UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Federal Center, Denver, Colorado 80225

In reply refer to:

Technical Letter
Dribble-40
February 11, 1964

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Nevada Operations Office
U.S. Atomic Energy Commission
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TECHNICAL LETTER: DRIBBLE-40
HYDROLOGIC AND PHYSICAL PROPERTIES OF
CORES FROM HYDROLOGIC TEST SITES
1 AND 2, TATUM DOME, LAMAR COUNTY,
MISSISSIPPI

By

A. I. Johnson and A. H. Ludwig

USGS-474-296

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William E. Hale

William E. Hale
Program Supervisor, Dribble
General Hydrology Branch

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TECHNICAL LETTER: Dribble-40

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CORES FROM HYDROLOGIC TEST SITES
1 AND 2, TATUM DOME, LAMAR COUNTY,
MISSISSIPPI

By

A. I. Johnson and A. H. Ludwig
February 11, 1964

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Technical Letter
Dribble-40
February 11, 1964

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HYDROLOGIC AND PHYSICAL PROPERTIES OF CORES FROM HYDROLOGIC TEST
SITES 1 AND 2, TATUM DOME, LAMAR COUNTY, MISSISSIPPI

By

A. I. Johnson and A. H. Ludwig

INTRODUCTION

As part of the safety evaluation for Project Dribble at the Tatum Salt Dome in Lamar Co. Miss., the U.S. Geological Survey, on behalf of the U.S. Atomic Energy Commission, is making a study of ground-water conditions prior to the nuclear device experiments. Among other information, this objective required knowledge of the physical and hydrologic characteristics of the aquifers. This report summarizes some of the physical and hydrologic properties of the less permeable sediments as determined from sidewall cores taken from test holes.

Basic data for determining the physical and hydrologic characteristics of the higher yielding aquifers have been obtained in the field by aquifer tests--the pumping from one well while measuring the effect on the water level in the pumped and nearby wells--and in the laboratory by analysis of samples. The field aquifer tests were summarized and discussed in Technical Letter Dribble-32, "Results of Aquifer Tests at Hydrologic Test Sites 1 and 2, Tatum Dome, Lamar County, Mississippi," by F. C. Koopman, A. I. Johnson, C. A. Armstrong, and R. E. Taylor.

The laboratory analyses summarized and discussed in this report are used to provide supplemental details on some of the aquifer materials but are especially needed to provide quantitative information on the sediments forming the confining or semiconfining beds.

Laboratory phases of the project were supervised by the senior author, chief of the Hydrologic Laboratory, U.S. Geological Survey, and the analyses were made by R. P. Moston, A. H. Ludwig, and C. V. Grant at that laboratory, in Denver, Colorado.

METHODS OF INVESTIGATION

During the period April through June 1961, two hydrologic test holes (HT-1 and HT-2, fig. 1) were drilled at two sites near Tatum Dome. Lithologic logs were prepared and geophysical logs were made to determine the sequence and general characteristics of the sediments penetrated by each of these holes. Sidewall cores were taken at specified depths and the hydrologic and physical properties of these cores were then determined in the Hydrologic Laboratory.

Collection of Samples

Cores of the sediments at Hydrologic Test Holes 1 and 2 were obtained by use of a Hunt Side-wall Coring Tool. This sampler, operated through drill pipe as a wire-line core barrel, is manufactured by the Hunt Tool Company, Houston, Tex., and is illustrated in figure 2.

To start the coring operation, the regular bit on the drill pipe is replaced with a special bit and drill-collar section with a side opening and deflector for the sidewall core shoe. The core shoe is connected

Figure 1. -- Location of Hydrologic Test Wells 1 and 2, Tatum Dome, Lamar County, Miss.

A

Figure 2.--Hunt Side-Wall Coring Tool. A, Coring operation; B, Sinker bar and overshot assembly on left, drill-collar assembly in center, and latch assembly on right. (Illustrations courtesy Hunt Tool Co., Houston, Tex.)

GPO 840-028

B

through a hinge pin to a latch-body assembly, which in turn is attached to a wire-line sinker bar by means of an overshot. This complete assembly is lowered through the drill pipe by means of a wire line until the core shoe hits the deflector and is seated in the formation to be cored (left in fig. 2A). The latch locks the latch-body, with attached sinker bar, to the drill-collar assembly, and, by slowly lowering the drill pipe a few inches, the core shoe is then pushed farther into the wall of the hole (middle and right in fig. 2A). A slight upward movement of the drill-collar assembly and drill pipe pulls the core shoe out of the side wall of the hole and returns the shoe to a downward deflected position. When the overshot is pulled by the wire line, the latch is released, the overshot jaws engage the latch plunger on the latch assembly, and the core shoe then may be retrieved through the drill pipe to the surface.

