a population of 21,882, according to the 1960 census. The economy of the county, and of the cities of Aliceville, Gordo, Reform, and Carrollton, is based primarily on agriculture and associated industries, such as lumber and pulpwood.

An inventory was made of selected drilled and dug wells and most of the flowing wells to obtain information upon which to evaluate the ground-water resources of Pickens County. Water samples were collected from most of the wells inventoried and these were analyzed for major constituents. The basic data are compiled in tables 1, 2, 8, and 9.

Acknowledgment is made to residents of Pickens County who cooperated during the course of the study by contributing information, and to drilling firms which made available drilling logs and well data.

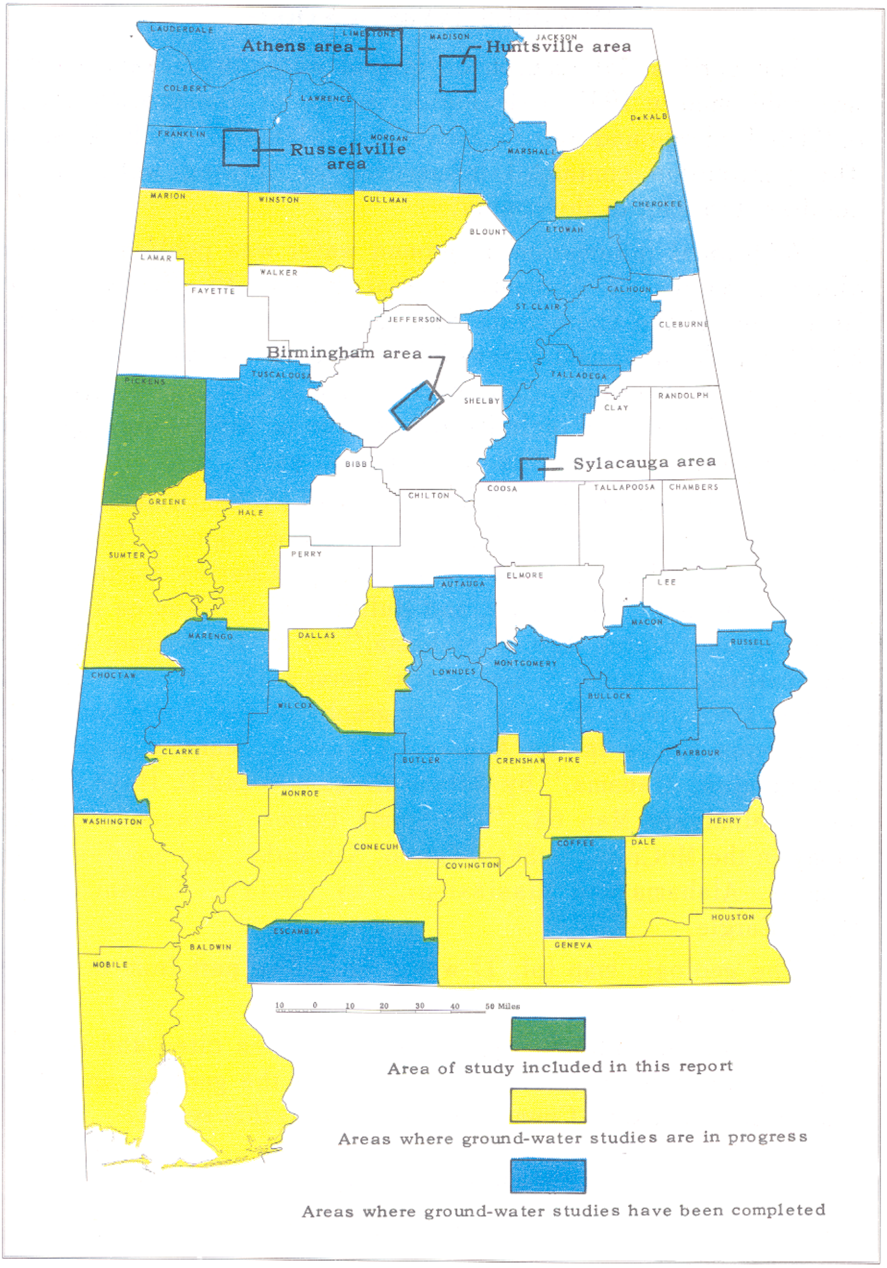

Figure 1.—Map of Alabama showing location of Pickens County.

PREVIOUS INVESTIGATIONS

The earliest information on ground water in Pickens County was published in 1907 in Geological Survey of Alabama Monograph 6, "The Underground Water Resources of Alabama," by E. A. Smith. The publication contained information on flowing wells in the southwestern part of the county.

Additional information on ground water was published in Geological Survey of Alabama Special Report 18, "Ground-Water Resources of the Cretaceous Area of Alabama," and in Bulletin 52, "Fluoride in Ground Water of the Cretaceous Area of Alabama," both by C. W. Carlston. Carlston recorded information on 24 wells in Pickens County and included information on the geology, ground-water resources, and quality of the ground water.

Publications describing the geology of Pickens County include two reports of the Alabama Geological Survey–Special Report 14, "Geology of Alabama," by G. I. Adams, Charles Butts, L. W. Stephenson, and C. W. Cooke, and Bulletin 48, "Notes on Deposits of Selma and Ripley Age in Alabama," by W. H. Monroe; and two publications by the U.S. Geological Survey–Oil and Gas Investigations Preliminary Map 50, "Stratigraphy of the Pre-Selma Upper Cretaceous Rocks in the Aubrey, Aliceville, Mantua, and Eutaw Quadrangles, Alabama," by Watson H. Monroe and D. Hoye Eargle; and Preliminary Map 64, "Pre-Selma Upper Cretaceous Stratigraphy in the McCrary, McShan, Gordo, Samantha, and Searles Quadrangles, Alabama and Mississippi," by Louis C. Conant and D. Hoye Eargle.

The geologic map (pl. 1) was modified in part from the latter two maps.

A selected bibliography, listing references cited and reports, maps, and charts containing information on the geology and water resources of Pickens County, is appended to this report.

GROUND WATER

OCCURRENCE

Ground water occurs under both water-table and artesian conditions in Pickens County (fig. 2). Water-table conditions occur

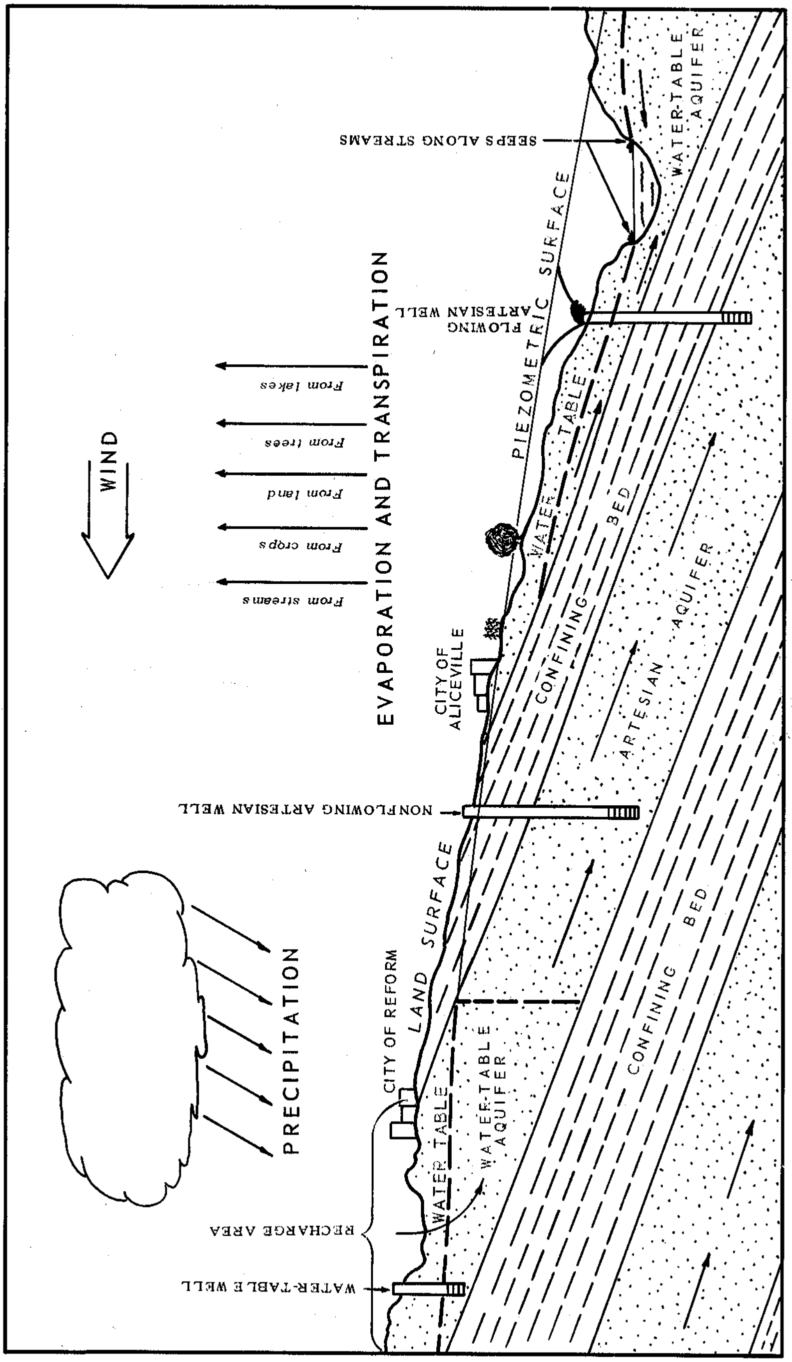

Figure 2.—Schematic diagram showing the hydrologic cycle and water-table and artesian conditions.

throughout the county except in the extreme southwest corner in the outcrop area of the Mooreville and Demopolis Chalks (pl. 1). Artesian conditions occur in the entire county, and many wells flow in areas of low elevation along the Tombigbee River and Lubbub Creek (pl. 1). The locations and depth of water-table and artesian aquifers in Pickens County are related directly to the geology.

The geologic units that crop out in Pickens County are of sedimentary origin and range in age from Late Cretaceous to Recent. They consist chiefly of chalk, clay, sand, and gravel. The Cretaceous deposits are divided into four geologic units which, in ascending stratigraphic order, are: Tuscaloosa Group, McShan Formation, Eutaw Formation, and Selma Group. The Tuscaloosa Group is divided into the Coker and Gordo Formations, and the Selma Group is divided into the Mooreville and Demopolis Chalks.

Along major streams the Cretaceous deposits are overlain by terrace deposits and alluvium of Quaternary age.

The distribution of outcropping formations is shown on plate 1 and their thickness, stratigraphy, lithology, and water-bearing character are shown on plate 2, figures 3, 4, 5, and in tables 2 and 3.

COKER FORMATION

The Coker Formation is the lower part of the Tuscaloosa Group and the basal unit of the Upper Cretaceous Series in Alabama as defined by Drennen (1953b, p. 3). In northeastern Pickens County the Coker Formation is underlain by the Pottsville Formation of Pennsylvanian age (Drennen, 1953b, p. 3) and in southwestern Pickens County by deposits of Early Cretaceous age. (See sample log Z-15, table 2.)

The thickness of the Coker Formation ranges from about 450 feet in the outcrop area (Conant and Eargle, 1947) to 900 feet in well Z-15. The top of the Coker dips toward the southwest at an average rate of 30 feet per mile (fig. 3). The formation crops out in the northeastern part of the county and, because the dip of the beds is greater than the slope of the land surface, it lies at progressively greater depths below the land surface toward the southwest (pl. 2).

Table 3.—*Summary of geologic units and their water-bearing properties*

System	Series	Stratigraphic unit		Thickness (feet)	Lithologic character	Water-bearing properties
Quaternary	Pleistocene and Recent	Alluvium		0-60	Gravel, sand, silt, and clay	Yields small supplies of good quality water to shallow wells.
Quaternary	Pleistocene and Recent	Terrace deposits		0-60	Gravel, sand, and clay	Yields small supplies of good quality water to shallow wells.
Cretaceous	Upper Cretaceous	Selma Group	Demopolis Chalk	0-100	Chalk and marl	Relatively impermeable; not a source of ground water.
Cretaceous	Upper Cretaceous	Selma Group	Mooreville Chalk (Arcola Limestone Member)	0-300	Limestone, chalk, and marl	Relatively impermeable; not a source of ground water.
Cretaceous	Upper Cretaceous	Eutaw Formation (Tombigbee Sand Member)		0-180	Massive to thin-bedded sand and gray clay	Yields small to moderate supplies of water to wells. Water locally has high iron content.
Cretaceous	Upper Cretaceous	McShan Formation		0-250	Alternating thin beds of sand and clay	Yields moderate to large supplies of water to wells. Principal source of water in west half of county. Water often has high iron content.
Cretaceous	Upper Cretaceous	Tuscaloosa Group	Gordo Formation	0-300	Upper part chiefly clay with some sand beds; lower part chiefly sand and gravel with some clay beds	Yields small to large supplies of water to wells. Principal source of water in east half of county. Water often has high iron content.
Cretaceous	Upper Cretaceous	Tuscaloosa Group	Coker Formation	450-900	Upper part chiefly clay with some sand beds; middle part alternating thin beds of sand and clay; lower part chiefly gravelly sand with some clay beds	Yields moderate to large supplies of water to wells. Potentially a source of water throughout the county. Locally, water has high iron content.

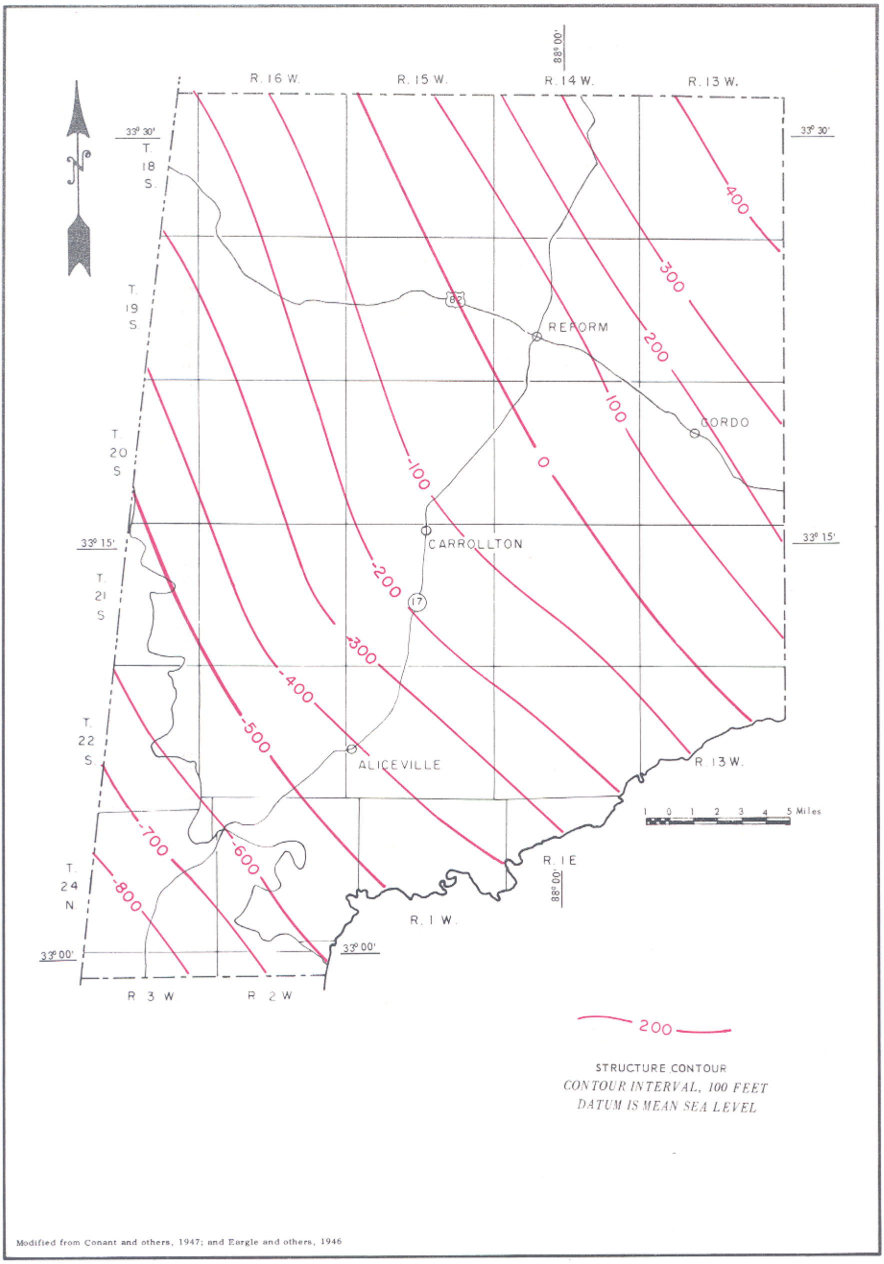

Figure 3.–Map showing generalized structural contours on top of Coker Formation.

The lower part of the Coker Formation consists of sand and gravel and irregular beds of carbonaceous and purple clay. The middle part consists of alternating thin beds of fine-grained glauconitic sand and laminated clay. The upper part consists of purple, gray, and carbonaceous clay and crossbedded white to pink fine- to coarse-grained micaceous sand, locally containing some chert gravel. Sand and gravel beds in the lower part of the formation become more numerous and thicker toward the southwest.

Sand and gravel beds in the Coker are aquifers throughout Pickens County. These aquifers are not tapped extensively by wells because of their excessive depth and the availability of water from shallower aquifers. Wells tapping the Coker Formation supply water for the city of Gordo. These wells tap sand beds in the upper part of the formation; one, K-13, has been test-pumped at 225 gpm with a drawdown in water level of 38 feet (table 4). Wells K-11, 12, 13, and 14 all flow when the city of Gordo wells are not pumping. Well R-8 is a flowing well that probably taps sand and gravel beds in the lower part of the Coker.

An electric log of oil test well Z-15 indicates that the Coker Formation contains relatively fresh water to a depth of 1,750 feet. A well tapping the lower part of the Coker near Columbus, Miss., was reported to flow 2,300 gpm. Evaluation of the sample and electric logs of well Z-15 (table 2) indicates that the lower part of the Coker Formation in southern Pickens County is a potential source of large quantities of ground water.

GORDO FORMATION

The Gordo Formation, the upper part of the Tuscaloosa Group, crops out in the northeastern part of Pickens County (pl. 1) and is present in the subsurface southwest of its outcrop area. It is about 270 feet thick (pl. 2) and is similar to the Coker Formation in its strike and dip (fig. 3).

The Gordo Formation can be divided into two parts: the lower part consists of gravelly, poorly sorted sand containing thin lenses of carbonaceous clayey sand and a little purple-mottled light-gray clay; the upper part consists of lenticular mottled clay and some beds of strongly crossbedded fine to coarse sand. Locally the sand beds in the upper part of the formation are relatively thick, as in wells X-17 and 18 (table 2).

Sand and gravel beds in the Gordo Formation generally are good aquifers in Pickens County. Local exceptions are upland areas in the outcrop where the formation is drained by streams that have cut into it, and areas where the sand and gravel are poorly sorted and contain a large percentage of silt-size material. Figure 4 shows the approximate depth to the base of the Gordo Formation and the approximate quantity and iron content of the available water.

Wells of large capacity tapping the Gordo Formation supply water for the towns of Reform, Carrollton, and Aliceville and for the natural-gas pumping station south of Reform. Well M-16 at Carrollton was reported to produce 160 gpm with a drawdown in water level of 18 feet. Well X-18 at Aliceville was pumped at 640 gpm with a drawdown of 55 feet.

The Gordo Formation is the principal source of ground water in the eastern half of the county. Future development probably will be in the same area and in the southwestern part of the county. Wells tapping aquifers in the Gordo southwest of the outcrop area, in lowland areas along Lubbub Creek, Tombigbee River, and Sipsey River, flow (pl. 1).

McSHAN FORMATION

The McShan Formation was originally the lower part of the Eutaw Formation prior to restriction of the Eutaw to the upper part by Monroe, Conant, and Eargle (1946, p. 204). The McShan is difficult to differentiate from the Eutaw because of their similar lithologies. However, it has been retained as a unit in this report because water in the McShan is more mineralized than water in the Eutaw (table 8). The projection of the McShan-Eutaw contact into the subsurface on plate 2 is based on the thickness of the units in the outcrop.

The McShan Formation crops out in a northwestward-trending belt across the central part of Pickens County, is about 250 feet thick, and is in the subsurface southwest of the outcrop area. The

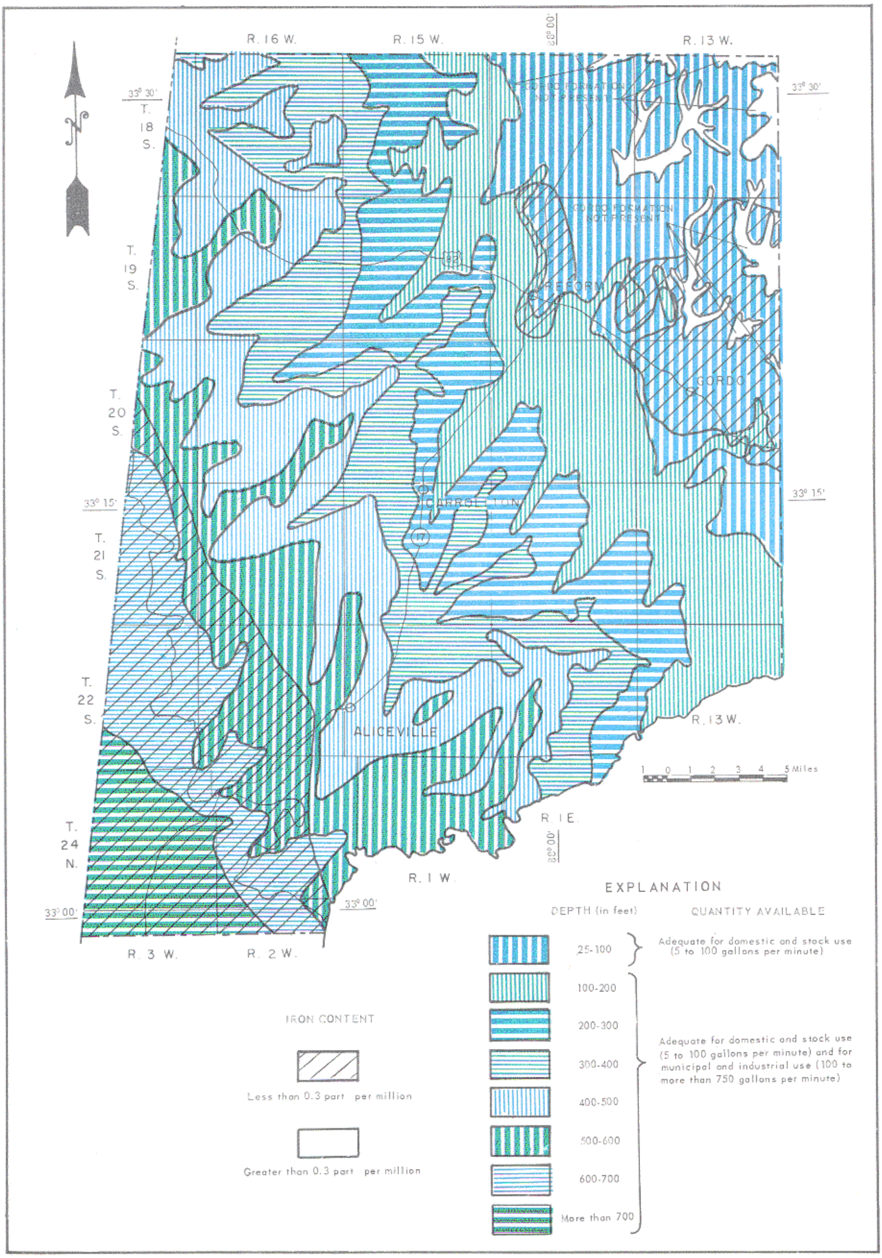

Figure 4.—Map showing depth to base of Gordo Formation, and approximate quantity and iron content of water available from the formation.