Core shoes used on the Hunt Side-Wall Coring Tool range from 4 to 15 inches in length and the core diameters range from $7/8$ to $1\ 3/8$ inches. For the coring in Hydrologic Test Holes 1 and 2, the drill-collar assembly was of $7\ 3/4$ -inch diameter and the core shoe was 9 inches long. The collected cores were $1\ 3/8$ inches in diameter and 4 to 8 inches long.

As soon as each core was collected, it was carefully wrapped in aluminum foil and packed in glass jars for shipment to the laboratory. Upon receipt in the laboratory, the samples were left in their glass containers until just prior to being used for the permeability test, thus preventing loss of moisture and reducing the possibility of contraction and cracking of the samples.

Laboratory Analysis Methods and Definitions

When the cores were removed from the sealed containers in the laboratory, they were trimmed by hand--if they were of a friable material, or with a diamond saw--in the case of a more dense material. The dimensions of the core were then determined and the core was placed in a 2- x 2-inch brass cylinder. Melted sealing wax was poured in the cylinder, around the core, and allowed to cool, thus forming an impermeable seal between the core and the cylinder wall and insuring that water passed only through the core.

The part of the sample not used for the permeability determination was air-dried. The chunks of air-dry material were then separated into individual particles by use of a mortar and rubber-covered pestle, care being taken to prevent crushing of the individual particles.

Samples were analyzed in the laboratory by standard methods described briefly in the following paragraphs. More detailed information on theory and methods of analysis may be obtained by referring to publications by the American Society for Testing and Materials (1958) and by Johnson and Morris (1962).

Specific Gravity of Solids

Specific gravity of solids, G , is the ratio of the unit weight of the solid particles, γ_s , to the unit weight of distilled water at 4°C, γ_w .

The volumetric-flask method was used for determining specific gravity. The sample was disaggregated into individual particles and a weighed overdry portion was dispersed in water in a calibrated volumetric flask.

The volume of the particles was equivalent to the volume of displaced water. The unit weight of the solid particles, γ_s , was obtained by dividing the dry weight of the sample by the volume of the solid particles. The specific gravity of solids then was obtained by dividing the unit weight of solids by the unit weight of water.

Dry Unit Weight

Dry unit weight, γ_d , is the weight of "soil" solids per unit of total volume of "soil" mass and normally is reported in grams per cubic centimeter or pounds per cubic foot. Total void space as well as solid particles are represented by the dry unit weight. The dry unit weight divided by the unit weight of distilled water at a stated temperature (usually 4°C) is known as the apparent specific gravity and has no units.

The volume of the trimmed cores was obtained by measurement of the core dimensions. This volume and the oven-dry weight of the core were then used to calculate the dry unit weight, for

$$\gamma_d = \frac{W_s}{V},$$

where γ_d = dry unit weight, in grams per cubic centimeter;

W_s = oven-dry weight of sample, in grams;

V = total volume of "soil" mass, in cubic centimeters.

The dry unit weight in grams per cubic centimeter is multiplied by 62.4 to convert to pounds per cubic foot.

Porosity

Porosity is defined as the ratio of (1) the volume of the void spaces to (2) the total volume of the rock or soil mass, and usually is expressed as a percentage.

Therefore,
$$n = \frac{V_v}{V} (100) = \frac{\gamma_s - \gamma_d}{\gamma_s} (100),$$

where

n = porosity, in percent,

V_v = volume of voids, in cubic centimeters,

V = total mass volume, in cubic centimeters,

γ_s = unit weight of particles, in grams per cubic
centimeter (equal numerically to specific gravity
of solids, in the metric system),

γ_d = dry unit weight of sample, in grams per cubic centi-
meter.

After the dry unit weight and the specific gravity of solids for the sample had been determined, the porosity was calculated by using the above equation.

Permeability

Permeability is the capacity of rock or incoherent material to transmit water under a pressure differential. It is determined in the laboratory by observing the rate of percolation of water through a sample of known length and cross-sectional area, under a known difference in head.

The coefficient of permeability used by the Ground Water Branch of the U.S. Geological Survey is defined (Wenzel, 1942, p. 7) as the rate of flow of water, in gallons per day, through a cross-sectional area of 1 square foot under a hydraulic gradient of 1 foot per foot at a temperature of 60°F. Permeability in gallons per day per sq ft divided by 0.0205 is equal to permeability in feet per year. Because relatively pure water is assumed, and exists in the aquifers at the test site, density has been neglected.

Coefficients of permeability were determined by use of variable-head permeameters (Johnson and Morris, 1962, p. 23). The brass cylinders with sealed-in cores were installed directly in the permeameter.

Entrapped air in a sample may cause considerable plugging of pore space and thus reduce the apparent coefficient of permeability. Therefore, a specially designed vacuum system is used by the Hydrologic Laboratory to provide the deaired tap water used as the percolation fluid. (See Johnson, Prill, and Morris, 1962, p. 24, for chemical analysis of the water.) The reported coefficient of permeability is the maximum value obtained after several test runs and represents saturation permeability.

Because coefficients of permeability reported from the laboratory are defined for a water temperature of 60°F, the permeability must be corrected for the temperature of the ground water before being applied to field problems (Wenzel, 1942, p. 7).

Particle-Size Distribution

A particle-size analysis, also termed "mechanical analysis," is the determination of the distribution of particle sizes in a sample. Particle sizes smaller than 0.0625 mm were determined by the hydrometer method of sedimentation analysis, and sizes larger than 0.0625 mm were by wet-sieve analysis.

From the hydrometer analyses and the sieve analyses, the percentage of the particles smaller than a given size was calculated and plotted as a cumulative distribution curve. The particle sizes, in millimeters, were plotted as abscissas on a logarithmic scale and the cumulative percentages of particles smaller than the size shown, by weight, as

ordinates on an arithmetic scale. The percentage in each of several size ranges was then determined from this curve.

The analyses were divided into the following groups according to their particle sizes.

<u>Particle Description</u>	<u>Particle Diameter (mm)</u>
Gravel	Greater than 2.0
Very coarse sand	1.0 - 2.0
Coarse sand	0.5 - 1.0
Medium sand	0.25 - 0.5
Fine sand	0.125 - 0.25
Very fine sand	0.0625 - 0.125
Silt-size	0.004 - 0.0625
Clay-size	Less than 0.004

This classification system is used officially by the Ground Water Branch, U.S. Geological Survey, and is identical to classifications proposed by Wentworth (1922) and the National Research Council (1947), except for further subdivisions of gravel, silt, and clay proposed by those authors. Subsequent references to sand, silt, and clay in this report will relate to sand-, silt-, and clay-size particles as specified in the foregoing table.

QUALITY OF SAMPLES

Cores, as collected by the Hunt Side-Wall Core Barrel , generally would be representative of the particle-size distribution in the lithologic units penetrated by the core shoe. However, the cores could not be considered as completely undisturbed samples in which the original structure and bedding planes were intact.

The core shoes are of necessity relatively small in diameter and have thick walls. This produces an area ratio (area of core diameter divided by area of outside diameter of core shoe) too small to prevent stresses in the formation and thus leads to disturbance of the core structure. Because the core shoe moves in an arc (fig. 2) into the horizon being sampled, the bedding planes may be nearly perpendicular to the axis of the core shoe at the start of a coring operation and gradually change through a series of angles until they may be parallel to the axis of the shoe by the end of a coring operation. This disadvantage can, of course, be overcome by using only the portion of core nearest the tip of the shoe for permeability tests.

The small diameter of the core shoe prevents entry of any gravel over 1 inch in diameter and probably eliminates much of the gravel over one-half inch in diameter. However, the reverse taper of the core shoe permits the core to have traveling and expansion room as the shoe penetrates the sediments, resulting in less disturbance of the cores and in better recovery of sample within the shoe.

Test holes generally are drilled by hydraulic-rotary methods, and drilling mud is used to prevent loss of circulation in the more permeable sections of the holes. The mud penetrates in varying amounts into the materials at the side of the hole, replacing the natural water in the voids of the formation. If the core shoes are too short, a large part to all of the core length may be in the zone invaded with drilling mud.

Thus, it is important to use as long a core shoe as possible and to use, for laboratory tests, the portion of the core closest to the tip of the shoe.