McShan consists chiefly of alternating thin beds of finely cross-bedded to laminated and rippled fine- to coarse-grained glauconitic sand, and light-gray laminated clay. Sand beds in the basal part of the formation are slightly coarser and thicker than those in the upper part.

The McShan Formation is the major aquifer tapped by wells in the western half of Pickens County. Sand beds in the McShan are thin and cannot be correlated; however, for the purposes of this report they will be considered as one aquifer. Three wells of large capacity, AA-10, X-19, and X-23, produce water from the McShan. Well AA-10 is reported to produce 500 gpm; wells X-19 and X-23 were test-pumped at 600 gpm with drawdowns of water level of 56 and 38 feet (table 4). Figure 5 shows the depth to the base of the McShan Formation and the approximate quantity and iron content of water available.

Wells tapping the McShan southwest of the outcrop area, in lowland areas along Lubbub Creek, Sipsey River, and Tombigbee River, flow (pl. 1).

EUTAW FORMATION

The Eutaw Formation of this report is the upper part of the unrestricted Eutaw Formation (Monroe and others, 1946). The maximum thickness of the restricted Eutaw Formation in Pickens County is about 180 feet. The Eutaw Formation crops out northeast of the Tombigbee River valley (pl. 1), and is tapped by wells in the subsurface to the southwest. The lower part of the Eutaw Formation consists of alternating thin beds of crossbedded fine- to medium-grained glauconitic sand and gray laminated clay. Locally, the clay beds become massive in the lower part of the formation. The Tombigbee Sand Member, the upper part of the formation, ranges from 25 to 100 feet in thickness, and consists of a massive bed of glauconitic sand containing fossil shells and, locally, layers of calcareous sandstone.

The Tombigbee Member, and locally the basal part of the Eutaw, are aquifers in Pickens County. Wells tapping the Eutaw generally are adequate for domestic and stock supply (5-100 gpm); and southwest of the outcrop, in lowland areas along the Tombigbee

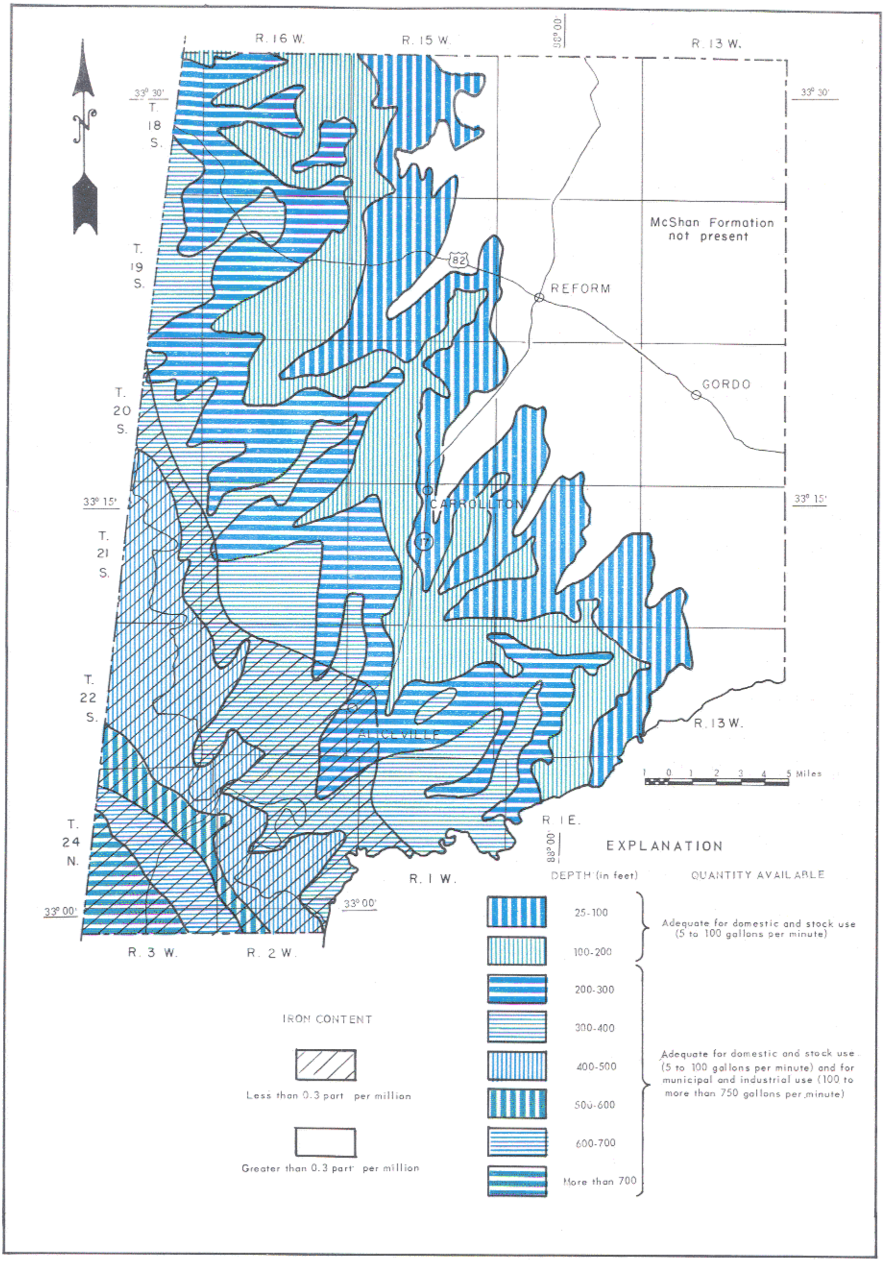

Figure 5.—Map showing depth to base of McShan Formation, and approximate quantity and iron content of water available from the formation.

River, wells in the Eutaw flow (pl. 1).

MOOREVILLE AND DEMOPOLIS CHALKS

The Mooreville and Demopolis Chalks are the lower two units of the Selma Group as correlated by Monroe (1946). They consist chiefly of dense gray to blue chalk, sandy chalk, and limestone. The Arcola Limestone Member, the upper part of the Mooreville, consists of two thin beds of limestone separated by sandy chalk. The Mooreville crops out near Pickensville, and the Mooreville, Arcola Member and Demopolis crop out in the upland southwest of the Tombigbee River.

The Mooreville and Demopolis are relatively impermeable and are not sources of ground water in Pickens County. However, the Mooreville is the confining bed for artesian water in the Tombigbee Sand Member.

TERRACE DEPOSITS AND ALLUVIUM

Terrace deposits and alluvium occur in and adjacent to most streams in Pickens County, overlying older geologic formations. They consist of unconsolidated clay, silt, sand, and gravel and underlie benchlike surfaces which occur at elevations above the present flood plain. These benches or terraces are remnants of older flood plains formed by streams that occupied the valleys during earlier stages of development. The terrace deposits were mapped as a unit but represent several terraces at different elevations above the flood plain. The uppermost terrace is the oldest and lower terraces are correspondingly younger. The lowermost terrace is only slightly higher than, and in many places merges with, the flood plain; therefore, as the contact between them is often difficult to distinguish, many lower terrace deposits were mapped with the alluvium.

Alluvium underlies the present flood plains and streambeds. In general, the alluvium is confined to the part of the stream valley that was built of sediments during the present regimen of the stream and that is covered with water when the stream overflows its banks at flood stages.

The thickness of the terrace deposits and alluvium ranges from 0 to about 60 feet. Sand and gravel beds are generally permeable and yield water to many shallow domestic and stock wells. These deposits are of limited extent and thickness and have not been developed for municipal and industrial supplies. Wells of large capacity probably could be constructed in the lower terrace deposits and alluvium along the Tombigbee and Sipsey Rivers where the aquifer is hydraulically connected with the streams.

SOURCE, RECHARGE, AND MOVEMENT

The source of ground water in Pickens County is precipitation, chiefly in the form of rain. The average annual precipitation there is about 52 inches. Part of the precipitation returns to the atmosphere through evaporation and transpiration, part flows into streams and lakes as runoff, and part seeps downward through the soil and rocks to the zone of saturation (fig. 2). In the Tennessee Valley area of northern Alabama nearly 20 percent of the precipitation seeps into the subsurface to become ground water (Curtis, 1953, p. 36). However, in Pickens County somewhat more than 20 percent of the precipitation seeps to the ground-water reservoir.

Direct infiltration of precipitation into the aquifers is the major means of recharge in Pickens County, although some aquifers receive recharge indirectly, by leakage from adjacent aquifers.

Ground water moves from areas of recharge to areas of discharge. The general direction of movement in Pickens County is southwestward, but this is disrupted locally by natural discharge to seeps and springs and artificial discharge through wells (fig. 6).

WATER-LEVEL FLUCTUATIONS

The water table is not a level or stationary surface; variations in its shape and elevation occur in response to changes in ground-water recharge and discharge and they can be correlated with precipitation and seasonal changes in evaporation and transpiration. Water-level fluctuations in Pickens County are seasonal and cyclic: water levels are highest in early spring after the winter rainfall and less evaporation and transpiration during the cooler months; they are lowest during the fall after a period of low rainfall during the summer and the higher rates of ground-water with-

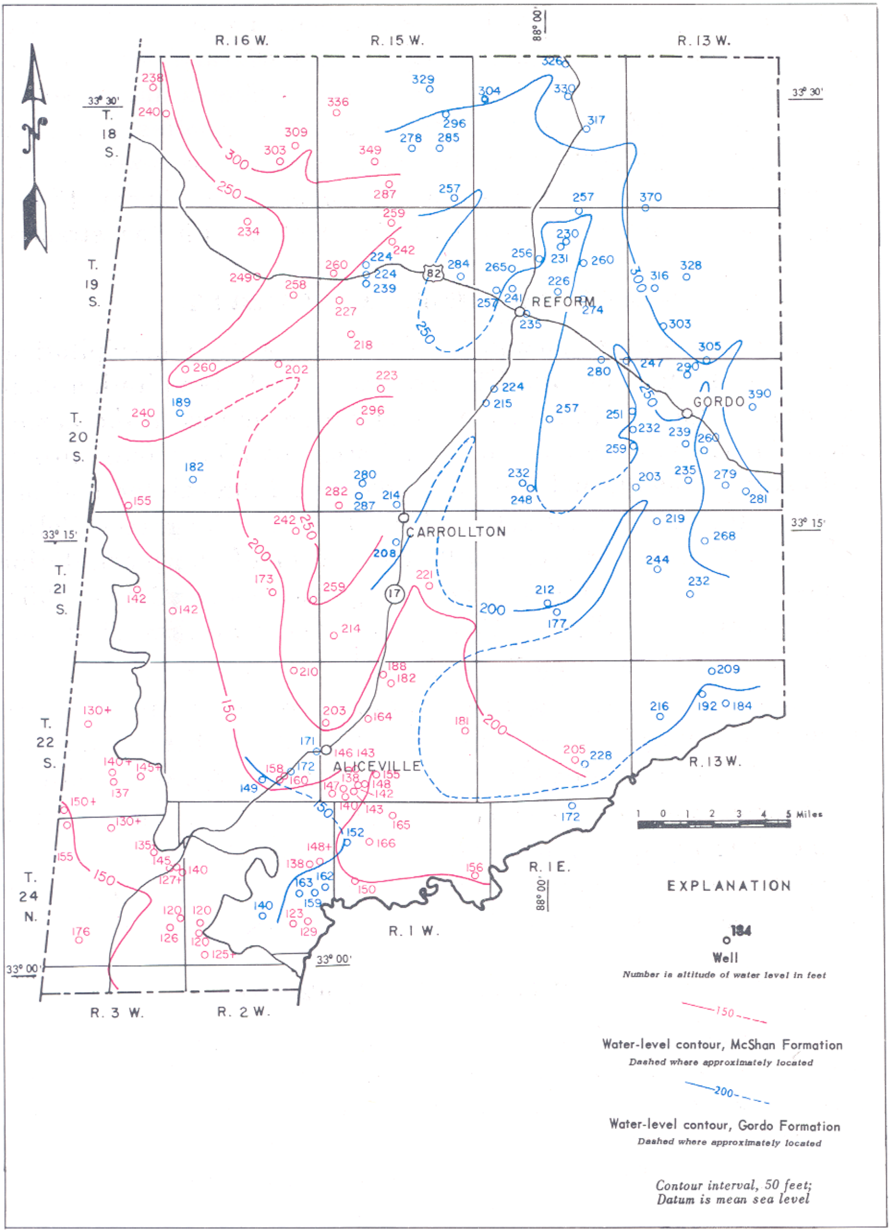

Figure 6.—Map showing altitude of water level in wells tapping Gordo and McShan Formations (1963).

drawal by pumping, evaporation, and transpiration.

The decline in water levels resulting from ground-water discharge has been negligible and the only effect reported has been the decline or cessation of flow from some artesian wells. The fluctuations in water level produced by changes in precipitation are shown in figures 7 and 8. Comparing the water-level fluctuations shown on figure 7 during the period 1948-52 with the fluctuations during 1963-64, it is evident that no significant decline in water level has occurred during the 16-year period.

The effect of precipitation on water levels may lag for days or months. In Pickens County the lag seems to be several days, because higher amounts of rainfall (fig. 8) generally show corresponding rises in water levels during the same week.

The seasonal fluctuations in water levels have a pronounced effect on the flow of streams and spring discharge. During periods of prolonged dry weather many springs cease flowing or flow at a reduced rate. During the same periods the direct runoff to streams is low and the flow in streams draining the outcrop area represents natural ground-water discharge. According to Peirce (1959, p. 198) the low-flow index (the discharge equaled or exceeded 95 percent of the time, expressed in cubic feet per second per square mile of drainage area) for streams in Pickens County is 0.03 to 0.10 cubic foot per second (13 to 45 gpm) per square mile.

SPECIFIC CAPACITY OF WELLS

Specific capacity, expressed in gallons per minute per foot of drawdown, commonly is used as an index to the approximate capacity of a well (table 4). For example, if a well is pumped at 100 gpm and the water level is lowered 10 feet, the specific capacity is 10 gpm per foot of drawdown. The specific capacity of a well is controlled chiefly by transmissibility of the aquifer and efficiency of the well.

UTILIZATION AND AREA OF ARTESIAN FLOW

In 1963 about 2.3 million gallons of ground water was used daily. The use of this water was as follows: 1.2 mgd for municipal

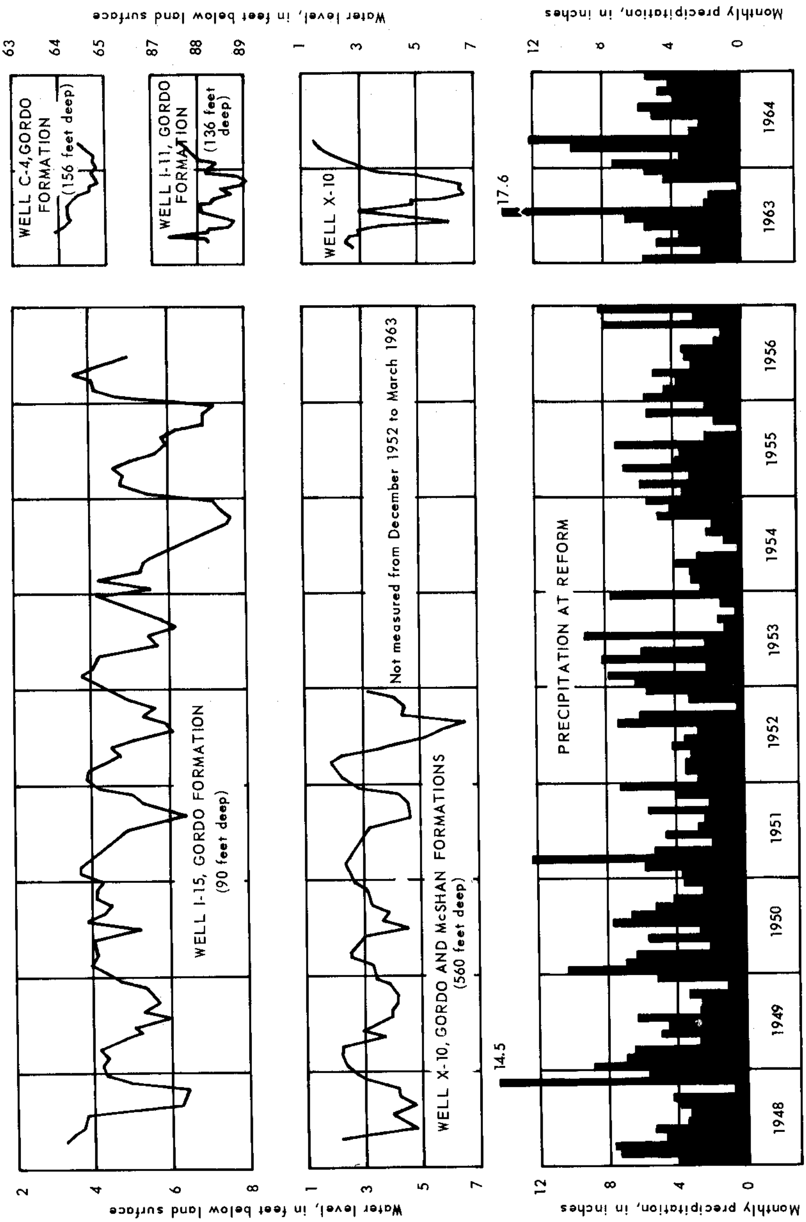

Figure 7.--Hydrographs showing response of water levels in Gordo and McShan Formations to changes in precipitation.

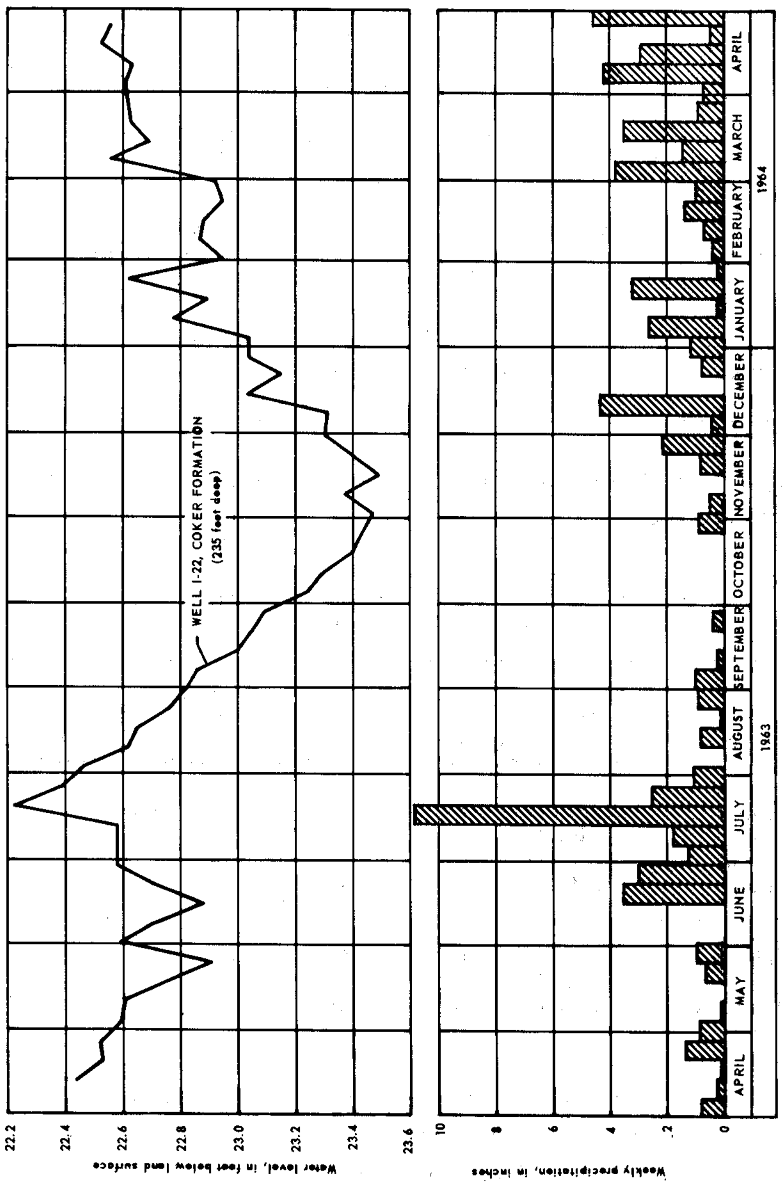

Figure 8.—Hydrograph of well I-22 showing lag in water-level response to changes in precipitation.

Table 4.—*Specific capacities of wells*

Well No.	Producing formation	Discharge (gpm)	Duration of discharge (hours)	Drawdown (feet)	Specific capacity (gpm per foot of drawdown)
I-22	Coker, upper part	590	....	85	7
K-11	Coker, upper part	230	....	110	2
K-13	Coker, upper part	150	4	26	6
		225	2	38	6
M-16	Gordo	160	4	18	9
X-18	Gordo	640	26	55	12
X-19	McShan	600	29	56	11
X-23	McShan	600	23	38	16

supply; 0.9 mgd for farm supply; and 0.2 mgd for self-supplied industry (table 5).

Table 5.—*Summary of water use and flow from wells* (in gallons per day)

	Use	Major aquifers			
		Coker Fm.	Gordo Fm.	McShan Fm.	Eutaw Fm.
City of Aliceville	700,000			700,000	
City of Carrollton	140,000		140,000		
City of Gordo	100,000	100,000			
City of Reform	260,000		260,000		
Municipal use	1,200,000	100,000	400,000	700,000	
Industrial use	200,000		140,000	65,000	
Estimated domestic and stock use	900,000	150,000	300,000	300,000	100,000
Total	2,300,000	250,000	840,000	1,065,000	100,000

Discharge from flowing wells

Flow from used wells (79)	1,523,000
Flow from unused wells (32)	527,000
Total flow from wells (111)	2,050,000

During this investigation most of the flowing wells were located and the discharge measured. There were 111 flowing wells inventoried and the total flow from these wells was calculated to be 2,050,000 gpd. Assuming that each used flowing well (table 5) supplies water for a family of six living in an electrified home, the average use per family would be 300 gpd (MacKichan and Kammerer, 1961, p. 4). The total amount of water put to beneficial use from the 79 flowing wells in use would be 24,000 gpd, or less than 2 percent of the total flow. The water from these flowing wells not utilized in 1963 was about 2 mgd. The area of artesian flow is relatively small (pl. 1); yet the wasted flow from these wells was only slightly less than the total water used in the county, 2.3 mgd. It is evident then that considerable ground water could be conserved if the flow from these wells were confined by mechanical means when the water is not being used.

The area of artesian flow, as shown on plate 1, represents conditions in 1963 and is subject to change in extent in response to water-level fluctuations. Residents in the county report that wells formerly flowed in Coal Fire Creek valley as far north as McShan, in Lubbub Creek valley as far north as Reform, and in Bear Creek valley as far north as Gordo. The area of flowing wells evidently has decreased; the reason for this decrease probably is declining water levels.

CHEMICAL QUALITY OF THE WATER

Minerals are dissolved by water from the soil and rocks as the water moves through the subsurface. The amount and kind of minerals dissolved vary from place to place according to the amount and type of organic material in the soil, the type of rock the water moves through, the length of time the water has been in contact with the rocks, and the temperature of the water.

The quality of water may restrict its use for municipal, industrial, domestic, or irrigation supplies. The amount of dissolved minerals that can be tolerated is not easily defined, because of the many diverse uses made of ground water. The U.S. Public Health Service (1962) has established standards to control the quality of water supplied by common carriers. According to these standards, the following concentrations should not be exceeded:

chloride, 250 ppm (parts per million); fluoride, 1.0 ppm; iron, 0.3 ppm; nitrate, 45 ppm; sulfate, 250 ppm; and total dissolved solids, 500 ppm. Water of poorer quality is used for domestic purposes in many areas because water that meets these quality standards is not available.

Hardness is a term in common usage for describing water quality. The ranges of hardness used in this report are: 0-60 ppm, soft; 61-120 ppm, moderately hard; 121-180 ppm, hard; and 181 ppm or more, very hard.

Of 376 samples represented in table 7, 1 sample was very hard, 3 samples were hard, 24 moderately hard, and the remainder soft. Hardness is not a serious quality problem in the county.

Partial chemical analyses, including determinations for iron, bicarbonate, carbonate, chloride, hardness, and pH, were made for water samples collected during this investigation (table 7). A summary of the results of these analyses is given in table 8.

The analyses of water from wells less than 50 feet deep have been included as one group in table 8 because water from shallow depths generally is not typical of a particular geologic formation. The quality of water from wells less than 50 feet deep probably varies in response to rainfall and evapotranspiration. Most of the samples tabulated in this report were collected during a relatively dry, warm summer and fall, and the mineral content of water from the shallow aquifers probably is slightly higher than normal.

In addition to these partial chemical analyses, wells were selected and sampled for comprehensive chemical analyses (table 9).

The only serious ground-water quality problem in Pickens County is excessive iron content, which causes staining of fixtures, discoloration of the water, and objectionable taste. For the purposes of this report an iron content greater than 0.3 ppm will be considered to be high and objectionable.

The iron content of ground water in Pickens County is variable and depends on the depth of the well, aquifers penetrated and screened, and the location of the well. Wells less than 50 feet deep generally yield water of low iron content. Wells more than 50 feet deep, in the Gordo Formation in two areas near Reform and Gordo also yield water of low iron content (fig. 4). Water from wells in the Tombigbee River valley and to the southwest is generally low in iron content. The low iron content of water from wells southwest of the Tombigbee River valley may be due to changes in the pH and Eh of the water in the aquifer, as discussed by Hem and Cropper (1959).

The iron content of ground water depends, in part, on the type of rocks in the aquifer and the length of time the water has been in contact with the rocks. The major iron-bearing minerals in Pickens County are glauconite and siderite. Some iron-bearing minerals are relatively stable and probably do not readily go into solution; others are unstable and will dissolve in circulating ground water. The ideal procedure for locating a water supply having a low iron content would be to drill into and test each aquifer individually, case off the undesirable aquifers, and screen the aquifers that contain the least iron.

The iron, chloride, and bicarbonate concentrations and the hardness of ground water along a southwest-northeast section are shown graphically on plate 2.

GROUND-WATER PROBLEMS

A complete and detailed discussion of water problems and solutions is beyond the scope of this report. Table 6 was prepared to show some major problems in Pickens County, the most common causes of the problems, possible solutions, and the data needed to make pertinent decisions regarding them.

Two questions most frequently asked by people planning to drill a well are: (1) How deep will I have to drill? (2) How should the well be constructed?

The depth necessary to drill to locate a water supply depends on the location in the county, the altitude of the well site, and the quantity of water needed. The drilling depths necessary to penetrate aquifers in the Gordo and McShan Formations are shown on figures 4 and 5. Figure 4 may be used also to estimate the depths to aquifers in the lower part of the Coker Formation by adding an assumed thickness of the Coker (500 feet) to the depths shown.

For example, the depths to major aquifers in the Aliceville area are as follows: McShan, 200 to 300 feet (fig. 5); Gordo, 400 to 500 feet (fig. 4); and Coker, 900 to 1,000 feet (depth of Gordo plus an assumed thickness of 500 feet for the Coker). The depths shown are generalized and are calculated to the basal part of the formations. Many wells produce water at shallower depths from sands that cannot be easily defined and mapped.

Type of well, length and type of casing, type and size of screen, and intervals to be screened or cased off are all problems to be considered when constructing a well. When drilling a well, a record should be kept of the material penetrated so that the most favorable zone can be developed as an aquifer. The well should be constructed with casing from the land surface to the producing zone, and screened only in the most favorable zone. The casing should be seated on a relatively impermeable bed or cemented in place to assure that water cannot move along the outside of the casing into the producing zone. If the entire depth of the test hole is not used, the unused partof the hole should be plugged to assure that water will not move up the hole into the producing zone. The well should be developed by pumping or bailing at a higher rate than the finished well is expected to produce, or by surging. This development should be continued until fine sediments in the producing zone are flushed out and the well produces clear water.

Many flowing wells are uncased except for the upper 20 to 40 feet and cannot be shut in or valved down without danger of caving in the uncased portion of the well. However, owners of unused flowing wells should consider capping or plugging them, realizing that this action may destroy a well of questionable value but prevent unnecessary declines in the piezometric water surface. New flowing wells should be cased, screened, and equipped with shutoff valves to control the flow. Problems with decrease in flow due to well caving and plugging can be prevented by the use of casing to the producing zone and screen in the producing zone.

SUMMARY AND CONCLUSIONS

The results of the ground-water investigation made in Pickens County lead to the following conclusions:

Table 6.—*Water problems and solutions*

Major Water Problems	Common Causes	Possible Solutions	Data Needed (see references below)
1. Deficient supply	1. Increased demand for water	1. Tap more productive aquifer	1. Location of aquifers; see text "Ground Water," plates 1 and 2 and table 1
2. Decreasing flow from wells	2. Declining water levels (water problem 4)	2. Provide water storage	2. Depth to aquifers; see text "Ground-Water Problems," figures 4 and 5, plate 2, table 1
	3. Well construction	3. Proper well construction	3. Yield of aquifers; see text "Ground Water," plates 1 and 2, figures 4 and 5, and table 3
3. Poor quality	4. Poor water in aquifer	4. Tap aquifer containing water of better quality	4. Water level; see text "Water-Level Fluctuations, figures 6, 7, 8, and table 1
		5. Treatment or filter system	5. Driller's or sample log; see text "Ground-Water Problems"
4. Declining water levels	5. Pumping	6. Proper well spacing	6. Quality of water in aquifers; see text "Chemical Quality of the Water," figures 4 and 5 and tables 8, and 9
	6. Weather conditions	7. No feasible solution	7. Aquifer properties (transmissibility, storage, etc. see text "Summary and Conclusions—Future Studies"
5. Wasted ground water	7. Uncontrolled flow from wells	8. Equip flowing wells with valves	8. Well construction; see text "Ground-Water Problems"

Source: Ground water in Pickens County is derived from precipitation which percolates into the subsurface. All geologic units except the Mooreville and Demopolis Chalks contain aquifers.

Quantity: Relatively large quantities of water (700 gpm or more per well) are available in the Coker, Gordo, and McShan Formations. Moderate to small quantities of water (5-100 gpm per well) are available in the Eutaw Formation and the terrace and alluvial deposits.

Use: Ground-water use in Pickens County is estimated to be 2.3 mgd in 1963. Most of this water (1.9 mgd) is supplied by the Gordo and McShan Formations.

Quality: The chemical quality of water from the terrace and alluvial deposits, from the Eutaw Formation, and from relatively shallow wells (less than 50 feet deep) in the Coker, Gordo, and McShan Formations, generally is satisfactory for domestic use. The chemical quality of water from deep wells (more than 50 feet deep) in the Coker, Gordo, and McShan Formations ranges from good to poor in different parts of the county (table 7 and figs. 4 and 5). The only serious problem with the quality of ground water in Pickens County is the high iron content. Treatment systems to remove iron can be built as a part of municipal or industrial water systems, and commercial treatment systems are available to remove or stabilize iron in domestic water supplies.

Problems: Many ground-water problems exist in Pickens County; the most serious is objectionable quantities of iron. There are two possible solutions to this problem: (1) locate a better source, or (2) remove the iron by treatment. The second solution generally is the better, because drilling wells is expensive, and in many areas where iron is a problem all aquifers yielding enough water for a municipal or industrial supply or for a modern home produce water of high iron content.

Many ground-water problems in Pickens County are directly or indirectly related to well construction. Proper construction and screening of wells could be of benefit in relieving problems associated with declining water levels, poor quality, and decreasing flow.

Future studies: Future studies will be necessary to solve further problems on ground water in Pickens County. Some subjects which should be considered for investigation are: quantity and quality of water available in the Coker Formation in downdip areas; aquifer characteristics (storage and transmissibility) of the Coker, Gordo, McShan, and Eutaw Formations; amount of water moving from one aquifer to another through wells; a water budget for the county; why objectionable quantities of iron are not present in aquifers southwest of Aliceville and how this situation can be maintained; depth of wells tapping major aquifers; location of aquifers having low iron content; relation between iron content and distance the water has traveled in the aquifer; and relation, if any, between the iron content of water in the aquifers and the type and grain size of iron-bearing minerals in the aquifer.

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BASIC DATA

Table 1.—*Records of selected wells and springs in Pickens County*

Well or spring: Numbers correspond to those on plates 1 and 2 and in tables 2, 7, and 9; asterisk indicates chemical analysis given in table 9.

Type: D, drilled or bored; Du, dug; S, spring.

Depth of well and water level: Reported depths are given in feet; measured depths are given in feet and tenths.

Altitude: Altitudes determined by aneroid barometer, or from topographic maps.

Method of lift: C, cylinder; F, flow; J, jet; M, manual; N, none; R, ram; S, submergible; T, turbine.

Use of water: D, domestic; Ind, industrial; Irr, irrigation; N, none; O, observation; P, public supply; S, stock.

Water-bearing unit: Kck, Coker Formation; Kg, Gordo Formation; Km, McShan Formation; Ke, Eutaw Formation; Qt, high terrace deposits; Qal, low terrace and alluvial deposits.

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
A-1	T. E. Williams....	....	Du	35	30	Kg	551	30	1-22-64	J	D,S	
A-2	J. B. Pugh........	....	Du	55	30	Kg	583	52	12- 5-63	J	D,S	
A-3	Donald Richardson	....	D	126	4	Kck	373	80	11-14-63	J	D	
A-4	W. D. Malone	Posey Drilling Co.	D	119	4	Kg	555	96	12-27-63	C	D,S	
A-5	W. F. Junkin......	Causey Drilling Co.	D	222	4	Kck	359	85	5-17-63	J	S	
A-6	O'Neal Pate.......	....	Du	68	30	Kg	448	61	11-25-63	J	D	
A-7	J. D. McCool	....	Du	65	30	Kg	431	60	11-26-63	J	D,S	
A-8	John Baines.......	Causey Drilling Co.	D	80	4	Kg	460	50	12-27-63	C	D,S	
B-1	Virgil Appling	....do...........	D	160	4	Kck	440	.....	....	J	D,S	

B-2	Curt Dorroh.......	Burton and Johnson	D	84	4	Kg	386	78.0	5-16-63	N	N	
B-3	....do..........	....	Du	63	30	Kg	386	60	5-16-63	J	D,S	
B-4	J. C. Cameron	....	S	....	...	Km	426	.....	....	J	D,S	Two springs.
B-5	W. L. Irwin.......	Causey Drilling Co.	D	140	4	Kg	404	100	5- 2-63	J	D	
B-6	O. W. Wilson	....	Du	57	30	Kg	381	51	5-16-63	J	D	
B-7	Joe Duckworth....	Causey Drilling Co.	D	108	4,2	Kg	417	70	9- -62	J	D	Casing: 4-in from surface to 102 ft; 2-in screen from 102 ft to 108 ft.
B-8	....do..........	Reliable Home Improvement.	D	121	4,2	Kg	417	63.7	5-15-63	N	N	Casing: 4-in from surface to 90 ft; 2-in from 90 to 111 ft; 2-in screen from 111 to 121 ft. Well abandoned in 1962.
B-9	Robert Shelton....	Causey Drilling Co.	D	100	4	Kg	439	65	5-15-63	J	D	
B-10	Mrs. P. G. Cook...	Reliable Home Improvement.	D	97	4,2	Kg	363	46	2-26-63	J	D	Casing: 4-in from surface to 88 ft; 2-in screen from 88 to 96 ft.
B-11	F. J. Shelton	....do..........	D	189	4	Kg	398	179	1-22-64	J	D,S	
B-12	Lynwood Sanford..	....	Du	36	30	Kg	327	.....	....	J	D,S	
B-13	A. A. Hollinger...	....	S	....	...	Kg	320	.....	....	J	D,S	
B-14	Lonnie McDaniel..	....	Du	40	30	Km	408	.....	....	J	D	Well deepened from 18 to 40 ft.
B-15	Leon Anderson....	....	Du	37.0	30	Kg	295	32.9	5-16-63	J	D	
C-1	Boyd Clemmons...	....	S	....	...	Km	404	.....	....	C	D	Estimated flow 2.5 gpm.
C-2	R. D. Stokes	....	S	....	...	Km	444	.....	....	J	D	
C-3	J. A. Cook	....	Du	20	30	Kg	345	16	5- 1-63	J	D	
C-4	Dr. Jack Davis....	Causey Drilling Co.	D	156	6	Kg	360	63.9	5- 1-63	S	O	
C-5	Bud Shaw........	....	Du	30	30	Km	447	.....	....	J	D	
C-6	Price Skelton.....	Posey Drilling Co.	D	118	4	Km	391	55	4- 4-63	J	D,S	
C-7	W. C. McGahey ...	....	Du	33.0	30	Kg	306	27.7	5- 1-63	M	D	
C-8	Bethlehem Church .	Causey Drilling Co.	D	182	4	Kg	428	105	5- 1-63	S	P	
C-9	W. E. Swedenberg .	....do..........	D	200	4	Kg	412	126.7	5- 1-63	J	D	
C-10	J. L. Woodward ...	....	Du	25	30	Km	371	22	4-16-63	J	D	
C-11	J. J. Keasley.....	Causey Drilling Co.	D	130	4	Km	352	65	4-16-63	J	D	
C-12	James Booth	....	D	130	4	Km	362	.....	....	J	D	
C-13	James Shaw	Posey Drilling Co.	D	174	2	Kg	347	90	5- 1-63	J	D	

Table 1.–*Records of selected wells and springs in Pickens County*–Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
D-1	E. R. Trapp	....	Du	47.5	30	Km	392	36.7	4-10-63	N	N	
D-2	J. W. Wilson	....	Du	35	30	Qt	372	31	4-10-63	J	D	
D-3	Andrews Chapel Church.	....	Du	58.0	30	Km	455	53.4	4-10-63	J	D	
D-4	Q. R. Dollar	....	Du	33	30	Km	405	28	4-10-63	J	D	
D-5	Hubert Caston	....	Du	25	30	Qt	371	17	4- 4-63	J	D,S	
D-6	G. G. Bain	....	Du	33.5	30	Qt	280	29.0	4- 1-63	J	D	
D-7	....do.	E. B. Norwood	D	235	4,2	Km	280	40	11-14-53	N	N	Casing: 4-in from surface to 47 ft; 2-in from 47 to 235 ft. Well dry in 1959.
D-8	J. B. Jaynes	....	Du	15.5	40	Qt	296	7.1	4- 4-63	N	N	
D-9	W. E. Carson	Posey Drilling Co.	D	105	2	Km	327	.....	....	J	D	
D-10	Liberty School	....	D	65	4	Km	327	18.1	4-10-63	J	P	
D-11	C. M. Fields	....	Du	17.0	30	Km	312	9.1	4- 5-63	J	D	
D-12	....do.	....	D	....	...	Km	312	.....	....	J	S	
D-13	Mrs. R. N. Bain	Reliable Home Improvement.	D	145	4	Km	300	32.1	2-27-63	J	S	Casing: 4-in from surface to 22 ft; none below.
D-14	R. H. Tilley	....	Du	15.3	30	Qt	375	10.3	4- 1-63	N	D	
D-15	C. L. Tilley	....	Du	26	30	Qt	375	.....	....	J	D	
D-16	Lawrence Moore	....	Du	26	...	Qt	376	22	4- 1-63	J	D	
E-1	Charles Patrick	....	Du	46	30	Qt	325	40	3-29-63	J	D	
E-2	Hubert Williamson	Clardy Drilling Co.	D	237	4	Km	345	107	3-29-63	J	D	
E-3	J. C. Joyner	....	Du	32	30	Qt	345	28	3-29-63	J	D	
E-4	Abrams Parade Service.	....	Du	25.0	30	Qt	345	22.8	4- 1-63	J	P	

E-5	James Cox	....	Du	18	30	Qt	343	9	4- 1-63	J	S	
F-1	Clarence Petty ...	....	Du	32	30	Qt	342	27.6	4- 4-63	M	D	
F-2	Lemon Smith......	....	Du	23	30	Qt	320	18	8-16-63	M	D	
F-3	Baptist Grove Church.	....	Du	32.0	30	Ke	282	19.1	8-16-63	C, M	P	
G-1	James Shaddox ...	Reliable Home Improvement.	D	315	4,2	Km	440	206	2-26-63	S	D	Casing: 4-in from surface to 300 ft; 2-in screen from 300 to 306 ft.
G-2	Woodrow Bush	....	Du	30.0	30	Ke	341	23.7	4-15-63	J	D	
G-3	C. L. Atkins	Clardy Drilling Co.	D	178	4	Km	352	50	4-15-63	J	D	Casing: 4-in from surface to 50 ft; equipped with filter to remove iron; sample collected after filtration.
G-4	John V. Keasler ..	....	Du	30	30	Km	338	25	8-16-63	M	D	
G-5	J. O. Brownlee ...	....	Du	26.0	30	Km	268	18.6	8-16-63	J	D	
G-6	Morris Ruffin	....	Du	26	30	Qt	371	22	8-27-63	J	D	
G-7	Oliver Cockrell ...	....	Du	32	30	Qt	339	.....	....	M	D	
G-8	W. R. Burgess	....	Du	25	30	Km	277	19	8-28-63	J	D	
G-9	Earl Williams	....	Du	20	30	Qt	266	17	8-28-63	M	D	
G-10	Mrs. Pearl Joner ..	....	Du	37.0	30	Ke	345	30.1	8-28-63	N	N	
G-11	R. E. Eaton	C. H. Murphy, Jr ..	D	5,500	...	....	300	.....	....	..	....	Oil test, sample log in Alabama Geol. Survey Bull. 64, p. 369.
H-1	Calvin L. Peeks ..	....	Du	25.0	30	Kg	262	16.9	5- 2-63	J	D	
H-2	Mrs. Turner	....	Du	22	30	Km	323	11	4- 5-63	J	D	
H-3	Henry Richards ...	Causey Drilling Co.	D	90	4	Km	324	64.8	4- 5-63	J	D,S	
H-4	A. L. Carpenter...	....	Du	60	30	Km	300	58	....	J	D	
H-5	John McDaniel....	....	D	....	4	....	427	.....	....	S	D,S	
H-6	Mrs. M. V. Brown..	Clardy Drilling Co.	D	385	4	Kg	374	90	9- 6-63	C	S	
H-7	W. C. Bonner	Causey Drilling Co.	D	155	4	Kg	260	.....	....	J	D	
*H-8	T. B. Woodard	....do...........	D	233	4	Kg	269	45	9- 6-63	J	D	
H-9	John Tyler	....do...........	D	210	4	Kg	269	45	9- 6-63	J	D	
H-10	Mineral Springs Baptist Church.	....do...........	D	220	4	Km	380	120	4-15-63	S	P	
H-11	James H. Heritage.	Posey Drilling Co.	D	150	4	Km	327	100	8-28-63	J	D	Equipped with sand filter to remove iron.
H-12	McShan Lumber Co.	Causey Drilling Co.	D	220	4	Kg	249	10	1956	J	Ind	