To accurately interpret, by laboratory analysis, the hydrologic and physical properties of the sediments as they exist under their natural in-place condition requires cores of good quality and sufficient number to be statistically representative of the complete geologic section. The cores not only should contain representative proportions of each size of particle (called "representative samples") and should retain their natural structure and bedding planes (called "undisturbed samples"), but also should be uncontaminated by drilling mud--or other types of drilling fluids or compounds.

All of the previously discussed factors will affect the quality of samples and in turn have a variety of effects on the properties which are indicated by laboratory analysis. The cumulative effect the various factors may have had on each property for side-wall cores collected from Tatum Dome is discussed in the next section of this report.

EVALUATION OF LABORATORY ANALYSIS DATA

The depth where each core was collected and its laboratory sample number are shown for all cores from HT-1 in figure 3 (Appendix) and for all cores from HT-2 in figure 4 (Appendix). These illustrations also permit evaluation of the core locations in relation to lithologic and geophysical logs and to location of the various aquifers. Data resulting from the laboratory analyses are reported in tables 1 and 2 in the Appendix.

For the samples analyzed, figures 5 through 20 (Appendix) show that most of the aquifers consist of very fine to fine sand--rather uniform in size distribution--with varying amounts of silt-size particles. Figures 5 through 20, as well as geophysical logs, indicate that there are many thin beds of silty and clayey sediments interspersed within the sections designated as aquifers (especially Aquifer 1). Samples from Local Aquifer at HT-2 were primarily coarse sands and fine gravels, and samples from Aquifer 2 at HT-2 were primarily medium to coarse sands with some fine gravels. Geophysical logs and samples indicate that the aquifer sediments may be slightly coarser in general at HT-2 than at HT-1. Most aquatards (low-permeability sediments between the aquifers) consist of silty clays to clayey silts.

Based on drilling logs and geophysical logs and a general knowledge of coring operations, there is evidence of much more coarse-textured materials in some of the aquifers (especially Aquifer 2) than is represented by the cores collected and analyzed. As discussed in the section "Quality of Samples," the coarsest particles did not enter the core shoe at all and some of the loose materials of medium to coarse texture may have dropped out of the core shoe as it was lifted to the surface. Thus, the samples are undoubtedly weighted towards the medium- or fine-textured sediments. Disturbance of the samples resulting from the design of the core shoe would not materially affect the particle-size distribution indicated by a sample. Because the percentage of each particle size is determined on a weight basis and the small amount of drilling mud would not affect these weights appreciably, any invasion of mud into the cored sediments also would not materially affect the particle-size distribution indicated by a sample.

Samples from HT-1 had specific gravity of solids ranging from 2.62 to 3.06 (Table 1, Appendix). Samples from HT-2 had specific gravity of solids ranging from 2.64 to 3.02 (Table 2, Appendix). The highest specific gravities were obtained for samples from the limestones and clays of the Catahoula Formation (Aquifer 3) and of the Cockfield Formation (Aquatard between Aquifers 4 and 5). The lowest specific gravities were obtained for samples from the Hattiesburg-Pascagoula Formations (Local Aquifer and Aquifer 1). The specific gravity of solids would not be affected particularly by any of the factors discussed under Quality of Samples.

The dry unit weight for samples from test hole HT-1 ranged from 1.53 to 2.09 g per cc and for samples from test hole HT-2 ranged from 1.45 to 2.12 g per cc. In general, the highest dry unit weights were obtained for samples from the limestones and clays of the Catahoula Formation (Aquifer 3) and the limestone of the Cook Mountain Formation. The lowest dry unit weights were obtained for samples from the Hattiesburg-Pascagoula Formations (Local Aquifer and Aquifer 1).

Samples from test hole HT-1 had porosities ranging from 23.4 to 50.0 percent and samples from test hole HT-2 had porosities ranging from 20.9 to 48.2 percent. In general, the highest porosities were obtained for samples from the limestones and clays of the Cockfield Formation (Aquatard between Aquifers 4 and 5) and from the Heterostegina zone of the Catahoula Formation (Aquatard between Aquifers 3 and 4). The lowest porosities usually were for samples from the lower limestones of the Cook Mountain Formation (Aquifer 5).