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
H-13	M. H. Hodge......	Causey Drilling Co.	D	150	4	Kg	275	107	1960	J	D	
H-14	John Cockrell	....	Du	26	30	Km	310	24	9- 6-63	M	D	
H-15	Thomas Irvin.....	....	Du	20	30	Km	312	14	8-28-63	J	D	
H-16	Dayton Shepherd ..	Posey Drilling Co.	D	115	4	Km	288	70	1962	J	D	
H-17	D. H. Perrigin	....	D	96	4	Qt, Km	245	31	1957	J	D,S	
H-18	Rolston Oglesby ..	....	Du	19.0	30	Qal	211	6.2	8-29-63	J	D	
I-1	R. R. Pugh.......	Causey Drilling Co.	D	72	4	Kg	289	32	1-21-64	J	D,S	
I-2	James C. Johnson.	Posey Drilling Co.	D	95	2	Kg	294	.....	....	J	D	
I-3	Fred Plyman	....	Du	35.0	30	Kg	404	31.1	5- 2-63	J	D	
I-4	O. D. Bonner Sr...	....	Du	42	30	Kg	270	39	12-27-63	J	D,S	
I-5	O. D. Bonner Jr...	Posey Drilling Co.	D	70	4	Kg	270	40	12-27-63	J	D	
I-6	Ray H. Elmore....	Causey Drilling Co.	D	101	4	Kg	313	53	1957	J	D	
I-7	H. E. Jones	Reliable Home Improvement.	D	104	4,2	Kg	300	44	9-15-60	J	D	Casing: 4-in from surface to 84 ft; 2-in from 84 to 98 ft; 2-in brass screen from 98 to 104 ft.
I-8	C. E. Cook.......	Causey Drilling Co.	D	90	4	Kg	315	50	5- 2-63	J	D,S	
I-9	Raymond Lindsey..	....	Du	65	30, 24	Kg	358	.....	....	J	D	

I-10	J. L. Pratt	Causey Drilling Co.	D	104	4	Kg	277	20	9- 5-63	J	D	
I-11	B. E. Manning	Reliable Home Improvement.	D	136	4,2	Kg	329	88.3	4- 1-63	N	O	Casing: 4-in from surface to 116 ft; 2-in screen from 116 to 124 ft.
I-12	C. P. Odom.......	....	Du	50.0	30	Kg	272	46.1	5-17-63	M	D	
I-13	G. R. Langdon....	Reliable Home Improvement.	D	105	4,2	Kg	323	49	9-15-60	J	D,S	Casing: 4-in from surface to 85 ft; 2-in from 85 to 99 ft; 2-in screen from 99 to 105 ft.
I-14	Mrs. Frank Lathrop	J. K. Scott	D	90	5,3	Kg	237	45	1946	C	D	Casing: 5-in from surface to 85 ft; 3-in screen from 85 to 90 ft.
I-15	Reform Gin Co....	....	D	90	4,2	Kg	240	5.1	3-31-50	N	N	Originally flowed, well destroyed.
*I-16	City of Reform....	....	D	90	6	Kg	244	.....	....	T	P	
*I-17	....do..........	Layne-Central Co.	D	88	6	Kg	238	.....	....	T	P	
I-18	Southern Natural Gas Co.	....	D	113	16	Kg	247	90	1935	T	Ind	
I-19	....do..........	Layne-Central Co.	D	220	16	Kck	247	.....	....	T	Ind	
I-20	....do..........	....do..........	D	113	16	Kg	249	.....	....	N	N	
*I-21	....do..........	....do..........	D	113	18	Kg	249	.....	....	T	P	
I-22	....do..........	....do..........	D	235	18, 10	Kck	249	23.1	1-28-64	N	O	Casing: 18-in from surface to 185 ft; 10-in screen from 185 to 235 ft. See driller's log.
I-23	Clarence Elmore ..	Posey Drilling Co.	D	125	2	Kg	362	91	12-16-63	J	D,S	
I-24	Billy Bollin	....	Du	50	30	Kg	362	45	12-16-63	J	D,S	
J-1	J. L. Abrams	Causey Drilling Co.	D	62	4	Kg	420	.....	....	J	D,S	
J-2	Homer Connell ...	....	Du	25.0	30	Kg	387	17.0	5-17-63	J	D	
J-3	C. D. Elmore	Posey Drilling Co.	D	65	2	Kg	336	.....	....	C	D,S	
J-4	Ward Fair	Causey Drilling Co.	D	100	4	Kg	431	58	1962	J	D,S	
J-5	Cole Fair	....	Du	37	30	Kg	408	28	11-14-63	J	D,S	
J-6	J. R. Sheperd.....	Causey Drilling Co.	D	185	4	Kg	501	135	12-27-63	S	D,S	
J-7	G. A. Free	....do..........	D	67	4	Kg	363	35	12-16-63	J	D,S	
J-8	Marlin Burkhalter..	....do..........	D	100	4	Kg	393	.....	....	J	D,S	
J-9	E. W. Burkhalter ..	Posey Drilling Co.	D	150	2	Kg	441	125	12-17-63	J	D,S	

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
J-10	Mitch Connely	Reliable Home Improvement.	D	200	4,2	Kck	343	80	9-15-60	..	....	Casing: 4-in from surface to 190 ft; 2-in stainless steel screen from 190 to 200 ft.
J-11	Wayman Woolbright	Causey Drilling Co.	D	170	4	Kg	434	.....	....	C	D,S	
J-12	C. C. Estes	....do..........	D	180	4	Kg	418	115	12-17-63	J	D	
*J-13	Jerome Hickman...	....do..........	D	150	4	Kck	313	.....	....	S	D	Equipped with filter to remove iron.
J-14	Joe Cork.........	....do..........	D	90	4, 2½	Kg	359	40	9-11-51	J	D,S	Casing: 4-in from surface to 84 ft; 2½-in screen from 84 to 90 ft. See driller's log.
J-15	Paul Hannah......	....do..........	D	93	4	Kg	357	.....	....	J	D,S	
J-16	L. Roy Lowe	....do..........	D	100	4	Kg	361	.....	....	C	D,S	
J-17	J. E. Benton......	....	Du	65	30	Kg	425	62	12-16-63	J	D,S	
K-1	George Koon	Causey Drilling Co.	D	74.0	4,2	Kg	345	40	4- 6-51	J	D,S	Casing: 4-in from surface to 68 ft; 2-in screen from 68 to 74 ft. See sample log.
K-2	S. H. Johnson	....do..........	D	70	4	Kg	325	35	12-27-63	J	D,S	
K-3	F. D. Gilliam.....	Ace Drilling Co...	D	78.5	4,2	Kg	327	.....	....	..	....	Casing: 4-in from surface to 64.5 ft; 2-in screen from 64.5 to 72.5 ft. See driller's log.
K-4	....do..........	....do..........	D	201	...	....	327	.....	....	..	....	Test hole. See driller's log.

K-5	City of Gordo.....	Gray Artesian Well Co.	D	460	6	Kck	278	35	11- 2-50	T	N	Casing: 6-in from surface to 400 ft; screen from 400 to 460 ft. See driller's log.
K-6	J. C. Bridges.....	....	Du	45	...	Kg	427	37	11-14-63	J	D,S	
K-7	J. D. Wilson......	Causey Drilling Co.	D	140	4	Kg	427	.....	....	J	D	
K-8	J. C. Shirley	....do...........	D	160	4,2	Kck	308	40	2- 3-55	J	D	Casing: 4-in from surface to 143 ft; 2-in screen from 143 to 149 ft. See driller's log.
K-9	Minton Mullenvix..	....do...........	D	....	4	....	303	.....	....	J	D	
K-10	Herbert Mullenvix .	....do...........	D	....	4	....	323	.....	....	S	D	
K-11	City of Gordo.....	Layne-Central Co .	D	143	16	Kck	239	+14.5	3-13-63	T	P	Casing: 16-in from surface to 123 ft; screen from 123 to 143 ft. Flows when Gordo city wells are not pumped. Flow 16.5 gpm.
K-12	....do...........	--Adams	D	160	3	Kck	242	+10.0	3-13-63	N	N	Abandoned. Flows when Gordo city wells are not pumped. Estimated flow 10 gpm.
*K-13	....do...........	H. W. Peerson Drilling Supply Co.	D	166.0	8,6	Kck	242	+ 2	9-19-51	T	P	Casing: 8-in from surface to 124 ft; 6-in screen from 124 to 166 ft. Flows when Gordo city wells are not pumped. Estimated flow 3 gpm. See driller' log.
K-14	Mrs. Frank Atkins .	Frank Atkins	D	167	3,2	Kck	251	3.4	4-16-63	N	N	Well flows when Gordo city wells are not pumped.
K-15	City of Gordo.....	Layne-Central Co .	D	196	...	....	250	.....	....	..	....	Test hole, near city water tower, exact location unknown. See sample log.
K-16	Mrs. Olin E. Tilley	....	Du	76	30	Kg	308	.....	....	J	D	
K-17	E. D. Lindsay	Causey Drilling Co.	D	114	4	Kg	286	35	11-21-63	J	D	
K-18	B. M. House......	J. K. Scott	D	123	5	Kg	253	75	6-28-46	C	D,S	Casing: 5-in from surface to 118 ft; screen from 118 to 123 ft. See driller's log.
K-19	....do...........	Causey Drilling Co.	D	100	4	Kg	272	40	11-21-63	J	D	
K-20	W. J. House	....do...........	D	106	4,2	Kg	289	30	12- 3-63	C	D,S	Casing: 4-in from surface to 90 ft; screen below.

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
K-21	Louise Sanders . . .	. . . .	D	. . . .	3	. . . .	221	3.1	5-17-63	C	D	Flowed until 1961.
K-22	James Floyd	Posey Drilling Co.	D	100	2	Kg	298	. . . . .	. . . .	J	D	
K-23	James O. Elmore . .	. . . . do.	D	135	4	Kg	339	100	12-10-63	J	D,S	
K-24	Ralph Elmore	Causey Drilling Co.	D	107	4	Kg	330	70	12-10-63	J	D	
K-25	Frank Wiers	Posey Drilling Co.	D	85	2	Kg	318	. . . . .	. . . .	J	D	
K-26	--McGee	Reliable Home Improvement.	D	123	4	Kg	354	. . . . .	. . . .	J	D	Equipped with filter to remove iron.
K-27	Dan Pate.	. . . .	Du	43	30	Kg	405	38	12-17-63	J	D,S	
K-28	W. K. Byars	Causey Drilling Co.	D	170	4	Kg	370	. . . . .	. . . .	C	D,S	
K-29	Jack Pate.	Posey Drilling Co.	D	192	4	Kg	347	112	7- -63	J	D	See driller's log.
K-30	N. L. House	. . . . do.	D	160	4	Kg	283	80.2	2-24-64	N	. . . .	
K-31	Naaman Fair.	Causey Drilling Co.	D	140	4	Kg	379	100	12-10-63	J	D,S	
K-32	W. D. Stevens	Posey Drilling Co.	D	69	4	Kg	326	45	12- 3-63	J	D,S	
L-1	Robert Driver.	Reliable Home Improvement.	D	65	4	Kg	265	18	9-15-60	J	D	Casing: 4-in from surface to 60 ft; 4-in slotted casing from 60 to 65 ft.
L-2	W. P. Lowe	Causey Drilling Co.	D	110	4	Kg	295	15	1959	J	D,S	
L-3	R. C. Noland	Posey Drilling Co.	D	100	4	Kg	217	. . . . .	. . . .	J	D,S	
L-4	Joe O. Jennings . .	. . . .	Du	20	30	Qt	240	. . . . .	. . . .	J	D	

L-5	H. K. Simpson	Causey Drilling Co.	D	110	4,2	Kg	254	30	11-21-63	J	D	
L-6	Duke Windham	....do....	D	96	4,2	Kg	225	10	7- -51	J	D,S	Casing: 4-in from surface to 90 ft; 2-in screen from 90 to 96 ft. Equipped with filter to remove iron.
L-7	J. R. Henderson	Posey Drilling Co.	D	86	2	Kg	295	64	3- 1-63	J	D	See driller's log.
L-8	Archie R. Brown	Causey Drilling Co.	D	106	4	Kg	298	.....	....	J	D	
L-9	Allen Reynolds	....do....	D	113	6	Kg	269	12	11-12-63	C	D,S	
L-10	R. L. McJenkin	....	Du	40	30	Km	332	42	11- 7-63	J	D,S	
L-11	E. D. McGee	Posey Drilling Co.	D	200	2	Kg	293	.....	....	J	D	
L-12	C. C. Walker	....	Du	48	30	Kg	265	45	12- 3-63	J	D,S	
L-13	E. P. Brown	Causey Drilling Co.	D	212	4,2	Kg	373	60	12- 3-63	C	D,S	
L-14	Paul Sellers	....do....	D	125	4	Kg	297	65	11- 7-63	J	D,S	Equipped with sand filter to remove iron.
L-15	C. N. Parsons	....do....	D	74	4,2	Kg	262	14	9- -57	J	D	Casing: 4-in from surface to 68 ft; 2-in brass screen from 68 to 74 ft. Equipped with sand filter to remove iron.
M-1	John D. Ammons	....	Du	62	30	Km	300	58	9- 6-63	J	D	
M-2	J. E. Gore	Reliable Home Improvement.	D	192	4,2	Km	397	174	2-26-63	S	D	Casing: 4-in from surface to 186 ft; 2-in brass screen from 186 to 192 ft.
M-3	Sam C. Yarbrough	....	Du	33	30	Km	332	.....	....	J	D,S	
M-4	Mrs. S. S. Pearson	....	Du	40	...	Km	330	34	9- 3-63	J	D	
M-5	Mrs. Lily Burgin	....	Du	36	30	Ke	407	31	8-29-63	J	D	
M-6	R. G. Furguson	....	Du	48	30	Km	410	43	9- 3-63	J	D	
M-7	Margie Robinson	....	D	172	4	Kg	233	142	11-21-63	J	D	Equipped with sand filter to remove iron.
M-8	J. W. Owings	....	Du	21	30	Qt	250	18	11-21-63	J	D,S	
M-9	Mrs. Clayton Fancher.	....	Du	13.0	30	Qal	289	4.6	8-29-63	M	D	
M-10	J. W. Campbell	....	D	140	1½	Km	296	.....	....	C	S	
M-11	....do....	....	Du	30	30	Km	300	18	8-29-63	J	D	
M-12	W. P. Ferguson	E. B. Norwood	D	330	4	Kg	380	100	8-29-63	J	S	Equipped with micromet feeder to stabilize iron.
M-13	John Lucas	Reliable Home Improvement.	D	200	...	Km	387	.....	....	N	N	

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
M-14	John Lucas.......	E. B. Norwood....	D	316	4	Kg	387	100	4- 2-63	S	D	
M-15	City of Carrollton .	Layne-Central Co .	D	160	8	Kg	271	57	1935	T	P	Casing: 8-in from surface to 160 ft; bottom 25 ft slotted and gravel packed. See driller's log.
M-16	....do..........	....do..........	D	160	10, 6	Kg	271	.....	....	T	P	Casing: 10-in from surface to 120 ft; 6-in from 42 to 139.5 ft; 6-in bronze screen from 139.5 to 160 ft. See driller's log.
N-1	Mrs. Billingen	....	Du	20	30	Km	220	18	8-29-63	J	D	
N-2	C. P. Herrell	....	Du	25	30	Qt	333	22	8-27-63	J	D	
N-3	Braxton Oswalt ...	E. B. Norwood....	D	320	4,2	Km	310	50	8-16-63	C	D	Casing: 4-in from surface to 56 ft; 3-in from 56 to 96 ft; 2-in slotted casing from 96 to 310 ft. Equipped with sand filter to remove iron.
N-4	Sam B. Jones	....	Du	23	30	Qt	320	18	8-27-63	J	D,S	
N-5	James Butler	....	D	....	4	....	379	.....	....	C	D,S	
N-6	M. R. Lewis	....	Du	46	30	Qt, Ke	334	42	8-27-63	J	D,S	
N-7	J. P. Dill	E. B. Norwood....	D	425	3,2	Kg	314	125	8-27-63	S	S	

N-8	....do..........	....do..........	D	425	4,2	Km, Kg	314	42	4-21-54	J	D,S	Casing: 4-in from surface to 45 ft; 2-in perforated pipe from 45 to 361 ft. Equipped with sand filter to remove iron.
N-9	F. L. Varnon	....	Du	23	40	Qt	316	18	8-27-63	C	D	
N-10	Albert Goodman ..	....	Du	34.0	30	Ke	399	30.1	9- 2-63	J	D	
N-11	Jessie M. Temple .	....	Du	27.0	40	Qt	327	24.0	9- 2-63	N	N	
N-12	W. O. Gates	E. B. Norwood....	D	465	4	Kg	276	94	8-27-63	J	S	
N-13	J. H. Hickman	Causey Drilling Co.	D	520	4	Kg	307	50	1958	S	S	
O-1	W. H. Copeland ...	....	Du	35	30	Qt	320	30	8-16-63	J	D	
O-2	Mrs. McClure	Clardy Drilling Co.	D	....	4	....	275	.....	....	J	D	
O-3	K. A. Scott.......	....	D	320	...	Km	285	45	8-27-63	J	D	
O-4	Mrs. A. H. Juergens.	....	Du	34	30	Qt	285	20	8-16-63	J	D	
O-5	J. D. Cook	....	D	500	4	Km, Kg	305	80	9- 9-63	J	D	
O-6	Johnson Bros	Charles Reeder ...	D	300	4	Km	290	.....	....	N	N	Abandoned; inadequate supply of water.
O-7	....do..........	....	Du	70	30	Ke	290	62	8-16-63	J	D	
O-8	J. D. Cook	....	D	....	4	....	153	.....	9- 9-63	F	S	Estimated flow 1 gpm.
O-9	....do..........	....	D	....	4	....	142	.....	9- 9-63	F	S	Flow 42.5 gpm
O-10	....	U.S. Army, Corps of Engineers.	D	84.3	...	....	145	34	5- 4-38	..	....	Test hole. See driller's log.
O-11	O. A. Stapp.......	B. C. Kelly........	D	200	4	Ke	145	.....	10- 4-63	F	S	Flow 37.5 gpm.
O-12	....do..........	....	D	390	...	Ke, Km	155	.....	9-10-63	F	D,S	Flow 9 gpm.
O-13	Cato Lang........	....	Du	28	30	Qt	302	24	8-27-63	J	D,S	
*O-14	J. H. Hickman	Causey Drilling Co.	D	100	4	Ke	269	30	8-27-63	J	D,S	
P-1	J. R. Long	....	D	....	6	....	158	.....	9-20-63	F	S	Flow 3 gpm.
P-2	....do..........	C. W. Blount	D	390	4,2	Km	268	60	10- 4-63	J	D,S	
*P-3	Pickensville Boat Landing.	E. B. Norwood....	D	360	4,2	Ke, Km	141	.....	3- 6-63	F	P	Casing: 4-in from surface to 42 ft; 2-in perforated pipe from 42 to 360 ft. Flow 60 gpm. See driller's log.
P-4	St. Louis and San Francisco Railroad.	Layne-Central Co .	D	290	8	Ke, Km	142	.....	3- 7-63	F, R	D	Flowing 58 gpm on Nov. 28, 1940; 12 gpm on March 7, 1963.

Table 1.–*Records of selected wells and springs in Pickens County*–Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
P-5	Mrs. Sanders......	....	D	....	6	....	135	+ 1	10- 4-63	N	S	Estimated flow 2 gpm.
P-6	....	U.S. Army, Corps of Engineers.	D	100.0	...	....	134	12	2-14-38	..	....	Test hole. See driller's log.
P-7	....	....do..........	D	99.8	...	....	139	22	2-15-38	..	....	Do.
P-8	....	....do..........	D	102.0	...	....	139	20	2-18-38	..	....	Do.
P-9	....	....do..........	D	78.0	...	....	135	2	7-17-38	..	....	Do.
P-10	James Wright	E. B. Norwood....	D	348	4,2	Ke, Km	232	64	9-18-63	J	D,S	Casing: 4-in from surface to 21 ft; 2-in slotted pipe from 21 to 254 ft. See driller's log.
P-11	R. W. Sanders	....	D	....	4	....	138	.....	3- 6-63	F	N	Flowing 9 gpm on Nov. 28, 1940; 6 gpm on March 3, 1963.
P-12	....	U.S. Army, Corps of Engineers.	D	21.0	...	....	134	20	5-26-38	..	....	Test hole. See driller's log.
Q-1	Big Creek School..	E. B. Norwood....	D	232	4	Km	288	46	3- 6-63	S	P	Casing: 4-in from surface to 232 ft; bottom part of casing slotted. See driller's log.
Q-2	Roy Howard	....	Du	20	30	Qt	264	16	8-29-63	J	D	
Q-3	Walter W. Jones...	....	Du	25.0	30	Qt	321	22.0	9- 3-63	M	D	
Q-4	Don Campbell.....	....	Du	25	30	Qt	198	19	10- 4-63	J	D	
Q-5	J. R. Cochrane....	Posey Drilling Co.	D	82	2	Km	213	.....	....	J	D	
Q-6	Luther Coleman...	....	Du	35	30	Qt, Ke	306	30	10-21-63	J	D,S	

Q-7	Belton Kelly	Posey Drilling Co.	D	125	4	Ke, Km	304	.....	....	J	S	
Q-8	J. C. Henderson	....	Du	32.0	30	Qt	296	30.0	10-21-63	J	D	
Q-9	Mrs. J. A. Coleman	McCracken and Ball.	D	240	4	Km	299	.....	....	J	S	
Q-10	George T. Driver	Causey Drilling Co.	D	250	4	Km	286	113	6-18-56	C	S	
Q-11	Lake Parker	C. W. Blount	D	300	4	Km	302	40.9	11- 7-63	J	S	
Q-12	Kenyon G. Meeks	....do	D	300	4	Km	307	.....	....	J	D	
Q-13	B. L. Meeks	E. B. Norwood	D	256	4	Km	315	36	3- 3-53	N	N	Casing: 4-in from surface to 42 ft; no record below. Abandoned in 1955 because of sand.
Q-14	....do	C. W. Blount	D	300	4	Km	315	20	1954	J	D	
Q-15	Floyd Blakeney	....	Du	23.0	30	Qt	303	19.0	10-21-63	J	D	
Q-16	Homer Sanders	E. B. Norwood	D	350	4	Km	250	.....	....	C	N	
Q-17	M. C. Trapp	C. W. Blount	D	350	4	Ke, Km	142	.....	10-18-63	F	D,S	Estimated flow 4 gpm.
Q-18	....do	....	D	390	6	Ke, Km	135	.....	10-18-63	F	S, Irr	Casing: 6-in from surface to 35 ft; none below. Flow 34 gpm.
Q-19	A. L. Hall	....	D	250	4	Km	290	.....	....	C	S	
R-1	J. R. Jones	E. B. Norwood	D	318	4,2	Km, Kg	244	54	4-26-54	..	....	Casing: 4-in from surface to 45 ft; 2-in slotted pipe from 45 to 300 ft.
R-2	H. M. Kilpatrick	....	D	....	4	....	197	.....	9- 3-63	F	N	Estimated flow 12 gpm.
R-3	....do	....	D	....	4,3	....	197	.....	9- 3-63	F	N	Estimated flow 5 gpm.
R-4	W. T. Lipsey, Jr	C. W. Blount	D	389	4,2	Kg	248	40	11-12-63	J	D,S	
R-5	Curtis Noland	....	Du	14	30	Qt	211	.....	....	J	D,S	
R-6	State of Alabama	....	D	....	3,2	....	197	.....	3-19-63	F	N	Estimated flow 10 gpm.
R-7	R. E. Hook	E. B. Norwood	D	270	4	Km, Kg	218	.....	....	J	D	Casing: 4-in from surface to 33 ft; none below. Equipped with sand filter to remove iron.
*R-8	Hugh Pate	C. W. Blount	D	700	4	Km (?), Kg, Kck	204	.....	10- 8-63	F	D	Supplies fish pond. Flow 30 gpm.
R-9	....do	....	D	85	6	Km	204	.....	10- 8-63	F	....	Supplies fish pond. Estimated flow 2 gpm.
R-10	J. E. Cole	....	Du	45	36	Km	264	43	10-18-63	J	D,S	

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
R-11	W. F. Owings.....	....	Du	60	30	Km	238	50	11-17-63	J	D,S	Equipped with micromet feeder to stabilize iron.
R-12	Hugh Pate........	C. W. Blount......	D	350	4	Km, Kg	174	.....	10- 8-63	F	S	Flow 15 gpm.
R-13	R. C. Munroe	Lynn McCracken ..	D	265	4	Qt, Km	329	38	1961	J	D,S	
R-14	Floyd Olin Lee ...	Posey Drilling Co.	D	195	2	Km	324	110	1960	J	D	Casing: 2-in from surface to 180 ft; 2-in screen from 180 to 195 ft.
R-15	C. H. Davidson ...	....	Du	29	30	Qt	301	26	10-25-63	J	D	
R-16	Hugh Pate	C. W. Blount	D	350	4	Km, Kg	204	.....	....	J	P	
R-17	....do..........	....	D	350	4	Km, Kg	175	.5	10- 4-63	N	S	
*R-18	....do..........	....	D	350	4	Km (?), Kg	176	.....	9-20-63	F	S	Flow 37.5 gpm.
S-1	Price Gray	Ace Drilling Co...	D	257	4,2	Kg	262	50	11-13-63	J	D,S	Equipped with filter to remove iron.
S-2	S. D. Gray........	Posey Drilling Co.	D	75	2	Kg	189	12	11-13-63	J	D	
S-3	James F. McCool..	....	Du	32	30	Km	260	26	11-13-63	J	D,S	
T-1	E. M. Bedford	Causey Drilling Co.	D	86	4	Kg	320	50	11-14-64	J	D,S	
T-2	Joe McCool	Reliable Home Improvement.	D	205	4	Kg	352	133	9-14-60	J	D,S	Casing: 4-in from surface to 143 ft; none below.

T-3	C. G. Latham.....	Causey Drilling Co.	D	106	4	Kg	318	50	12-10-63	J	D,S	
T-4	J. E. Billings.....	....do...........	D	90	4	Kg	392	.....	....	J	D,S	
T-5	A. M. Gay........	....do...........	D	73	4	Kg	288	.....	....	J	D,S	
T-6	J. C. Sutton......	Reliable Home Improvement.	D	143	4,2	Kg	257	13	9-15-60	J	D,S	Casing: 4-in from surface to 133 ft; 2-in from 133 to 137 ft; 2-in screen from 137 to 143 ft.
T-7	J. C. Hartley.....	....do...........	D	75	4,2	Kg	272	40	9-15-60	J	D,S	Casing: 4-in from surface to 67 ft; 2-in from 63 to 69 ft; 2-in screen from 69 to 75 ft. Equipped with sand filter to remove iron.
T-8	J. E. Burkhalter..	....	Du	32	30	Km	276	29	12- 3-63	J	D,S	
T-9	R. S. Allen, Jr....	....	Du	28	30	Km	333	25	11-22-63	J	D	
U-1	Robert Thomas....	....	Du	30	30	Kg	237	28	11-16-63	J	D,S	
U-2	Alice Jones......	....	D	....	4	....	265	57.4	11-22-63	J	S	Equipped with filter to remove iron.
U-3	George Lewis....	....	D	184	4	Kg	210	18	10-16-63	J	D,S	
U-4	Gulf States Paper Corp.	....	D	80	2	Kg	184	.....	10-16-63	F	N	Estimated flow ¼ gpm.
U-5	Revis H. Sanders..	C. W. Blount.....	D	290	4	Kg	276	60	11-22-63	J	D,S	
U-6	....do...........	....	Du	28	36	Km	276	18	11-22-63	J	D	
U-7	J. B. Craft.......	Causey Drilling Co.	D	....	4	....	238	72.6	11-22-63	J	D,S	Equipped with sand filter to remove iron.
V-1	B. E. Abston.....	Posey Drilling Co.	D	130	2	Km	307	102	11-22-63	J	D	
V-2	W. L. Craft.......	Causey Drilling Co.	D	300	4	Kg	238	10	11-22-63	J	D,S	
V-3	Kenneth R. Sanders	C. W. Blount......	D	200	4	Kg	217	.....	....	J	S	
V-4	W. L. Craft.......	....do...........	D	280	4	Kg	285	10	11-22-63	J	D,S	
W-1	H. E. Windle.....	....do...........	D	440	4,2	Kg	227	.....	....	C	D,S	
W-2	Mrs. Sallie Cunningham.	....	D	200	4	Km	179	+ 8.5	11-27-40	N	N	Flowing 33 gpm Nov. 27, 1940; estimated flow 25 gpm Oct. 16, 1963.
W-3	....do..........	....	D	....	4	....	179	.....	10-11-63	F	N	Estimated flow 1 gpm.
W-4	....do..........	....	D	....	4	....	173	.....	10-16-63	F	N	Flow 16.5 gpm.
W-5	....do..........	....	D	....	...	....	176	.....	10-16-63	F	N	Estimated flow 3 gpm.
W-6	....do..........	....	D	200	4	Km	173	+ 9.5	11-27-40	N	N	Flowing 26 gpm Nov. 27, 1940; estimated flow 15 gpm Oct. 16, 1963.

Table 1.–*Records of selected wells and springs in Pickens County*–Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
W-7	Albert G. Noland..	Reliable Home Improvement.	D	231	4,2	Km	275	94	9-15-60	J	D	Casing: 4-in from surface to 184 ft; 2-in from 184 to screen; base of screen at 226 ft.
W-8	R. E. Hook.......	E. B. Norwood....	D	234	4	Km	165	1	2-13-63	J	P	Casing: 4-in from surface to 23 ft; no record below; well flows during wet weather.
W-9	Mrs. E. H. Anders.	C. W. Blount	D	229	...	Km	190	84	5- -59	..	D,S	
W-10	R. B. Somerville ..	....	D	400	4	Km	276	73.0	10-25-63	N	N	Casing: 4-in from surface to 58 ft; none below. Water level 20 ft in 1950 and 45 ft in January 1963.
W-11	Kirksey and Amason.	B. C. Kelly.......	D	200	4	Km	155	.....	10-11-63	F	N	Estimated flow ⅓ gpm.
W-12	....do..........	E. B. Norwood....	D	425	4	Km, Kg	155	.....	10-11-63	F	S	Casing: 4-in from surface to 44 ft; none below. Flow ½ gpm.
W-13	George Owens	....	D	450	4	Km, Kg	142	.....	11- 4-63	F	N	Estimated flow 40 gpm.
W-14	....do..........	E. B. Norwood....	D	250-300	4	Km	143	.....	11- 4-63	F	N	Reported flow 80 gpm in 1955; flow less in 1963 because discharge has been partially plugged. Estimated flow 10 gpm.

W-15	....do..........	....	D	250-300	3	Km	146	.....	11- 4-63	F	D,S	Flow 4.5 gpm.
W-16	Kirksey and Amason.	B. C. Kelly.......	D	200	4	Km	143	.....	10-11-63	F	D,S	Flow 4 gpm.
W-17	....do..........	....do..........	D	200	4	Km	143	.....	10-11-63	F	D	Flow 20 gpm.
W-18	....do..........	....do..........	D	200	4	Km	142	.....	10-11-63	F	S	Flow 14 gpm.
W-19	....do..........	....do..........	D	200	3	Km	145	.....	10-11-63	F	D,S	Flow 2.8 gpm.
W-20	....do..........	E. B. Norwood....	D	255	4	Km	153	13	2-17-53	C	D	Casing: 4-in from surface to 33 ft; no record below.
W-21	S. E. Murphy......	B. C. Kelly	D	260	4	Km	195	20	10-15-63	J	D	Casing: 4-in from surface to 40 ft; none below.
W-22	R. H. Kirksey	....	D	....	4	....	155	.....	10-15-63	F	N	Discharges into fish pond. Estimated flow 5 gpm.
W-23	....do..........	....	D	....	4	....	150	.....	10-15-63	F	S	Flow 22 gpm.
W-24	Kirksey and Amason.	B. C. Kelly	D	200	4	Km	138	.....	10-11-63	F	N	Flow 46.5 gpm.
W-25	C. L. Montgomery .	Lynn McCracken ..	D	240	3	Km	147	.....	10-15-63	F, J	D	Flow 5 gpm.
W-26	J. L. Rice........	....do..........	D	200	3	Km	140	.....	10-15-63	F, J	D	Flow 10 gpm.
W-27	B. C. Kelly, Sr ...	....do..........	D	280	...	Km	139	.....	10-15-63	F, J	D	Flow 5 gpm.
W-28	Kirksey and Amason.	B. C. Kelly.......	D	200	4	Km	140	.....	10-11-63	F	N	Flow 2 gpm.
W-29	....do..........	....do..........	D	200	4	Km	141	.....	10-11-63	F	S	Flow 6 gpm.
X-1	Mamie Trull	Clardy Drilling Co.	D	350	4	Km	285	.....	....	J	D,S	
*X-2	Harold Garrison...	....do..........	D	380	4	Km	285	75	10-21-63	J	D	
X-3	Thomas Parker....	C. W. Blount......	D	900	4	....	290	.....	....	C	D,S	
X-4	C. E. Martin......	E. B. Norwood....	D	390	4	Ke, Km	248	.....	....	C	D,S	Casing: 4-in from surface to 60 ft; none below.
X-5	Hester Ball	....	D	....	4	....	152	.....	9-10-63	F	D	Flow 1 gpm.
X-6	St. Louis and San Francisco Rail-road.	....	D	....	4	....	145	.....	9-18-63	F	D	Estimated flow 6 gpm.
X-7	Dicie Cole	....	D	....	4	....	143	.....	9-10-63	F	D,S	Estimated flow ¼ gpm.
X-8	D. K. Watson	C. W. Blount	D	406	4,2	Km	274	100	10-18-63	J	D,S	Casing: 4-in from surface to 147 ft; 2-in from 147 to 406 ft.
X-9	H. M. Stapp.......	Burl Drilling Co...	D	258	8	Km	174	.....	....	T	Irr	Casing: 8-in from surface to 40 ft; no record below. Pumped at 500 gpm when drilled. Flowed when drilled.

Table 1.–*Records of selected wells and springs in Pickens County*–Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
X-10	H. M. Stapp.......	Lynn McCracken ..	D	560	4	Km, Kg	174	2.1	4-20-48	C	N	Well flowed when drilled.
X-11	....do..........	Burl Drilling Co...	D	298	8	Km	180	.....	....	T	Irr	Casing: 8-in from surface to 40 ft; no record below. Reported capacity, 500 gpm.
X-12	J. D. Sanders.....	....	D	....	3	....	145	.....	9-18-63	F	D,S	Flow 2 gpm.
X-13	Gulf States Paper Corp.	....	D	....	4	....	138	.....	9-10-63	F	N	Estimated flow 3 gpm.
X-14	....do..........	....	D	....	4	....	134	.....	10-25-63	F	P	Flow 2.3 gpm.
X-15	Lois Robertson ...	....	D	....	8	....	151	+ 1.0	11-18-63	N	D,S	Estimated flow 2 gpm.
X-16	Willey Macaa	E. B. Norwood....	D	444	4	Ke, Km, Kg	160	.....	11-18-63	F	D,S	Casing: 4-in from surface to 40 ft; none below. Flow 3.5 gpm.
*X-17	City of Aliceville .	Layne-Central Co .	D	443	12, 8	Kg	198	27	1943	T	P	Casing: 12-in from surface to 393 ft; 8-in screen from 393 to 443 ft. See driller's log.
*X-18	....do..........	....do..........	D	492	12, 8	Kg	169	+ 3	1943	T	P	Casing: 12-in from surface to 368 ft; 8-in from 368 to 434 ft; 8-in screen from 434 to 484 ft. Reported capacity 730 gpm in 1943. See driller's log.

*X-19	....do...........	....do...........	D	354	12, 8	Km	173	13	10- -43	T	P	Casing: 12-in from surface to 300 ft; 8-in screen from 300 to 350 ft. Reported capacity 770 gpm in 1943. See driller's log.
*X-20	H. C. Horton......	-- Adams.........	D	130	3	Ke	151	+ .5	11- 4-63	N	S	Estimated flow 2 gpm.
X-21	....do...........	....	D	....	5	....	146	.....	11- 4-63	F, J	D,S	Do.
X-22	....	Layne-Central Co .	D	610	...	....	160	.....	....	..	....	Test hole, located in sec. 26, T. 22 S., R. 16 W.; exact location unknown. See driller's log.
*X-23	Aaron Harris......	....do...........	D	438	12, 8	Km	158	+ .5	9- 9-52	N	N	Casing: 12-in from surface to 279 ft; 8-in screen from 279 to 304 ft; 8-in casing from 304 to 348 ft; 8-in screen from 348 to 373 ft. Reported capacity 765 gpm in 1943. See driller's log.
X-24	Mrs. Lois Robertson.	....	D	....	3	....	149	.....	11-18-63	F	S	Flow 2 gpm.
X-25	M. C. Collins.....	....	D	....	3	....	149	.....	11-18-63	F	D,S	Estimated flow 1 gpm.
X-26	Jim McCaa	E. B. Norwood....	D	423	4,2	Ke, Km, Kg	149	.....	9-18-63	F	D,S	Casing: 4-in from surface to 42 ft; 2-in perforated pipe from 42 to 423 ft. Estimated flow 1.5 gpm. See driller's log.
*X-27	City of Aliceville .	....do...........	D	444	4,2	Ke, Km, Kg	148	.....	8-15-63	F, J	P	Casing: 4-in from surface to 60 ft; 2-in perforated pipe from 60 to 444 ft. Flow 10.7 gpm. See driller's log.
X-28	Gulf States Paper Corp.	....	D	....	4	....	133	.....	10-28-63	F	N	Flow 4 gpm.
X-29	....do...........	....	D	....	3	....	131	.....	10-28-63	F	N	Flow 20 gpm.
X-30	....do...........	....	D	....	3	....	129	.....	10-28-63	F	N	Flow 4 gpm.
X-31	....do...........	....	D	....	4	....	130	.....	10- 7-63	F	S	Flow $^3/_4$ gpm.
X-32	H. C. Horton......	....	D	300	8	Ke, Km	149	3	11- 4-63	T	Irr	Casing: 8-in from surface to 20 ft; no record below. Well had not been used for 4 years in 1963.

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
Y-1	U.S. Army, Corps of Engineers.	U.S. Army, Corps of Engineers.	D	19.2	...	....	122	.....	5- -38	..	....	Test hole. See driller's log.
Y-2	Mrs. J. E. Seymer	....	D	....	2	....	145	.....	9-18-63	F	D,S	Flow 3 gpm.
Y-3	....do....	....	D	....	4	....	144	.....	9-10-63	F	S	Flow ½ gpm.
Y-4	Gulf States Paper	....	D	....	4	....	135	.....	10-28-63	F	N	Flow 19 gpm.
Y-5	R. L. Zigler	C. W. Blount	D	400	4	Ke, Km	130	.....	9-21-63	F	S	Flow 28 gpm.
Y-6	Paul Thompson	....	D	500	4	Ke, Km	145	.....	9-26-63	F	D,S	Flow 16.5 gpm.
Y-7	W. B. Morgan	....	D	500	3	Ke, Km	140	.....	9-26-63	F	D,S	Flow 5 gpm.
Y-8	....do....	E. B. Norwood	D	525	1½	Ke, Km	155	18	9-26-63	J	D	
Y-9	R. L. Zigler	C. W. Blount	D	500	4,2	Ke, Km	150	.....	9-21-63	F	S	Flow 4 gpm.
Y-10	....do....	....	D	....	3	....	157	.....	9-26-63	F, J	D	Flow 1 gpm.
Z-1	....do....	C. W. Blount	D	600	3	Ke, Km	130	.....	9-21-63	F	S	Flow 19 gpm.
Z-2	....do....	....do....	D	600	4	Ke, Km	150	.....	9-21-63	F	S	Flow 6 gpm.
Z-3	....do....	....do....	D	600	3	Ke, Km	140	.....	9-21-63	F	S	Flow 21.5 gpm.

Z-4	....do..........	....do..........	D	600	4	Ke, Km	155	.....	9-21-63	F	S	Flow 10 gpm.
*Z-5	G. C. Sanders.....	Posey Drilling Co.	D	580	4	Ke, Km	250	100	9-26-63	J	D,S	White clay reported from 500 to 580 ft.
Z-6	R. L. Zigler......	....	D	....	4	....	241	.....	....	J	D,S	
Z-7	Steve McBride	C. W. Blount	D	500	3	Ke, Km	135	.....	9-20-63	F	S	Estimated flow 10 gpm.
Z-8	Jake McBride.....	E. B. Norwood....	D	500	4,2	Ke, Km	163	18	9-20-63	J	D	Casing: 4-in from surface to 21 ft; 2-in perforated pipe from 21 to 400 ft. See driller's log.
Z-9	H. B. Hanson.....	C. W. Blount	D	500	4	Ke, Km	127	.....	9-20-63	F	S	Flow 6 gpm.
Z-10	Mrs. J. T. McDaniel.	....do..........	D	....	4	....	235	.....	....	J	D	
Z-11	H. B. Hanson.....	....do..........	D	500	4	Ke, Km	120	.....	9-20-63	F	N	Flow 4.5 gpm.
Z-12	S. V. Powell	....	D	....	4	....	120	.....	3-14-63	F	N	Estimated flow 2 gpm.
Z-13	....do..........	....	D	337	...	Ke	212	.....	....	C	S	
Z-14	....do..........	....	D	400	4,2	Ke, Km	126	.....	3-14-63	F	S	Flow 10 gpm.
Z-15	J. G. Lee	Sonat, Inc........	D	10,250	...	....	212	.....	....	N	N	Oil test, see sample log and electric log (pl. 2).
Z-16	Charles Goodwin..	....	D	500	4	Ke, Km	216	81.0	3-19-63	J	D	
Z-17	W. W. Boyd.......	Vent Smith	D	630	4,2	Ke, Km	196	20	3-19-63	C	D,S	Casing: 4-in from surface to 60 ft; 2-in from 350 to 630 ft.
Z-18	Town of Dancy....	--Johnson	D	452	...	Ke	184	45.9	3-14-63	C	P	
Z-19	R. R. Johnson	....	D	740	4	Ke, Km	164	8.4	3- 8-63	C	D,S	
AA-1	J. R. Brandon.....	....	D	....	...	....	144	.....	10-10-63	F	D,S	Flow 4 gpm.
AA-2	Mrs. F. C. Nickleson.	B. C. Kelly	D	....	4	....	138	.....	10-10-63	F	S	Estimated flow 2 gpm.
AA-3	....do..........	....do..........	D	....	4	....	140	.....	10-10-63	F	S	Flow 7 gpm.
AA-4	Richard Minor	....do..........	D	....	4	....	137	.....	10-10-63	F	D,S	Flow 13 gpm.
AA-5	T. L. Grayson	....	D	....	5	....	140	.....	10-10-63	F	D,S	Flow 7.2 gpm.
AA-6	H. B. James	....	D	180	2	Ke	130	.....	10-28-63	F	D,S	Flow 1 gpm.
AA-7	....do..........	....	D	180	3	Ke	130	.....	10-28-63	F	D,S	Flow 16 gpm.
AA-8	Kenneth Owens ...	....	D	....	3	....	133	.....	10- 7-63	F	D,S	Flow 2.5 gpm.

Table 1.—*Records of selected wells and springs in Pickens County*—Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
AA-9	Gulf States Paper Corp.	....	D	....	4	....	132	.....	10-28-63	F	S	Flow 6.5 gpm.
AA-10	F. C. Huyck Felt Co.	Layne-Central Co .	D	560	18, 10	Km	160	27.0	1-13-56	T	Ind	Casing: 18-in from surface to 421 ft; 10-in screen from 421 to 501 ft. Reported yield 500 gpm. See driller's log.
AA-11	....	U.S. Army, Corps of Engineers.	D	84.6	...	....	124	21	5- 2-38	..	....	Test hole. See driller's log.
AA-12	Gulf States Paper Corp.	....	D	....	4	....	126	.....	10-28-63	F	N	Flow 12 gpm.
AA-13	....do........	....	D	....	5	....	125	.....	10-28-63	F	N	Flow 3 gpm.
AA-14	....	U.S. Army, Corps of Engineers.	D	108.2	...	....	121	9.5	4-28-38	..	....	Test hole. See driller's log.
AA-15	R. L. Zigler......	....	D	....	4	....	135	.....	3- 8-63	F, J	D	Flow 50 gpm.
AA-16	....do........	....	D	....	4	....	129	.....	3- 8-63	F	S	Flow 37 gpm.
AA-17	....do........	....	D	....	4	....	129	.....	3- 8-63	F	S	Estimated flow 10 gpm.
AA-18	....do........	....	D	....	4	....	130	.....	3- 8-63	F	S	Do.
AA-19	....	U.S. Army, Corps of Engineers.	D	29.5	...	....	116	22.0	5-26-38	..	....	Test hole. See driller's log.
AA-20	Kenneth Owens ...	....	D	....	3	....	120	.....	10- 7-63	F	N	Flow 8.5 gpm.
AA-21	Paul Thompson ...	....	D	200	4	Ke, Km	148	.....	10-10-63	F	D,S	Flow 6 gpm.