Drilling mud invading the sediments in the side of the test hole would tend to increase the dry unit weight and decrease the porosity of the cores. These changes would be reflected in the laboratory data, if the cores were from the invaded zone. Core disturbance resulting from the construction of the core shoe probably would cause an increase in dry unit weight and a decrease in porosity (due to compaction of the core) in the silts and clays, and the opposite effect (due to "bulking") would result in the sands and gravels. These increases or decreases might amount to as much as 4 to 5 percent (approximately 2 to 3 percent porosity, for example). Release of the overburden load will cause a decrease in dry unit weight and an increase in porosity when the core is removed from its natural position at some depth below the surface. This effect may amount to approximately 2 percent porosity for sands and gravels and as much as 5 percent porosity for silts and clays. The net result of all these effects would be an increase in porosity of approximately 1 percent and a decrease in dry unit weight of approximately 0.03 g per cc for silt and clay cores, and an increase in porosity of approximately 3 percent and a decrease in dry unit weight of approximately 0.08 g per cc for sand and gravel cores.

Samples from HT-1 had permeabilities ranging from 0.0003 to 4 gpd per square foot and samples from HT-2 had permeabilities ranging from 0.0002 to 2. The highest permeabilities were obtained from the gravelly sands of the Hattiesburg-Pascagoula Formations (Local Aquifer and Aquifer 1), and the lowest permeabilities were obtained from the clays of the Hattiesburg-Pascagoula Formations and from the clays and limestones of the Cockfield Formation.

Because even a small amount of mud will restrict the movement of water, the permeabilities of samples were probably reduced by the invasion of the drilling fluid--if the portion of the core tested was in the zone of mud penetration. Permeabilities of the sands and gravels may have been somewhat increased and of the silts and clays somewhat reduced by disturbance caused by the construction of the core shoe. Permeabilities indicative of flow parallel to the bedding planes may be reduced as much as one-tenth of their value if most of the tested portion of the core is in the section where the bedding planes are perpendicular to the axis of the core shoe. Because there usually is not as great a difference between permeability parallel to the bedding and perpendicular to the bedding in silts and clays, this effect would be greatest in sands and gravels.

Aquifer tests (Tech. Letter Dribble-32) indicate that the permeabilities of the aquifers range as much as several hundred times greater than the most permeable cores tested in the laboratory. However, this can be explained adequately by the lack of cores from the coarsest sediments.

CONCLUSIONS

Even if the properties of the cores may not be greatly affected by all of the factors discussed earlier, the cores should not be considered to represent an accurate interpretation of the average properties of the aquifers. Because of the lack of cores from the coarsest sediments, the full geologic section of any of the aquifers was not represented by the suite of cores analyzed in the laboratory. However, the

properties of the aquatard materials probably are represented quite well by the analyses of the cores obtained from those zones.

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APPENDIX

Section 12, T. 2 N., R. 16 W.
Elevation, 306.48 feet above sea level
Datum: rotary table, elevation 321 feet
Lithology from binocular microscopic examination of
cuttings and cores.

U.S. Geological Survey
August 1961

Figure 3. - Lithologic and electrical log of Hydrologic Test Hole-1, showing cored intervals and laboratory sample numbers.

Section 14, T. 2 N., R. 16 W.
Elevation, 295.05 feet above sea level
Datum: rotary table, elevation 302.4 feet
Lithology from binocular microscopic examination
of cuttings and cores.

U.S. Geological Survey
August 1961

Figure 4.--Lithologic and electrical log of Hydrologic Test Hole 2, showing cored intervals and laboratory sample numbers.

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	---	17.0	22.5	10.8	27.3	18.6	0.6	0.4	2.3	0.5		
	---	44.9	54.1	0.6	0.2	0.2						
	---	21.0	---	17.6	45.4	14.8	1.2					
---	23.3	38.7	29.4	8.4	0.2

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 – 0.0625 mm	V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	59.0	39.8	0.8	0.2	0.2

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	-----	19.6	33.4	46.4	0.6							
-----	14.4	5.8	36.8	42.2	0.8							
-----	26.6	12.1	24.1	32.5	4.1	0.6

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 – 0.0625 mm	V. fine 0.0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	————	24.0	8.4	19.4	44.2	3.6	0.4

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	33.3	57.1	5.8	2.4	0.8	0.2	0.4

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	29.4	60.0	10.0	0.4	0.2

% OF SIZE	PARTICLE SIZE GRADE PER AASHTO													
	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES						
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64		
—	6.5	2.3	3.1	9.3	16.2	11.6	16.4	28.4	6.2					
---	6.7	2.2	6.1	36.5	23.7	6.1	7.2	9.1	2.4

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
—	30.8	28.2	30.6	10.4	0.2							
- - -	25.7	54.3	18.0	1.8								
· · ·	40.0	50.2	8.6	1.2