AA-22	....do..........	....	D	200	3	Ke, Km	138	.....	10-10-63	F	S	Flow 4 gpm.
AA-23	....do..........	....	D	....	2	....	131	.....	10- 8-63	F	D,S	Do.
AA-24	R. L. Zigler......	....	D	....	...	....	135	.....	3- 8-63	F	S	Estimated flow 10 gpm.
AA-25	R. J. Reynolds Tobacco Co.	C. W. Blount	D	500	4	Ke, Km	140	.....	9-20-63	F	S	Estimated flow 1 gpm.
AA-26	....	U.S. Army, Corps of Engineers.	D	50.7	...	....	121	9.0	2-10-38	..	....	Test hole. See driller's log.
AA-27	....	....do..........	D	91.0	...	....	123	22	2-11-38	..	....	Do.
AA-28	Smith and Hillery..	....	D	....	2	....	130	.....	10- 8-63	F	D	Flow 2 gpm.
AA-29	Paul Thompson ...	E. B. Norwood....	D	626	4,2	Km (?), Kg	147	+16	10-10-63	N	S	Flow 30 gpm.
*AA-30	....do..........	....do..........	D	616	4,2	Km (?), Kg	143	+16	10-10-63	N	S	Flow 37.5 gpm.
AA-31	....do..........	C. W. Blount	D	672	4	Km (?), Kg	146	+16	10-10-63	N	S	Flow 27 gpm.
AA-32	Jamie Summerville	....	D	....	6	....	133	.....	10- 7-63	F	N	Estimated flow 15 gpm.
AA-33	Lufis Turnipseed .	--Bailey..........	D	300	3	Ke, Km	129	.....	10- 7-63	F	D	Flow 9 gpm.
AA-34	James Corder.....	E. B. Norwood....	D	270	4	Ke, Km	123	.....	10- 8-63	F	D,S	Flow 5.5 gpm.
AA-35	Mary Hagaman	C. W. Blount	D	725	4	Ke, Km, Kg	140	.....	10- 8-63	F	D,S	Flow 37.5 gpm.
AA-36	H. B. Hanson.....	....do..........	D	450	4	Ke, Km	120	.....	9-20-63	F	N	Estimated flow 25 gpm.
AA-37	....do..........	....do..........	D	450	4	Ke, Km	120	.....	9-20-63	F	D,S	Flow 25 gpm.
AA-38	R. J. Reynolds Tobacco Co.	....do..........	D	500	4	Ke, Km	125	.....	9-20-63	F	S	Flow 4.5 gpm.
AA-39	....	U.S. Army, Corps of Engineers.	D	78.8	...	....	107	12.0	5-12-38	..	....	Test hole. See driller's log.
AA-40	E. C. Owens, Jr...	....	D	....	4	....	133	.....	10- 7-63	F	S	Estimated flow 0.2 gpm.
AA-41	....do..........	....	D	....	4	....	140	2	10- 7-63	J	S	
AA-42	....	U.S. Army, Corps of Engineers.	D	101.5	...	....	124	10	4-25-38	..	....	Test hole. See driller's log.
AA-43	E. C. Owens, Jr...	E. B. Norwood....	D	400	4	Ke	120	.....	10- 7-63	F	S	Flow 3 gpm.

Table 1.–*Records of selected wells and springs in Pickens County*–Continued

Well or spring	Owner	Driller	Type	Depth of well (feet)	Diameter of well (inches)	Water-bearing unit	Altitude of land surface (feet)	Water level: Above (+) or below land surface (feet)	Water level: Date	Method of lift	Use of water	Remarks
AA-44	Weyerhauser Co...	....	D	....	4	....	124	.....	10- 7-63	F	D,S	Flow 6 gpm.
BB-1	Kirksey and Amason.	E. B. Norwood....	D	359	4,2	Km	232	67.2	10-11-63	C	D,S	Casing: 4-in from surface to 62 ft; 2-in perforated pipe from 62 to 359 ft.
BB-2	C. L. Montgomery .	Lynn McCracken ..	D	240	1¼	Km	139	.....	10-15-63	F, J	D	Flow 6 gpm.
BB-3	....do...........	....do...........	D	240	...	Km	139	.....	10-15-63	F, J	D	Do.
BB-4	Lucius Estes.....	B. C. Kelly	D	210	4	Km	147	.....	10-10-63	F, J	D	Casing: 4-in from surface to 20 ft; none below. Flow 2.3 gpm.
BB-5	Mrs. F. C. Nickleson.	....do...........	D	....	4	....	141	.....	10-10-63	F	N	Flow 12 gpm.
BB-6	....do...........	....do...........	D	....	4	....	141	.....	10-10-63	F	D	Estimated flow 1 gpm.
BB-7	Calvin F. Duncan .	....do...........	D	240	4	Km	138	.....	10-15-63	F, J	D	Flow 12 gpm.
BB-8	Hubert Windle	....do...........	D	240	4	Km	138	.....	10-15-63	F, J	D	Flow 8 gpm.
BB-9	H. H. Summerville.	C. W. Blount	D	500	...	Km, Kg	179	.....	....	J	D,S	Flowing when drilled.
BB-10	....do...........	E. B. Norwood....	D	950	4	Km, Kg, Kck	168	25	10-17-63	J	D	Casing: 4-in from surface to 40 ft; no record below. Equipped with filter to remove iron.

BB-11	....do..........	....do..........	D	450	4	Km, Kg	168	15.6	10-17-63	N	N	Abandoned because of high iron content.
BB-12	Mrs. E. P. Gautney	....	D	350	4	Ke, Km	176	10	10-17-63	J	D	
BB-13	Surville Lockett ..	B. C. Kelly	D	240	3	Km	162	6	1943	J	D,S	
BB-14	Jamie Summerville.	....	D	250	4	Ke, Km	151	1	10- 8-63	J	D	
BB-15	....do..........	....	D	250	4	Ke, Km	140	.....	10- 7-63	F	D,S	Estimated flow 2 gpm.
BB-16	....do..........	....	D	....	4	....	132	.....	10- 7-63	F	D,S	Estimated flow 1 gpm.
BB-17	Cunningham Farm .	....	D	....	4	....	147	.....	10-15-63	F	D,S	Estimated flow 3 gpm.
BB-18	....do..........	....	D	....	4	....	151	.....	10-15-63	F	D	Do.
BB-19	....do..........	....	D	....	4	....	151	.....	10-15-63	F	D,S	Flow 4.5 gpm.
BB-20	Jamie Summerville.	....	D	....	4	....	129	.....	10- 8-63	F	D,S	Flow 1.4 gpm.
CC-1	K. R. Sanders	....	D	300	3	Km (?), Kg	172	.....	10-16-63	F	S	Flow 32 gpm.
DD-1	Marathon Corp....	....	D	....	3	....	120	+ 4	9-26-63	N	N	Flow 9 gpm.
DD-2	....do..........	....	D	420	3	Ke	125	.....	3- 8-63	F	N	Flow 2.5 gpm.
DD-3	....do..........	....	D	420	3	Ke	120	.....	3- 8-63	F	N	Flow 6 gpm.
DD-4	H. B. Hanson.....	C. W. Blount	D	450	3	Ke	121	.....	9-20-63	F	S	Do.
DD-5	Leon McBride	....do..........	D	600	4	Ke, Km	196	.....	....	J	S	
EE-1	J. L. King	....	D	600	4	Ke, Km	174	43.5	3-14-63	J	S	Casing: 4-in from surface to 30 ft; no record below.
EE-2	....do..........	Elijah Eaves	D	602	4	Ke, Km	180	30	3-14-63	C	D,S	Do.

Table 2.—*Sample and drillers' logs of wells*

	Thickness (feet)	Depth (feet)
I-22		
Driller's log		
Clay	8	8
Sand, clayey	4	12
Sand and gravel	6	18
Clay	40	58
Sand	14	72
Clay	4	76
Sand, clayey	15	91
Sand and gravel	24	115
Clay	28	143
Sand	4	147
Clay	24	171
Sand	3	174
Clay	7	181
Sand, clayey	11	192
Sand, hard	19	211
Sand, hard; cut good	14	225
Sand, packed	10	235
Clay, tight	9	244
J-14		
Sample log		
(Sample description by C. W. Drennen)		
Sand, red-brown, medium, some coarse grains, angular to subangular, silty, ferruginous pellets	10	10
Sand, brown-red, medium, angular to subangular; fragments of waxy red sandy clay; ferruginous pellets	10	20
Sand, light-red, medium, angular to subangular	10	30
Sand, light-yellow-red, medium, angular to subangular; some muscovite	10	40
Sand, light-brown-yellow, medium, angular to subangular; muscovite	10	50
Sand, light-yellowish-white, medium, angular to subangular; muscovite; some white sandy clay	10	60
Sand, light-yellowish-white, medium, angular to subangular; muscovite	30	90

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
K-1		
Sample log		
(Sample description by C. W. Drennen)		
Sand, light-red-brown, medium, subangular	10	10
Sand, light-red-brown, medium to coarse, subangular to subrounded; some muscovite	10	20
Sand, light-red-brown; some yellow, white, and pink clay	10	30
Sand, light-brown, coarse, subangular to subrounded	10	40
Sand, yellow-brown, coarse to very coarse, subangular to subrounded; a few subangular to subrounded chert granules	20	60
Sand, light-yellow-brown, fine to medium, subangular to subrounded; some white sandy clay	10	70
K-3		
Driller's log		
Clay, red	2.5	2.5
Clay, red, sandy	5	7.5
Sand, yellow-brown; some clay	14	21.5
Clay, white, sandy	3	24.5
Clay, white; white sand	24	48.5
Sand; brown clay	4	52.5
Sand; white clay	5	57.5
Clay; streaks of white sand	5	62.5
Clay; streaks of sand	2	64.5
Sand, brown	2	66.5
Clay, sandy	1.5	68
Sand and gravel, clayey	5	73
Clay, white	1	74
Sand	2	76
Clay, white	1.5	77.5
Sand and gravel	1	78.5
Rock	.....	.....
K-4		
Driller's log		
Clay, red, sandy	4	4
Sand and gravel, yellow	11.5	15.5
Sand; yellow-white clay	26	41.5
Clay, white, sandy	5	46.5
Sand; yellow clay	10	56.5

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
K-4—Continued		
Sand; clay streaks	5.5	62
Sand; streak of yellow clay	5	67
Sand and gravel, yellow	15	82
Rock	.5	82.5
Clay, red to yellow, sandy	5	87.5
Clay, red, sandy; some red clay	10	97.5
Clay, red, sandy	58	155.5
Clay, gray, mottled-red	7.5	163
Sand; gray to white clay	3	166
Sand, gray	2	168
Clay, gray-green	3	171
Sand, brown	4	175
Clay, gray-green	1	176
Sand, brown	1.5	177.5
Clay, gray-green	2	179.5
Clay, gray-green, sandy	21.5	201
K-5 Driller's log		
Clay	20	20
Sand	20	40
Shale	85	125
Rock	10	135
Shale	55	190
Soapstone, hard	10	200
Rock	10	210
Rock, soft	10	220
Rock	10	230
Sandstone	10	240
Soapstone	140	380
Sand	80	460
K-8 Driller's log		
Sand, yellow, fine	48	48
Clay, red and blue	15	63
Sand, yellow, coarse; chert gravel	21	84
Sandstone	.5	84.5
Clay, red	35.5	120

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
K-8—Continued		
Clay, blue	14	134
Ironstone	.5	134.5
Sand, yellow and white, coarse	25.5	160
K-13 Driller's log		
Clay, sandy	9	9
Sand; rock breaks	13	22
Sand and gravel	20.5	42.5
Sand and gravel; pink to yellow clay	20.5	63
Clay, pink; gravel	20	83
Clay, pink; sand streaks	21	104
Clay, pink; gravel	11	115
Sand, packed, cut good	50	165
Clay, lignitic	21	186
K-15 Sample log		
Clay, reddish-tan, sandy; fine- to medium-grained sand	3	3
Sand, tan, fine to coarse; small gravel	23	26
Sand, fine to coarse; clay	10	36
Sand, gravel, and chert	10	46
Clay, red to purple	10	56
Clay, red to gray, mottled	30	86
Clay, gray and reddish-gray, sandy	10	96
Clay, reddish-brown and gray	10	106
Clay, red and gray, mottled	10	116
Clay, red, sandy	10	126
Clay, gray, micaceous	30	156
Sand, tan, coarse	10	166
Clay, gray	10	176
Clay, red and gray, mottled	20	196
K-18 Driller's log		
Soil	2	2
Clay, yellow and white	19	21
Clay, red, mottled	7	28
Sand, yellow	14	42

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
K-18—Continued		
Sandstone	1	43
Clay, gray	15	58
Sand, brown, coarse	5	63
Clay, red	9	72
Sand, yellow, coarse, loose	31	103
Sand, white, hard, packed	20	123
K-29 Driller's log		
Clay, white	100	100
Sand and gravel, clayey	60	160
Rock	1	161
Clay, white	14	175
Sand and gravel	15	190
Clay, white	2	192
L-7 Driller's log		
Clay, red and gray	5	5
Sand, yellow, fine	3	8
Clay; yellow sand streaks	4	12
Clay, blue; sand streaks	43	55
Sand	3	58
Clay, blue; sand streaks	7	65
No record	21	86
M-15 Driller's log		
Clay, sandy	75	75
Shale, sandy; fine-grained sand	8	83
Clay, blue	17	100
Sand; shale streaks	20	120
Sand, very fine	40	160
Rock	....	....

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
M-16		
Driller's log		
Clay, sandy	20	20
Shale	10	30
Shale and sand	12	42
Sand, red	7	49
Shale and sand	7	56
Shale	10	66
Shale and sand	24	90
Shale	20	110
Sand and shale	12	122
Sand	41	163
O-10		
Driller's log		
Sand, brown, fine	17.3	17.3
Sand and gravel, brown, fine; some clay	1.7	19
Sand, brown, clayey, compact	8.5	27.5
Sand, greenish-gray, compact	7.5	35
Shale, greenish-gray, sandy, soft; numerous thin lenses of fine-grained sand	31	66
Sand, greenish-gray, calcareous, compact; thin lenses of sandy shale	1.5	67.5
Shale, greenish-gray, sandy, soft, numerous thin lenses of fine-grained sand	13.8	81.3
Sand, greenish-gray, compact	3	84.3
P-3		
Driller's log		
Clay	22	22
Sand and gravel	8	30
Rock, blue	35	65
Sand	9	74
Shell	61	135
Sand	55	190
Shell	6	196
Sand	32	228
Shell	36	264
Sand	26	290
Shell	34	324
Sand	36	360

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
P-6		
Driller's log		
Soil, light-tan, sandy	2	2
Clay, gray and tan, sandy	6.6	8.6
Sand, gray and tan	13.9	22.5
Sand and gravel, light-tan	3	25.5
Silt, dark-gray, sandy	12.9	38.4
Slate, medium-hard; layers of blue clay, sand, and gravel	13.1	51.5
Slate, blue; stiff blue and gray clay	8.5	60
Clay, blue and green; layers of sand and slate rock	40	100
P-7		
Driller's log		
Sand, tan, clayey	9.1	9.1
Sand, tan and gray; some clay	6.3	15.4
Sand, tan	6.6	22
Sand and gravel	3.5	25.5
Clay, blue; layers of sand and soft slate	74.3	99.8
P-8		
Driller's log		
Sand, tan; some clay	1	1
Sand, light-tan	28	29
Sand and gravel, tan	10.5	39.5
Sand, green and gray; layers of sandstone	15.1	54.6
Slate, gray, soft	22.4	77
Sand, green; layers of slate	25	102
P-9		
Driller's log		
Soil, sandy	2	2
Clay, dark-brown	4.1	6.1
Sand, tan; some clay	15	21.1
Sand and gravel, light-tan, fine	11.6	32.7
Sand and gravel, gray, coarse	1	33.7
Slate, medium-hard	3	36.7
Sand, dark-green and gray; thin clay layers	33.3	70
Sand, dark-gray	8	78

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
P-10		
Driller's log		
Clay	6	6
Gravel, clayey	9	15
Shell	120	135
Sand	34	169
Shell	52	221
Sand	16	237
Shell	10	247
Sand	30	277
Shell	9	286
Sand	12	298
Shell	4	302
Sand	46	348
P-12		
Driller's log		
Sand, brown, fine, silty	6	6
Sand, tan, fine	2	8
Sand, tan, fine; some clay	1	9
Clay, tan and gray, silty, stiff	9	18
Clay, gray, sandy; some gravel	1	19
Sand and gravel	2	21
Q-1		
Driller's log		
Clay	18	18
Shell	94	112
Sand	18	130
Shell	22	152
Sand	10	162
Shell	20	182
Sand	51	233
X-17		
Driller's log		
Clay, yellow	15	15
Clay, yellow, sandy	9	24
Sand and gravel	12	36

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
X-17—Continued		
Shale, sandy	10	46
Sand, soft	10	56
Shale, sandy	62	118
Sand	11	129
Rock	....	....
Shale, sandy	12	141
Sand, and shale streaks	42	183
Sand, packed	5	188
Sand, shaly	17	205
Sand, and shale streaks	18	223
Sand, shaly	50	273
Sand	13	286
Shale	29	315
Sand, draggy	9	324
Sand	9	333
Sand, packed	12	345
Shale, sandy	24	369
Sand	9	378
Sand, packed	11	389
Gumbo	....	....
No record	54	443
X-18 Driller's log		
Clay	18	18
Gravel	6	24
Sand; clay streaks	25	49
Shale, sandy	23	72
Shale	76	148
Shale, sandy	22	170
Rock	1	171
Shale	68	239
Sand, shaly	25	264
Clay	30	294
Shale	20	314
Sand	2	316
Gumbo	14	330
Gumbo, tough	76	406
Sand, fine, draggy	14	420
Sand, packed	72	492
Clay	....	....

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
X-19		
Driller's log		
Clay, sandy	12	12
Sand, fine	24	36
Sand, red	8	44
Hardpan	1	45
Gravel	13	58
Clay, sandy	19	77
Sand, fine, packed	13	90
Shale	66	156
Sand; shale streaks	39	195
Shale	6	201
Sand, shaly	39	240
Sand	4	244
Clay	4	248
Sand	16	264
Shale, sandy	36	300
Sand, packed	36	336
Shale	2	338
Sand, hard, packed	16	354
Clay, hard	5	359
X-22		
Driller's log		
Soil	16	16
Sand and gravel	38	54
Shale, sandy	29	83
Shale	56	139
Shale; hardpan layer	15	154
Shale	5	159
Shale, sandy	138	297
Sand; shale streak	11	308
Sand, packed	4	312
Shale	22	334
Sand	47	381
Shale	42	423
Shale, sandy	14	437
Gumbo	14	451
Shale	38	489
Sand, shaly	39	528
Sand	15	543
Shale	40	583

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
X-22—Continued		
Sand	9	592
Clay; sand streaks	18	610
X-23 Driller's log		
Soil	13	13
Sand and gravel	36	49
Shale, sandy	65	114
Shale	38	152
Shale, sandy	19	171
Sand	10	181
Sand, fine, shaly	85	266
Sand, draggy	45	311
Gumbo	10	321
Shale	16	337
Sand	40	377
Gumbo	33	410
Sand	18	428
Gumbo	10	438
X-26 Driller's log		
Clay	15	15
Sand	15	30
Gravel	6	36
Shell	90	126
Sand	24	150
Shell	25	175
Sand	30	205
Shell	20	225
Sand	16	241
Shell	5	246
Sand	38	284
Shell	16	300
Sand	18	318
Shell	41	359
Sand	34	393
Shell	14	407
Sand	16	423

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
X-27		
Driller's log		
Clay	12	12
Sand and gravel	45	57
Rock, blue	41	98
Shell	54	152
Sand	8	160
Shell	52	212
Sand	66	278
Shell	57	335
Sand	7	342
Shell	69	411
Sand	33	444
Y-1		
Driller's log		
Silt, tan, compact; clayey sand	2	2
Sand, tan, fine	11.5	13.5
Sand and gravel	4.7	18.2
Silt, gray, sandy, compact	1	19.2
Z-8		
Driller's log		
Clay	14	14
Rock, blue	92	106
Sand	18	124
Shell	8	132
Sand and rock	87	219
Shell	37	256
Sand	12	268
Shell	38	306
Sand	44	350
Shell	24	374
Sand	6	380
Shell	37	417
Sand	63	480
Shell	20	500

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
Z-15		
Sample log		
(Modified from sample description by Randall Fleming, geologist, Geological Survey of Alabama)		
Mooreville Chalk		
No record	65	65
Siltstone, light-gray, indurated, calcareous; light-gray fossiliferous chalk	30	95
Chalk, light-gray, micaceous, fossiliferous	150	245
Siltstone, light-gray, calcareous, micaceous	30	275
Eutaw Formation		
Siltstone, light-gray, calcareous, micaceous; yellowish-gray very fine to medium-grained glauconitic fossiliferous sand	30	305
Shale, light-olive-gray, micaceous; yellowish-gray very fine to medium-grained glauconitic fossiliferous sand	30	335
Shale, light-olive-gray, micaceous; yellowish-gray very fine to fine-grained glauconitic micaceous lignitic sand	60	395
Shale, light-olive-gray, micaceous; yellowish-gray very fine to medium-grained glauconitic sand	30	425
Shale, light-olive-gray, micaceous; yellowish-gray very fine to fine-grained glauconitic sand	60	485
Shale, light-olive-gray, micaceous, glauconitic; yellowish-gray very fine to fine-grained glauconitic sand	60	545
Sand, yellowish-gray, very fine to medium, micaceous, glauconitic; light-olive-gray micaceous shale	60	605
Sand, yellowish-gray, very fine to medium, micaceous; siderite concretions; light-olive-gray micaceous shale	30	635
Sand, pinkish-gray, very fine to fine, glauconitic, micaceous; siderite concretions; light-olive-gray micaceous shale	90	725
Gordo Formation		
Sand, pinkish-gray, very fine to medium, micaceous; siderite concretions; light-olive-gray micaceous shale; dusky-red clay	30	755
Sand, yellowish-gray, fine to medium, micaceous; siderite concretions; dusky-red clay	60	815

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
Z-15—Continued		
Gordo Formation—Continued		
Sand, yellowish-gray, fine to coarse, glauconitic, micaceous; siderite concretions; dusky-red clay	60	875
Sand, pale-yellowish-orange, medium to very coarse; chert pebbles	30	905
Sand, pale-yellowish-orange, medium to very coarse; pebbles of quartz and chert; dusky-red clay	30	935
Sand, pale-yellowish-orange and light-gray, fine to very coarse; siderite concretions; pebbles of quartz and chert	60	995
Coker Formation		
Pebbles, yellowish-gray, very fine to coarse, glauconitic; siderite concretions; olive-gray shale; dusky-red clay	60	1055
Sand, yellowish-gray and light-gray, very fine to medium, glauconitic, micaceous; olive-gray shale; dusky-red clay	30	1085
Shale, olive-gray, micaceous; dusky-red clay; siderite concretions; very fine to medium-grained gray sand	60	1145
Shale, olive-gray, micaceous; dusky-red clay	60	1205
Shale, olive-gray, micaceous	150	1355
Shale, olive-gray, micaceous; dusky-red clay	30	1385
Pebbles, chert and quartz, very fine to fine; olive-gray shale	60	1445
Pebbles, chert and quartz, fine to medium	60	1505
Pebbles, chert and quartz, fine to medium; yellowish-gray coarse-grained sand	60	1565
Pebbles, quartz and chert, fine to medium; olive-gray micaceous shale; yellowish-gray coarse-grained sand	30	1595
Pebbles, quartz and chert, fine to medium; pale-red medium- to coarse-grained sand; olive-gray micaceous shale	30	1625
Sand, pale-red, medium to coarse; fine- to medium-grained quartz and chert pebbles	90	1715
Sand, grayish-orange, medium to very coarse; oolitic chert pebbles	60	1775
Sand, grayish-orange, medium to very coarse; oolitic chert pebbles; light-gray clay	30	1805
Sand, grayish-orange, fine to very coarse	90	1895