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
—	32.4	64.2	3.0	0.4								
- - -	23.7	41.5	12.4	19.8	0.6							
· · ·	54.3	30.7	18.6	3.2	0.2							
· · ·	73.6	24.6	1.0	0.6	0.2

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
—	5.2	4.8	2.4	10.1	57.9	17.9	1.4	0.3				
- - -	25.7	51.5	19.4	3.4								
· · ·	27.7	54.5	16.0	1.6	0.2

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
—	6.2	9.8	29.6	51.2	3.2							
- - -	25.8	18.4	28.8	58.4	6.0	1.6						
· · ·	37.2	52.2	10.0	0.6								
· · ·	13.5	68.1	16.0	2.0	0.4

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine 0.625-1.25	Fine 1.25-2.5	Medium 2.5-5	Coarse 5-1	V. Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V. Coarse 32-64
—	32.5	54.3	10.2	2.6	0.4							
— — —	16.3		5.2	8.4	24.6	24.6	8.9	5.0	5.9	3.1		
· · ·	12.0		4.9	8.3	26.4	32.3	6.2	2.6	3.4	1.9		
· · ·	17.4	52.4	13.6	10.2	6.4

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine 0.625-1.25	Fine 1.25-2.5	Medium 2.5-5	Coarse 5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	52.2	42.0	2.2	2.8	0.8	13.2	0.6					
—	5.8	10.8	5.8	12.6	52.4	51.8	0.6					
· · ·	4.7	7.6	5.6	12.4	17.4	51.8	0.6					
· · ·	5.8	12.8	8.6	14.2	33.2	25.0

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine 0.0625-0.125	Fine 0.125-0.25	Medium 0.25-0.5	Coarse 0.5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————
	26.7	24.0	9.9	23.5	12.5	1.0	0.2	0.2	0.6	1.4		
	23.8	21.0	21.5	20.4	9.6	0.4						
	14.0	28.4	18.5	25.0	3.4	0.2						
	38.1	16.7	18.8	25.0	1.4							
	41.7	20.5	29.8	35.6	2.2

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 – 0.0625 mm	V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
_____	21.8	27.2	32.4	18.0	0.6							
-----	10.7	10.7	6.2	27.4	45.0							
-----	7.8	22.0	28.8	39.0	2.4

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 – 0.0625 mm	V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	———— 8.5	19.3	19.4	51.6	1.2							
———— 21.8	11.0	15.2	51.8	0.2

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V. Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V. Coarse 32-64
—	19.9	11.3	10.6	55.2	3.0							
- - -	15.6	23.2	13.4	39.0	8.8							
---	8.0	16.8	13.8	59.8	1.6

% OF SIZE	CLAY SIZES < 0.004 mm	SILT SIZES 0.004 - 0.0625 mm	SAND SIZES					GRAVEL SIZES				
			V. fine .0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V. Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V. Coarse 32-64
—	64.9	23.7	5.2	4.0	2.2							
- - -	63.6	32.8	2.8	0.6	0.2

Figure 20.--Particle-size distribution of samples of the Claiborne Formation (Cocksfield) between Aquifers 4 and 5, Hydrologic Test Hole 2.

% OF SIZE	CLAY SIZES	SILT SIZES	SAND SIZES					GRAVEL SIZES				
	< 0.004 mm	0.004 - 0.0625 mm	V. fine 0.0625-.125	Fine .125-.25	Medium .25-.5	Coarse .5-1	V.Coarse 1-2	V. fine 2-4	Fine 4-8	Medium 8-16	Coarse 16-32	V.Coarse 32-64
	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————	—————
	24.8	38.8	23.4	8.4	2.6							
	19.0	30.2	14.4	23.2	13.0	0.2						
	81.2	16.6	0.8	0.8	0.6							

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
61MIS1	474	1-474	Miocene, Hattiesburg-Pascagoula undifferentiated, clay	2.62	1.65	37.0	4
32	a ₂	1-518	do	2.67	1.94	27.3	----
	a ₃	1-544	do	2.70	1.89	30.0	----
	a ₄	1-596	do	2.69	1.74	35.3	----
	5	1-644	Miocene, Hattiesburg clay, sand	2.74	1.81	33.9	0.9
	a ₆	1-676	do	2.74	1.88	31.4	----
	b ₇	1-722	do	----	----	----	----
	8	1-744	do	2.68	1.68	37.3	.1
	9	1-775	do	2.71	1.77	34.7	.02
	10	1-824	Miocene, Hattiesburg clay, clay	2.70	1.86	31.1	.002
	11	1-880	Miocene, Hattiesburg clay, sand	2.65	1.59	40.0	.03

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
^b 61MIS12	912	1-912	Miocene, Hattiesburg clay, sand	----	----	----	----
13	942	1-942	do	2.66	1.76	33.8	2
³³ 14	978	1-978	Miocene, Hattiesburg clay, clay	2.78	1.95	29.9	.0003
15	1,046	1-1046	do	2.76	1.69	38.8	.0008
^b 16	1,080	1-1080	Miocene, Hattiesburg clay, sand	----	----	----	----
17	1,120	1-1120	do	2.67	1.67	37.5	.009
18	1,160	1-1160	Miocene, Catahoula sandstone, clay	2.69	1.84	31.6	.002
19	1,215	1-1215	Miocene, Catahoula sandstone, sand	2.74	1.85	32.5	.001
^b 20	1,233	1-1233	do	----	----	----	----
21	1,263	1-1263	do	2.68	1.72	35.8	.01

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
61MIS22	1,318	1-1318	Miocene, Catahoula sandstone, clay	2.77	2.02	27.1	0.002
23	1,328	1-1328	Miocene, Catahoula sandstone, sand	2.72	1.86	31.6	.001
24	1,347	1-1347	Miocene, Catahoula sandstone, clay	2.77	1.99	28.2	.002
25	1,371	1-1371	do	2.84	1.75	38.4	.004
26	1,431	1-1431	Miocene, Catahoula sandstone, Heterostegina Zone, limestone	2.78	1.91	31.3	.003
^a 27	1,459	1-1459	do	2.76	1.89	31.5	----
^a 28	1,513	1-1513	Miocene, Catahoula sandstone, Heterostegina Zone, clay	2.73	1.91	30.0	----
29	1,548	1-1548	Oligocene-Miocene, Paynes Hammock-sand Chickasawhay undif. (?)	2.74	1.94	29.2	.0007

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
61MIS30	1,588	1-1588	Oligocene-Miocene, Paynes Hammock-sand Chickasawhay undif. (?)	2.74	1.91	30.3	0.0003
35 a ₃₁	1,609	1-1609	Oligocene-Miocene, Paynes Hammock-clay Chickasawhay undif. (?)	2.70	1.90	29.6	----
b ₃₂	1,672	1-1672	Oligocene, Bucatunna clay, clay	----	----	----	----
b ₃₃	1,679	1-1679	Unknown	----	----	----	----
b ₃₄	1,687	1-1687	Oligocene, Mid Byram Member, sand	----	----	----	----
35	1,790	1-1790	Oligocene, Glendon limestone, limestone?	2.73	1.99	27.1	.006
a ₃₆	1,889	1-1889	Oligocene, Marianna limestone, limestone	2.73	1.89	30.8	----

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
61MIS37	1,899	1-1899	Unknown	2.77	2.02	27.1	0.004
38	1,913	1-1913	Oligocene, Red Bluff clay, clay	2.78	2.08	25.2	.001
36 ^a 39	1,925	1-1925	Oligocene, Red Bluff clay, calcareous clay	2.74	1.93	29.6	----
40	2,135	1-2135	Eocene, Moody's Branch, limestone	2.75	1.89	31.3	.003
41	2,164	1-2164	Eocene, Cockfield clay	2.81	1.80	35.9	.002
42	2,211	1-2211	do	2.87	1.62	43.6	.0009
43	2,221	1-2221	Eocene, Cockfield, limestone	3.06	1.53	50.0	.001
44	2,235	1-2235	Eocene, Cockfield, clay	2.89	1.95	32.5	.004
45	2,244	1-2244	Eocene, Cook Mtn., limestone	2.78	1.76	36.7	.01

Table 1.--Laboratory analysis data for samples from Hydrologic Test Hole 1, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 12,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
^b 61MIS46	2,246	1-2246	Eocene, Cook Mtn., limestone	----	----	----	----
37 47	2,295	1-2295	do	2.75	1.80	34.5	0.03
48	2,329	1-2329	do	2.76	1.79	35.1	.01
^c 49	-----	-----	--	-----	-----	-----	-----
50	2,347	1-2347	Eocene, Cook Mtn., limestone	2.74	2.01	26.6	.1
51	2,356	1-2356	do	2.73	2.09	23.4	.2
52	2,371	1-2371	do	2.73	1.93	29.3	.006
53	2,414	1-2414	Eocene, Cane River, silt	2.76	1.90	31.2	.0006

^a Samples disintegrated--could not run permeability test.