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
Z-15—Continued		
Lower Cretaceous strata		
Sand, grayish-orange, fine to very coarse; pale-red lime nodules	30	1925
Lime nodules, pale-red; grayish-orange fine to very coarse grained sand	30	1955
Lime nodules, pale-red; very fine to fine-grained quartz and chert pebbles; yellowish-gray fine- to medium-grained sand; dusky-red clay	30	1985
Sand, grayish-orange to light-gray, very fine to very coarse; pale-red lime nodules	120	2105
Sand, grayish-orange, fine to very coarse; light-olive-gray shale	30	2135
Sand, grayish-orange to light-gray, fine to very coarse; very fine to fine chert and quartz pebbles	30	2165
Pottsville Formation		

AA-10
Driller's log

Soil, and red clay	8	8
Marl, blue	55	63
Limestone	52	115
Sand, fine	4	119
Limestone	15	134
Sand and limestone	40	174
Limestone, and streaks of sand	25	199
Limestone, hard	67	266
Shale, and streaks of sand	24	290
Sand, packed	9	299
Shale	33	332
Shale, and streaks of fine-grained sand	28	360
Sand, fine, and shale streaks	40	400
Shale	14	414
Sand, packed, cut good	30	444
Sand, packed, and shale streaks	24	468
Sand, packed, cut good	59	527
Clay, red	33	560

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
AA-11		
Driller's log		
Sand, brown, fine	30	30
Sand, brown, fine; medium-grained gravel	5	35
Gravel, large	10	45
Shale, gray, sandy, hard	5	50
Shale, gray; thin layers of compact gray silty sand	3	53
Sand, greenish-gray, compact; layers of hard gray silty clay	5	58
Shale, gray, sandy, soft	3	61
Sand, greenish-gray, silty, compact	7.5	68.5
Clay, gray, shaly, hard; layers of compact gray silty sand	3.5	72
Sand, greenish-gray, calcareous, compact; layers of soft gray shale	4	76
Shale, gray, soft; layers of compact gray sand	5.6	81.6
Sand, greenish-gray, calcareous, compact	3	84.6
AA-14		
Driller's log		
Sand, brown, silty	10	10
Sand, brown, fine	25	35
Gravel, large	2	37
Sand, brown, fine; medium-grained gravel	4.6	41.6
Sand, brown, fine, compact	1.6	43.2
Sand, gray, compact; layers of soft gray shale	15.8	59
Silt, greenish-gray, sandy	4.4	63.4
Shale, greenish-gray, sandy, soft; lenses of fine-grained gray sand	20	83.4
Sand, greenish-gray, calcareous, compact	24.8	108.2
AA-19		
Driller's log		
Sand, gray, medium	9.5	9.5
Clay, tan, sandy	1.5	11
Sand, tan, fine	4	15
Sand, gray, medium	6.3	21.3
Sand, tan, coarse	4.7	26
Sand and gravel	3	29
Shale, gray, soft	.5	29.5

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
AA-26		
Driller's log		
Soil, dark, sandy	2	2
Clay, tan, stiff; some sand	5	7
Sand, tan	2.2	9.2
Sand and gravel, gray	26	35.2
Limestone, gray, hard	1.1	36.3
Sand, dark-gray	14.4	50.7
AA-27		
Driller's log		
Soil, dark, sandy	1.5	1.5
Clay, tan, sandy	3.7	5.2
Sand, dark-tan, clayey	7.2	12.4
Sand, light-tan	11.6	24
Sand and gravel, light-tan	2	26
Limestone, gray, clayey, soft	1.3	27.3
Silt, gray, sandy, hard	5.7	33
Silt, gray, sandy, loose	11.2	44.2
Limestone, dark-gray, clayey, soft	4	48.2
Silt, dark-gray, sandy	21.8	70
Slate, blue; thin sandstone layers	3.7	73.7
Silt, dark-green and gray, sandy	17.3	91
AA-39		
Driller's log		
Silt, brown, fine, sandy	1	1
Sand, brown, fine	21.2	22.2
Sand and gravel, brown, fine	2.9	25.1
Silt, gray, sandy	6.4	31.5
Silt, gray, sandy; some medium-grained gravel	5.5	37
Limestone, gray, clayey, soft	3	40
Sand, gray, calcareous, very compact	2.9	42.9
Sand, greenish-gray, calcareous, compact; layers of shale	11.4	54.3
Sand, greenish-gray, loose	.8	55.1
Sand, green, compact; thin layers of gray shale	23.7	78.8

Table 2.—*Sample and drillers' logs of wells*—Continued

	Thickness (feet)	Depth (feet)
AA-42		
Driller's log		
Silt, brown, fine, sandy	2	2
Silt, brown, sandy; some clay	15	17
Sand, brown, clayey, compact	7	24
Sand and gravel, brown, loose	1.2	25.2
Limestone, gray, clayey, soft	33.4	58.6
Sand, greenish-gray, calcareous, compact	13	71.6
Sand, greenish-gray, calcareous, compact; layers of soft gray sandy shale	29.9	101.5

Table 7.—*Partial chemical analyses of water from wells*
(in parts per million)

[Well or spring: Numbers correspond to those on plates 1 and 2 and in tables 1 and 2. Asterisk indicates comprehensive chemical analysis available in table 9.

Water-bearing unit: Kck, Coker Formation; Kg, Gordo Formation; Km, McShan Formation; Ke, Eutaw Formation; Qt, terrace deposits; Qal, alluvium]

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
A-1	1-22-64	Kg	.....	0.40	6	0	18	25	20	....	6.2
A-2	12- 5-63	Kg	.....	.11	29	0	2.0	22	0	....	6.6
A-3	11-14-63	Kck	.....	1.4	18	0	2.0	12	0	....	6.7
A-4	12-27-63	Kg	.....	1.1	10	0	3.0	8	0	....	7.0
A-5	5-17-63	Kck	.....	10	19	0	5.0	19	3	....	6.8
A-6	11-26-63	Kg	.....	.18	20	0	4.0	15	0	....	6.6
A-7	11-26-63	Kg	.....	2.4	18	0	6.0	25	10	....	6.5
A-8	12-27-63	Kg	.....	.57	6	0	10	20	15	....	7.0
B-1	5-15-63	Kck	.....	.25	11	0	5.0	8	0	....	7.3
B-3	5-16-63	Kg	.....	.49	4	0	6.0	20	17	....	6.8
B-4	5- 2-63	Km	.....	.08	7	0	7.0	20	14	....	7.3
B-5	5- 2-63	Kg	.....	.47	22	0	5.0	10	0	....	6.9
B-6	5-16-63	Kg	.....	1.7	28	0	8.0	34	11	....	7.0
B-7	5-15-63	Kg	.....	.69	6	0	4.0	10	5	....	7.2
B-9	5-15-63	Kg	.....	.14	7	0	4.0	14	8	....	7.1
B-10	5-15-63	Kg	.....	2.2	13	0	6.0	12	1	....	7.1
B-11	1-22-64	Kg	.....	2.9	12	0	2.0	21	11	....	6.4
B-13	5- 2-63	Kg	.....	.15	5	0	8.0	15	11	....	7.3
B-14	5-16-63	Km	.....	.71	12	0	40	106	96	....	7.2
B-15	5-16-63	Kg	.....	1.5	25	0	6.0	15	0	....	7.1
C-1	4- 4-63	Km	.....	.10	13	0	4.0	9	0	....	6.0
C-2	5- 1-63	Km	.....	.33	14	0	5.0	14	3	....	7.2
C-3	5- 1-63	Kg	.....	1.2	22	0	24	41	23	....	7.4
C-5	4-16-63	Km	.....	5.0	34	0	30	19	0	....	6.6
C-6	4- 4-63	Km	.....	15	35	0	4.0	24	0	....	6.4
C-7	5- 1-63	Kg	.....	.08	24	0	8.0	36	16	....	7.6
C-8	5- 1-63	Kg	64	.81	10	0	8.0	8	0	....	6.0
C-9	5- 1-63	Kg	.....	7.0	26	0	6.0	11	0	....	7.2
C-10	4-16-63	Km	.....	.60	12	0	4.0	10	0	....	7.4
C-11	4-16-63	Km	.....	1.4	10	0	4.0	8	0	....	7.2
C-12	4-16-63	Km	.....	2.6	28	0	4.0	11	0	....	6.5
C-13	5- 1-63	Kg	.....	.45	27	0	4.0	10	0	....	7.0
D-2	4-10-63	Qt	.....	.31	12	0	14	20	10	....	7.0
D-4	4-10-63	Km	.....	.14	22	0	4.0	11	0	....	7.0
D-5	4- 4-63	Qt	.....	.29	11	0	60	66	57	....	6.0
D-6	4- 1-63	Qt	.....	.05	18	0	12	20	5	....	6.8
D-9	4- 5-63	Km	.....	.76	51	0	5.0	28	0	....	6.9
D-10	4-10-63	Km	.....	.77	14	0	6.0	8	0	....	7.2
D-11	4- 5-63	Km	.....	.40	46	0	22	40	2	....	8.2
D-12	4- 5-63	Km	.....	.44	44	6	22	48	2	....	8.8
D-13	4- 5-63	Km	.....	9.0	52	0	5.0	49	6	....	8.1
D-15	4- 1-63	Qt	.....	.92	28	0	4.0	18	0	....	6.8

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
D-16	4- 1-63	Qt	.....	0.10	10	0	6.0	10	2	....	6.6
E-1	3-29-63	Qt	.....	.74	42	0	19	31	0	....	6.2
E-2	3-29-63	Km	.....	1.4	100	0	4.0	64	0	....	8.2
E-3	3-29-63	Qt	.....	.15	10	0	4.0	10	2	....	6.6
E-4	4- 1-63	Qt	.....	.23	26	0	8.0	20	0	....	7.1
E-5	4- 1-63	Qt	.....	.08	39	0	7.0	36	4	....	7.1
F-1	4- 4-63	Qt	.....	.18	30	0	50	39	14	....	7.2
F-2	8-16-63	Qt	.....	.05	41	0	6.0	34	0	....	7.9
F-3	8-16-63	Ke	.....	.35	73	0	4.0	62	2	....	8.2
G-1	4-23-63	Km	.....	13	78	0	5.0	58	0	....	8.0
G-2	4-15-63	Ke	.....	.13	20	0	4.0	19	3	....	7.1
G-3	4-15-63	Km	.....	.86	84	2	4.0	62	0	....	8.4
G-4	8-16-63	Km	.....	.02	17	0	8.0	22	8	....	6.3
G-5	8-16-63	Km	.....	.66	28	0	2.0	28	5	....	7.8
G-6	8-27-63	Qt	.....	.18	13	0	4.0	10	0	....	6.9
G-7	8-27-63	Qt	.....	.11	11	0	10	18	9	....	6.0
G-8	8-28-63	Km	.....	1.6	46	0	29	45	7	....	6.1
G-9	8-28-63	Qt	.....	.59	53	0	5.0	45	2	....	8.1
H-1	5- 2-63	Kg	.....	.39	29	0	14	34	10	....	7.3
H-2	4- 5-63	Km	.....	.13	48	0	4.0	14	0	....	7.8
H-3	4- 5-63	Km	.....	.82	24	0	8.0	9	0	....	7.6
H-4	4- 5-63	Km	.....	.33	38	0	8.0	19	0	....	7.7
H-5	5- 1-63	....	.....	8.4	15	0	4.0	8	0	....	7.1
H-6	9- 6-63	Kg	.....	7.0	6	0	4.0	2	0	....	7.1
H-7	9- 6-63	Kg	.....	9.3	12	0	1.0	10	0	....	7.3
*H-8	9- 6-63	Kg	.....	1.6	20	0	2.0	11	0	....	6.9
H-9	9- 6-63	Kg	.....	.39	13	0	4.0	10	0	....	7.3
H-10	4-15-63	Km	.....	16	34	0	4.0	29	1	....	7.7
H-11	8-28-63	Km	.....	22	28	0	5.0	28	5	....	7.6
H-12	9- 6-63	Kg	.....	.24	12	0	3.0	15	5	....	6.2
H-13	9- 3-63	Kg	.....	1.4	14	0	2.0	12	1	....	7.1
H-14	9- 6-63	Km	.....	.02	60	0	103	181	132	....	7.6
H-15	8-28-63	Km	.....	.13	66	0	39	88	34	....	7.0
H-16	8-29-63	Km	.....	12	31	0	3.0	20	0	....	6.4
H-17	8-28-63	Qt,Km	.....	2.1	9	0	5.0	9	2	....	7.3
H-18	8-29-63	Qal	.....	1.1	41	0	13	40	6	....	6.9
I-1	1-21-64	Kg	.....	2.8	10	0	3.0	15	7	....	6.3
I-2	5- 2-63	Kg	.....	.13	19	0	8.0	22	6	....	7.1
I-3	5- 2-63	Kg	.....	.17	9	0	6.0	15	8	....	7.1
I-4	12-27-63	Kg	.....	1.8	5	0	19	19	15	....	6.8
I-5	12-27-63	Kg	.....	.98	48	0	2.0	5	0	....	6.9
I-6	5-17-63	Kg	.....	.40	11	0	5.0	9	0	....	7.1
I-7	5- 2-63	Kg	.....	.24	7	0	5.0	10	4	....	7.1
I-8	5- 2-63	Kg	.....	.35	8	0	6.0	10	3	....	7.3
I-9	5- 1-63	Kg	.....	.35	32	0	6.0	30	4	....	7.7
I-10	9- 5-63	Kg	.....	1.5	14	0	1.0	14	3	....	6.2
I-12	5-17-63	Kg	.....	.13	33	0	9.0	35	8	....	6.8
I-13	1-22-64	Kg	.....	2.7	11	0	2.0	18	9	....	6.3

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
I-14	1-22-64	Kg	.....	6.5	21	0	4.0	30	13	....	6.7
I-23	12-16-63	Kg	.....	.16	25	0	2.0	9	0	....	6.6
I-24	12-16-63	Kg	.....	.05	30	0	26	36	11	....	7.4
J-1	12-27-63	Kg	.....	.06	5	0	8.0	18	14	....	6.6
J-2	5-17-63	Kg	.....	.25	37	0	13	19	0	....	6.7
J-3	11-26-63	Kg	.....	.76	7	0	2.0	16	10	....	6.4
J-4	12-27-63	Kg	.....	.08	7	0	1.0	5	0	....	6.7
J-5	11-14-63	Kg	.....	.12	6	0	4.0	15	10	....	6.5
J-6	12-27-63	Kg	.....	.14	10	0	5.0	9	1	....	6.9
J-7	12-16-63	Kg	.....	.08	6	0	5.0	9	4	....	6.7
J-8	12-17-63	Kg	.....	3.7	8	0	1.0	8	1	....	5.8
J-9	12-17-63	Kg	.....	.13	34	0	2.0	8	0	....	6.5
J-11	12-17-63	Kg	.....	7.1	43	0	1.0	8	0	....	6.6
J-12	12-17-63	Kg	.....	.06	9	0	1.0	11	4	....	6.4
*J-13	12-27-63	Kck	.....	.14	13	0	2.0	5	0	....	7.0
J-14	12-16-63	Kg	.....	1.7	7	0	69	50	44	....	6.4
J-15	12-17-63	Kg	.....	.17	10	0	1.0	8	0	....	5.8
J-16	12-17-63	Kg	.....	1.2	13	0	1.0	9	0	....	6.3
J-17	12-16-63	Kg	.....	.03	4	0	4.0	11	8	....	6.0
K-1	12-18-63	Kg	.....	.14	11	0	3.0	10	1	....	7.4
K-2	12-27-63	Kg	.....	.09	10	0	2.0	8	0	....	6.7
K-6	11-14-63	Kg	.....	.11	2	0	10	25	23	....	5.2
K-7	12-16-63	Kg	.....	.20	7	0	1.0	8	2	....	6.4
K-8	12-17-63	Kck	.....	2.1	13	0	2.0	10	0	....	6.6
K-9	4-16-63	....	.....	.10	44	0	8.0	26	0	....	6.7
K-10	4-16-63	....	.....	.50	16	0	2.0	5	0	....	6.9
K-11	3- 8-63	Kck	63	.07	10	0	2.0	5	0	....	7.3
K-16	12-10-63	Kg	.....	.19	14	0	2.0	11	0	....	6.6
K-17	11-21-63	Kg	.....	.37	5	0	2.0	10	6	....	6.1
K-19	11-21-63	Kg	.....	.19	5	0	7.0	12	8	....	6.1
K-20	12- 3-63	Kg	.....	1.5	7	0	10	11	5	....	6.1
K-21	5-17-63	....	.....	1.6	65	0	4.0	50	0	....	8.0
K-22	12-10-63	Kg	.....	.18	22	0	2.0	8	0	....	6.6
K-23	12-10-63	Kg	.....	.73	7	0	2.0	9	3	....	6.6
K-24	12-10-63	Kg	.....	.29	8	0	2.0	8	1	....	6.8
K-25	12-17-63	Kg	.....	.89	30	0	11	38	13	....	7.0
K-27	12-17-63	Kg	.....	.20	16	0	5.0	16	3	....	6.6
K-28	12-10-63	Kg	.....	1.1	8	0	2.0	9	2	....	6.5
K-29	11- 7-63	Kg	.....	1.1	16	0	6.0	11	0	....	6.0
K-31	12-10-63	Kg	.....	.20	7	0	2.0	6	0	....	5.5
K-32	12- 3-63	Kg	.....	.96	10	0	1.0	9	1	....	6.4
L-1	3- 6-63	Kg	.....	.20	5	0	11	11	7	....	5.5
L-2	11-12-63	Kg	.....	.86	10	0	4.0	8	0	....	6.0
L-3	11-21-63	Kg	.....	1.9	15	0	3.0	11	0	....	6.8
L-4	9- 6-63	Qt	.....	.15	90	0	30	12	0	....	8.1
L-5	11-21-63	Kg	.....	21	16	0	2.0	22	9	....	6.6
L-6	12-18-63	Kg	.....	11	16	0	4.0	9	0	....	7.3
L-7	5- 2-63	Kg	.....	3.2	40	0	9.0	21	0	....	7.0

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (°F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
L-8	11-21-63	Kg	.....	2.6	12	0	4.0	9	0	....	6.9
L-9	11-12-63	Kg	.....	2.2	7	0	20	14	8	....	5.4
L-10	11- 7-63	Km	.....	14	7	0	69	84	78	....	6.1
L-11	11-21-63	Kg	.....	1.6	30	0	5.0	15	0	....	6.8
L-12	12- 3-63	Kg	.....	5.7	24	0	207	171	152	....	6.1
L-14	11- 7-63	Kg	.....	15	17	0	8.0	14	0	....	5.9
L-15	11- 7-63	Kg	.....	5.6	11	0	7.0	10	1	....	6.9
M-1	9- 6-63	Km	.....	.25	13	0	1.0	20	9	....	5.9
M-2	8-29-63	Km	.....	4.6	36	0	6.0	18	0	....	7.0
M-3	11-12-63	Km	.....	.04	40	0	137	115	82	....	6.4
M-4	9- 3-63	Km	.....	5.9	12	0	26	38	28	....	7.0
M-5	8-29-63	Ke	.....	.61	21	0	24	21	4	....	7.3
M-6	9- 3-63	Km	.....	.94	15	0	14	35	23	....	6.7
M-7	11-21-63	Kg	.....	.....	18	0	2.0	11	0	....	6.8
M-8	11-21-63	Qt	.....	.12	6	0	6.0	22	17	....	6.1
M-9	8-29-63	Qal	.....	.01	18	0	8.0	22	7	....	6.2
M-10	8-29-63	Km	.....	.72	99	0	4.0	76	0	....	7.0
M-12	10- 4-63	Kg	.....	8.8	45	0	1.1	.....	....	201	5.9
M-14	8-29-63	Kg	.....	16	49	0	6.0	39	0	....	7.6
M-15	11-27-40	Kg	64	18	20	.....	2	18	....	....	...
N-1	8-29-63	Km	.....	.22	20	0	25	29	13	....	7.1
N-2	8-27-63	Qt	.....	.20	19	0	20	22	6	....	6.2
N-3	8-16-63	Km	.....	12	54	0	4.0	39	0	....	8.2
N-4	8-27-63	Qt	.....	.00	5	0	5.0	9	5	....	7.3
N-5	8-29-63	....	.....	7.3	91	0	5.0	62	0	....	8.2
N-6	8-27-63	Qt,Ke	.....	.09	17	0	7.0	10	0	....	7.4
N-7	8-27-63	Kg	.....	1.3	86	0	3.0	60	0	....	...
N-8	8-27-63	Km,Kg	.....	19	32	0	7.0	29	3	....	7.3
N-9	8-27-63	Qt	.....	.32	36	0	100	89	59	....	7.7
N-10	9- 3-63	Ke	.....	.35	27	0	12	38	16	....	6.8
N-12	8-27-63	Kg	.....	1.2	86	0	5.0	45	0	....	8.1
N-13	8-27-63	Kg	68	4.5	86	0	5.0	68	0	....	7.4
O-1	8-16-63	Qt	.....	.06	10	0	52	56	48	....	7.1
O-2	8-16-63	....	.....	1.9	88	3	4.0	69	0	....	8.4
O-4	8-16-63	Qt	.....	.34	26	0	6.0	29	8	....	7.8
O-5	9- 9-63	Km,Kg	.....	.51	120	2	2.0	88	0	....	8.4
O-7	8-16-63	Ke	.....	.09	14	0	6.0	18	7	....	7.6
O-8	9- 9-63	....	65	.26	102	2	2.0	6	0	....	8.4
O-9	9- 9-63	....	66	.22	90	2	2.0	36	0	....	8.3
O-11	10- 4-63	Ke	64	.16	93	0	2.9	4	0	166	7.7
O-12	9-10-63	Ke,Km	66	.19	87	1	2.0	19	0	....	8.3
O-13	8-27-63	Qt	.....	.01	46	0	6.0	48	10	....	7.6
*O-14	8-27-63	Ke	.....	.18	86	0	7.0	40	0	....	7.6
P-1	9-20-63	....	66	.15	96	2	2.0	10	0	....	8.4
P-2	10- 4-63	Km	.....	.36	102	0	5.5	43	0	205	7.8
*P-3	3- 6-63	Ke,Km	66	.22	88	4	2.0	9	0	....	8.4
P-4	3- 6-63	Ke,Km	66	.12	93	0	4.0	8	0	....	8.0
P-5	10- 4-63	....	.....	.16	113	0	3.0	3	0	190	7.9

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
P-10	9-18-63	Ke,Km	.....	0.55	182	4	5.0	166	17	....	8.4
P-11	3- 6-63	....	66	.20	98	5	4.0	4	0	....	8.5
Q-1	8-29-63	Km	.....	.45	56	0	4.0	28	0	....	6.6
Q-2	8-29-63	Qt	.....	.03	9	0	6.0	14	7	....	7.2
Q-3	9- 3-63	Qt	.....	.07	8	0	14	12	5	....	6.8
Q-4	10- 4-63	Qt	.....	.08	6	0	19	22	17	119	6.5
Q-5	12- 9-63	Km	.....	2.0	111	0	3.0	75	0	....	8.2
Q-6	10-21-63	Qt,Ke	.....	1.5	24	0	11	29	9	....	7.1
Q-7	10-21-63	Ke,Km	.....	2.6	64	0	5.0	50	0	....	8.0
Q-8	10-21-63	Qt	.....	.11	11	0	14	18	9	....	6.2
Q-9	10-21-63	Km	.....	5.8	18	0	4.0	10	0	....	7.1
Q-12	11- 7-63	Km	.....	.59	93	0	5.0	56	0	....	7.4
Q-14	11- 7-63	Km	.....	14	23	0	3.0	15	0	....	7.0
Q-15	10-21-63	Qt	.....	.23	18	0	42	22	7	....	6.9
Q-16	10-28-63	Km	.....	18	18	0	3.0	20	5	....	7.5
Q-17	10-18-63	Ke,Km	66	.28	128	0	5.0	5	0	....	8.2
Q-18	10-18-63	Ke,Km	66	.26	112	2	4.0	6	0	....	8.4
Q-19	10-21-63	Km	.....	1.6	94	0	4.0	70	0	....	7.0
R-2	9- 3-63	....	64	15	28	0	4.0	26	3	....	7.1
R-3	9- 3-63	....	64	15	31	0	3.0	28	3	....	7.2
R-4	11-12-63	Kg	65	14	59	0	6.0	45	0	....	6.6
R-6	3-19-63	....	65	14	46	0	3.0	41	3	....	7.9
*R-8	10- 8-63	Km,Kg, Kck	69	12	43	0	7.5	30	0	94	7.3
R-9	10- 8-63	Km	66	1.4	59	0	5.1	42	0	126	7.5
R-10	10-18-63	Km	.....	.68	14	0	11	25	14	....	7.1
R-11	11- 7-63	Km	.....	.70	19	0	74	36	20	....	6.2
R-12	10- 8-63	Km,Kg	66	1.7	63	0	2.6	47	0	118	7.5
R-13	11- 4-63	Qt,Km	.....	.08	6	0	6.0	11	6	....	6.1
R-14	10-25-63	Km	.....	1.5	75	0	4.0	54	0	....	8.2
R-15	10-25-63	Qt	.....	.11	10	0	10	12	4	....	7.3
R-16	11- 7-63	Km,Kg	.....	1.1	130	0	4.0	94	0	....	8.2
*R-18	9-20-63	Km,Kg	65	7.0	74	0	5.0	58	0	....	8.0
S-1	11-13-63	Kg	.....	18	21	0	6.0	18	1	....	5.8
S-2	11-13-63	Kg	.....	7.5	46	0	2.0	38	0	....	7.7
S-3	11-13-63	Km	.....	.41	5	0	46	36	32	....	6.6
T-1	11-14-63	Kg	.....	1.1	10	0	3.0	10	2	....	6.5
T-2	12- 3-63	Kg	.....	10	14	0	1.0	11	0	....	6.8
T-3	12-10-63	Kg	.....	.84	9	0	4.0	10	3	....	5.7
T-4	12-10-63	Kg	.....	.20	5	0	2.0	8	4	....	6.4
T-5	12- 3-63	Kg	.....	.30	11	0	2.0	11	2	....	6.7
T-6	12- 3-63	Kg	.....	3.2	14	0	1.0	8	0	....	6.9
T-7	11-22-63	Kg	.....	.....	9	0	18	25	18	....	6.1
U-1	10-16-63	Kg	.....	.22	8	0	27	22	15	....	6.6
U-2	11-22-63	....	.....	.....	87	6	1.0	78	0	....	8.8
U-3	10-16-63	Kg	.....	.42	11	0	3.0	10	1	....	7.0
U-4	10-16-63	Kg	66	.04	10	0	4.0	10	2	....	7.0
U-5	11-22-63	Kg	.....	12	66	0	2.0	48	0	....	7.7

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$ Calcium, magnesium	Noncarbonate	Specific conductance (micromhos at 25° C)	pH
U-6	11-22-63	Km	.....	0.57	17	0	40	172	158	....	7.1
U-7	11-22-63	....	.....	4.8	51	0	2.0	39	0	....	7.7
V-1	11-22-63	Km	.....	4.1	29	0	2.0	16	0	....	6.7
V-2	11-22-63	Kg	.....	26	28	0	2.0	22	0	....	7.3
V-3	11-22-63	Kg	.....	13	21	0	2.0	16	0	....	7.0
V-4	11-22-63	Kg	.....	29	34	0	2.0	26	0	....	7.5
W-1	11- 7-63	Kg	.....	17	16	0	2.0	10	0	....	6.1
W-2	10-16-63	Km	65	.87	98	0	3.0	65	0	....	8.2
W-3	10-11-63	....	66	.97	85	0	3.0	60	0	157	7.6
W-4	10-16-63	....	65	.85	88	0	1.0	64	0	....	7.2
W-5	10-16-63	....	67	.36	84	0	2.0	62	0	....	8.1
W-6	10-16-63	Km	66	1.0	86	0	2.0	65	0	....	8.1
W-7	10-17-63	Km	.....	19	55	0	5.0	49	4	....	7.6
W-8	10-21-63	Km	.....	.71	96	0	9.0	50	0	....	8.1
W-9	7-27-58	Km	.....	.2	......	.....	3.5	46	....	....	6.2
W-11	10-11-63	Km	67	.07	92	0	3.4	14	0	163	7.7
W-12	10-11-63	Km,Kg	66	.09	97	0	3.5	16	0	162	7.3
W-13	11- 4-63	Km,Kg	65	.05	94	0	6.0	15	0	....	8.1
W-14	11- 4-63	Km	65	.04	93	0	4.0	12	0	....	7.9
W-15	11- 4-63	Km	66	.04	96	0	4.0	18	0	....	7.3
W-16	10-11-63	Km	66	.16	92	0	2.8	20	0	160	7.7
W-17	10-11-63	Km	66	.09	94	0	1.6	22	0	164	7.8
W-18	10-11-63	Km	66	.08	95	0	2.6	21	0	163	7.7
W-19	10-11-63	Km	66	.09	96	0	2.8	16	0	157	7.7
W-20	10-15-63	Km	.....	.19	96	0	3.0	15	0	157	7.7
W-21	10-15-63	Km	.....	.09	92	0	3.0	10	0	156	7.3
W-22	10-15-63	....	67	.08	95	0	3.5	15	0	158	7.8
W-23	10-15-63	....	66	.11	95	0	3.1	20	0	159	7.8
W-24	10-11-63	Km	66	.10	96	0	3.3	20	0	162	7.7
W-25	10-15-63	Km	67	.10	94	0	2.0	20	0	154	7.3
W-26	10-15-63	Km	67	.11	93	0	3.0	21	0	157	7.7
W-27	10-15-63	Km	66	.08	91	0	3.4	18	0	154	7.7
W-28	10-11-63	Km	66	.09	96	0	3.8	18	0	160	7.8
W-29	10-11-63	Km	66	.11	96	0	2.0	22	0	163	7.8
X-1	10-21-63	Km	.....	3.9	80	0	6.0	58	0	....	6.9
*X-2	10-21-63	Km	.....	1.1	106	0	4.0	62	0	....	7.3
X-3	10-18-63	....	.....	.08	132	4	6.0	32	0	....	8.5
X-4	10-25-63	Ke,Km	.....	.68	67	0	30	59	4	....	6.7
X-5	9-10-63	....	67	.22	127	5	2.0	6	0	....	8.6
X-6	9-18-63	....	66	.22	108	1	2.0	5	0	....	8.3
X-7	9-10-63	....	68	.05	142	5	3.0	5	0	....	8.6
X-8	10-18-63	Km	.....	.10	128	2	6.0	21	0	....	8.4
X-12	9-18-63	....	66	.39	136	2	2.0	6	0	....	8.4
X-13	9-10-63	....	66	.09	110	3	4.0	6	0	....	8.5
X-14	10-25-63	....	66	.20	124	0	9.0	8	0	....	8.2
X-15	11-18-63	....	66	.05	112	0	2.0	4	0	....	8.0
X-16	11-18-63	Ke,Km, Kg	66	.08	93	0	2.0	20	0	....	7.9
*X-20	11- 4-63	Ke	66	.04	116	0	6.0	6	0	....	7.7

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
X-21	11- 4-63	....	66	0.07	131	2	6.0	5	0	....	8.3
X-24	11-18-63	....	66	.06	112	0	2.0	5	0	....	8.2
X-25	11-18-63	....	66	.13	126	0	3.0	2	0	....	8.1
X-26	9-18-63	Ke,Km, Kg	.....	.11	93	2	3.0	5	0	....	8.4
*X-27	8-15-63	Ke,Km, Kg	68	.14	92	2	4.0	11	0	....	8.3
X-28	10-28-63	....	66	.08	156	5	7.0	5	0	....	8.5
X-29	10-28-63	....	66	.20	104	2	9.0	5	0	....	8.4
X-30	10-28-63	....	66	.02	189	6	8.0	4	0	....	8.6
X-31	10- 7-63	....	66	.10	151	0	3.3	2	0	243	8.0
Y-2	9-18-63	....	66	.14	120	4	4.0	5	0	....	8.6
Y-3	9-10-63	....	68	.20	142	2	3.0	5	0	....	8.4
Y-4	10-28-63	....	67	.01	98	2	9.0	11	0	....	8.3
Y-5	9-21-63	Ke,Km	66	.07	154	6	8.0	5	0	....	8.6
Y-6	9-26-63	Ke,Km	70	.10	91	0	4.4	5	0	156	7.8
Y-7	9-26-63	Ke,Km	68	.09	124	0	4.1	2	0	201	7.9
Y-8	9-26-63	Ke,Km	.....	.09	119	0	3.8	6	0	196	7.9
Y-9	9-21-63	Ke,Km	70	.05	146	5	8.0	5	0	....	8.6
Y-10	9-26-63	....	68	.09	169	0	7.1	4	0	282	8.1
Z-1	9-21-63	Ke,Km	67	.08	170	8	10	8	0	....	8.7
Z-2	9-21-63	Ke,Km	68	.03	166	6	13	8	0	....	8.6
Z-3	9-21-63	Ke,Km	68	.03	162	6	13	8	0	....	8.6
Z-4	9-21-63	Ke,Km	68	.04	165	7	10	5	0	....	8.7
*Z-5	9-26-63	Ke,Km	.....	.06	240	0	54	3	0	531	8.2
Z-6	9-26-63	....	.....	.09	233	0	18	8	0	407	8.2
Z-7	9-20-63	Ke,Km	66	.06	190	6	10	6	0	....	8.6
Z-8	9-20-63	Ke,Km	.....	.20	188	6	4.0	10	0	....	8.6
Z-9	9-20-63	Ke,Km	67	.05	126	2	6.0	5	0	....	8.3
Z-10	3-19-63	....	.....	.06	193	6	14	8	0	....	8.6
Z-11	9-20-63	Ke,Km	68	.03	219	8	61	12	0	....	8.6
Z-13	3-14-63	Ke	68	.16	218	12	200	21	0	....	8.7
Z-14	3-14-63	Ke,Km	67	.04	222	12	50	4	0	....	8.8
Z-16	3-19-63	Ke,Km	.....	.04	220	8	240	64	0	....	8.5
Z-17	3-19-63	Ke,Km	.....	.07	212	12	270	12	0	....	8.6
Z-18	3-14-63	Ke	.....	.88	222	10	300	30	0	....	8.8
Z-19	3- 8-63	Ke,Km	.....	.33	138	4	20	14	0	....	8.6
AA-1	10-10-63	....	66	.07	83	0	2.3	14	0	155	7.7
AA-2	10-10-63	....	65	.06	97	0	3.4	10	0	159	7.8
AA-3	10-10-63	....	66	.06	89	0	3.3	12	0	158	7.7
AA-4	10-10-63	....	65	.05	97	0	3.5	11	0	159	7.7
AA-5	10-10-63	....	66	.12	97	0	3.4	10	0	157	7.8
AA-6	10-28-63	Ke	67	.08	148	2	8.0	4	0	....	8.4
AA-7	10-28-63	Ke	66	.07	141	4	7.0	5	0	....	8.6
AA-8	10- 7-63	....	67	.15	171	0	4.6	5	0	271	8.1
AA-9	10-28-63	....	66	.17	141	3	6.0	4	0	....	8.4
AA-10	8-15-63	Km	69	.04	118	3	2.0	8	0	....	8.5
AA-12	10-28-63	....	67	.05	144	4	8.0	5	0	....	8.5

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
AA-13	10-28-63	....	68	0.04	138	3	6.0	5	0	....	8.4
AA-15	3- 8-63	....	69	.08	104	0	8.0	10	0	....	7.9
AA-16	3- 8-63	....	68	.14	95	2	6.0	12	0	....	8.3
AA-18	3- 8-63	....	68	.07	117	2	5.0	8	0	....	8.4
AA-20	10- 7-63	....	66	.06	108	0	13	9	0	213	7.8
AA-21	10-10-63	Ke,Km	66	.19	107	0	3.9	10	0	174	7.9
AA-22	10-10-63	Ke,Km	66	.09	102	0	3.1	6	0	165	7.8
AA-23	10- 8-63	....	66	.09	112	0	4.1	8	0	182	7.8
AA-25	9-20-63	Ke,Km	69	.04	136	3	6.0	6	0	....	8.4
AA-28	10- 8-63	....	66	.04	151	0	7.0	4	0	249	8.0
AA-29	10-10-63	Km(?), Kg	68	.46	100	0	5.0	35	0	166	7.8
*AA-30	10-10-63	Km(?), Kg	69	.35	99	0	3.4	28	0	160	7.8
AA-31	10-10-63	Km(?), Kg	68	.31	97	0	3.4	23	0	162	7.7
AA-32	10- 7-63	....	67	.10	118	0	5.5	8	0	200	7.9
AA-33	10- 7-63	Ke,Km	66	.04	142	0	7.0	5	0	234	8.1
AA-34	10- 8-63	Ke,Km	66	.13	169	0	7.7	4	0	275	8.1
AA-35	10- 8-63	Ke,Km, Kg	70	.16	102	0	13	10	0	198	7.8
AA-37	9-20-63	Ke,Km	69	.05	170	6	10	6	0	....	8.6
AA-38	9-20-63	Ke,Km	69	.02	229	6	150	14	0	....	8.5
AA-40	10- 7-63	....	.....	.09	166	0	12	5	0	288	8.1
AA-41	10- 7-63	....	.....	.16	185	0	10	5	0	312	8.2
AA-43	10- 7-63	Ke	66	.39	207	0	13	5	0	345	8.1
AA-44	10- 7-63	....	67	.07	178	0	11	4	0	302	8.1
BB-1	12-18-63	Km	.....	1.4	118	0	3.0	60	0	....	8.0
BB-2	10-15-63	Km	66	.12	92	0	3.2	16	0	156	7.7
BB-3	10-15-63	Km	66	.12	95	0	3.3	15	0	157	7.8
BB-4	10-10-63	Km	66	.10	104	0	6.9	18	0	172	7.5
BB-5	10-10-63	....	66	.07	95	0	2.8	11	0	159	7.8
BB-6	10-10-63	....	66	.09	93	0	2.7	12	0	157	7.7
BB-7	10-15-63	Km	65	.07	94	0	3.5	13	0	154	7.7
BB-8	10-15-63	Km	65	.09	93	0	3.3	13	0	157	7.8
BB-9	10-17-63	Km,Kg	.....	.30	8	0	2.0	14	7	....	7.3
BB-10	10-17-63	Km,Kg, Kck	.....	6.3	65	0	3.0	38	0	....	8.0
BB-12	10-17-63	Ke,Km	.....	1.4	65	0	6.0	56	3	....	8.1
BB-13	10-17-63	Km	.....	.45	94	0	2.0	40	0	....	8.1
BB-14	10- 8-63	Ke,Km	.....	.06	111	0	3.6	6	0	180	7.9
BB-15	10- 7-63	Ke,Km	67	.29	104	0	3.8	8	0	166	7.9
BB-16	10- 7-63	....	66	.07	134	0	4.1	7	0	213	7.8
BB-17	10-15-63	....	66	.07	101	0	4.0	5	0	167	7.7
BB-18	10-15-63	....	65	.06	124	0	8.1	5	0	214	7.9
BB-19	10-15-63	....	65	.05	120	0	9.0	7	0	208	7.9
BB-20	10- 8-63	....	67	.08	126	0	4.8	7	0	206	7.9
CC-1	10-16-63	Km,Kg	66	5.2	47	0	2.0	35	0	....	8.0
DD-1	9-26-63	....	67	.08	254	0	44	5	0	522	8.2

Table 7.—*Partial chemical analyses of water from wells*—Continued
(in parts per million)

Well or spring	Date of collection	Water-bearing unit	Temperature (° F)	Iron (Fe)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25° C)	pH
								Calcium, magnesium	Noncarbonate		
DD-2	3- 8-63	Ke	67	0.07	234	10	118	9	0	....	8.6
DD-3	3- 8-63	Ke	67	.06	208	18	182	11	0	....	8.7
DD-4	9-20-63	Ke	69	.04	224	0	227	18	0	....	7.9
DD-5	9-20-63	Ke,Km	.....	.27	177	8	215	16	0	....	8.5
EE-2	3-14-63	Ke,Km	.....	.10	224	10	290	18	0	....	8.6

Table 8.—*Summary of quality-of-water data*

	Number of samples	Iron (Fe)			Bicarbonate (HCO_3)			Chloride (Cl)			Hardness as $CaCO_3$ (Ca, Mg)		
		High	Median	Low	High	Median	Low	High	Median	Low	High	Median	Low
Wells less than 50 feet deep.	71	14	0.20	0	90	18	2	207	13	2	181	22	8
Wells more than 50 feet deep and in Coker Formation (Kck)	8	10	.25	.07	22	13	10	5	3	2	19	11	5
Wells more than 50 feet deep and in Gordo Formation (Kg)	102	29	.90	.03	100	14	4	69	4	1	68	11	2
Wells more than 50 feet deep and in McShan Formation (Km)	62	22	.70	.04	128	92	10	74	4	1	76	21	8
Wells more than 50 feet deep and in Eutaw Formation (Ke)	13	.88	.08	.04	234	207	14	300	8	2.9	40	10	4
Flowing wells from Eutaw and McShan Formations (Ke, Km)	26	2.9	.07	.02	229	142	87	150	6	2	19	6	2

Table 9.—*Comprehensive chemical analyses of water from selected wells*

[Water-bearing unit: Kck, Coker Formation; Kg, Gordo Formation; Km, McShan Formation; Ke, Eutaw Formation]

Well	Date of collection	Water-bearing unit	Silica (SiO_2)	Aluminum (Al)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25° C)	pH
			Parts per million																		
H-8	9-25-62	Kg	8.7	....	1.6	0.0	9.2	1.9	3	4.4	46	0	0.0	2.3	0.2	0.01	55	31	0	88	7.0
[1]I-16	1-27-40	Kg	....	....	.1	.1	....	....	.....	....	.....	....	....	16	0	.....	.....	5	....	......	6.4
[1]I-17	2-15-60	Kg	7.0	nil	nil	nil	1.4	.7	2.9	1.0	12.2	....	4.9	nil	....	nil	30.1	6.4	....	......	5.4
I-21	2-10-64	Kg	12	....	.01	....	2.0	.2	.9	.8	6	0	0	2.7	0	0	22	6	1	26	5.3
J-13	2-19-64	Kck	15	....	2.7	....	2.0	0	.9	1.4	9	0	0	.8	0	0	24	5	0	25	5.4
[1]K-13	11-22-60	Kck	17.2	....	.21	....	2.3	1.0	3.1		22.5	0	2.8	3.6	.2	.....	35	10.9	....	......	5.4
O-14	2-10-64	Ke	14	....	.29	....	10	2.9	17	6.2	88	0	5.8	2.4	0	0	101	37	0	158	6.8
P-3	2-10-64	Ke,Km	11	....	.36	....	1.9	.3	35	2.8	92	0	6.4	1.7	0	.4	104	6	0	163	7.1
R-8	2-10-64	Km,Kg, Kck	11	....	3.7	.34	8.7	2.0	3.2	4.8	39	0	0	6.6	.2	0	56	30	0	94	5.4
R-18	2-10-64	Km,Kg	12	....	3.8	....	13	4.0	2.8	5.5	65	0	5.4	2.2	.1	1.0	78	49	0	128	6.4
X-2	2-10-64	Km	24	....	2.2	....	16	3.7	15	4.5	108	0	0	1.8	.1	.5	119	55	0	181	6.9
[1]X-17	3-15-43	Kg	10.6	....	.14	....	1.7	.7	34.5		96.4	.6	5.3	5.5	....	.....	120	7.2	....	......	8.0
[1]X-18	3-15-43	Kg	5.6	....	1.5	....	5.4	1.7	24.1		97.6	0	1.5	5.5	....	.....	101	20.7	....	......	7.6
[1]X-19	12-22-42	Km	10.8	....	.15	....	2.9	1.0	28.5		89.1	0	3.1	6.8	....	.....	92	12	....	......	7.5
X-20	2-10-64	Ke	12	....	.04	....	1.0	.4	43	2.0	115	0	0	3.2	.2	.0	119	4	0	182	7.3
[1]X-23	12-29-42	Km	10.4	....	....	....	5.7	1.4	26.2		95.2	0	3.0	5.5	....	.....	94	19.9	....	......	7.7
X-27	2-10-64	Ke,Km, Kg	10	....	.33	....	3.2	.5	32	2.8	93	0	0	2.8	.1	.0	97	10	0	153	7.2
Z-5	2-10-64	Ke,Km	12	....	.04	....	2.0	.2	124	2.3	243	0	0	51	.5	.2	312	6	0	525	7.4
AA-30	2-10-64	Km(?), Kg	11	....	.30	....	8.7	1.5	22	4.8	93	0	.2	2.9	.0	.0	97	28	0	152	6.9

[1] Analysis from Alabama Department of Public Health.