^b Samples taken from Hydrologic Laboratory for tests in other laboratories.

^c This number assigned to a core from well WP-1.

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS1	2,616	2-2616	Eocene, Cook Mtn., or Cane River, siltstone	2.80	1.56	44.3	0.0004
38 2	2,607	2-2607	Eocene, Cook Mtn., or Cane River, clay	2.92	1.82	37.7	.001
3	2,585	2-2585	Eocene, Cook Mtn., limestone	2.73	1.92	29.7	---
4	2,563	2-2563	do	2.72	1.70	37.5	.03
5	2,543	2-2543	do	2.72	1.73	36.4	.01
6	2,497	2-2497	do	2.77	1.68	39.4	.004
7	2,483	2-2483	do	2.72	1.74	36.0	.02
8	2,475	2-2475	do	2.74	1.64	40.1	---
9	2,467	2-2467	do	2.74	1.64	40.1	.2
10	2,451	2-2451	do	2.74	1.83	33.2	.004
11	2,435	2-2435	do	2.77	1.95	29.6	.1

30 percent porosity

$$.00067 \text{ gpd/ft}^2$$

$$.0001 \text{ ft}^3/\text{ft}^2$$

100' head in 400 ft

$$V = \frac{.0001 \times \frac{1}{4}}{.3}$$

$$= .0001' / \text{day}$$

$$= .04' / \text{year}$$

$$= \frac{100}{.04} = 10000 \text{ UN.}$$

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS12	2,419	2-2419	Eocene, Cook Mtn., very near contact of Cockfield	2.88	1.68	41.7	0.003
39 13	2,405	2-2405	Eocene, Cockfield clay	2.85	1.80	36.8	.0002
14	2,393	2-2393	do	3.02	1.77	41.4	.006
15	2,360	2-2360	do	2.78	1.78	36.0	.001
16	2,322	2-2322	do	2.76	1.87	32.2	.0003
17	2,295	2-2295	Eocene, Jackson, Moody's Branch, limestone	2.76	1.96	29.0	.0009
18	2,267	2-2267	do	2.77	1.73	37.5	---
19	2,225	2-2225	Eocene, Yazoo clay	2.75	1.94	29.5	.0006
20	2,136	2-2136	do	2.77	2.08	24.9	.0006
21	2,090	2-2090	Eocene, Red bluff clay, limestone	2.76	1.78	35.5	.0007

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS22	2,060	2-2060	Eocene, Vicksburg, limestone	2.76	1.87	32.2	0.002
23	2,051	2-2051	do	2.73	1.84	32.6	.0007
24	2,030	2-2030	do	2.77	1.98	28.5	.09
25	2,019	2-2019	do	2.75	1.95	29.1	---
26	2,010	2-2010	do	2.74	2.01	26.6	.07
27	1,996	2-1996	do	2.75	1.93	29.8	.07
28	1,959	2-1959	do	2.74	1.90	30.7	---
29	1,944	2-1944	do	2.74	1.98	27.7	.01
30	1,904	2-1904	do	2.73	1.90	30.4	.004
31	1,878	2-1878	Oligocene, middle member of Byram Fm., Vicksburg group, sand	2.73	1.73	36.6	.005
32	1,856	2-1856	do	2.69	1.71	36.4	.01

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS33	1,824	2-1824	Oligocene, middle member of Byram Fm., Vicksburg group, sand	2.69	1.70	36.8	0.08
41 34	1,806	2-1806	Oligocene, Bucatunna clay or Byram Fm.	2.74	1.89	31.0	.0008
35	1,772	2-1772	do	2.67	1.65	38.2	.1
36	1,743	2-1743	do	2.70	1.60	40.7	.0006
37	1,730	2-1730	do	2.71	1.82	32.8	.0003
38	1,709	2-1709	Oligocene-Miocene, Chickasawhay limestone, clay	2.73	1.82	33.3	.0002
39	1,689	2-1689	Chickasawhay limestone, sand	2.70	1.68	37.8	---
40	1,655	2-1655	Oligocene-Miocene, Chickasawhay limestone, sand	2.68	1.65	38.4	.8
41	1,617	2-1617	Miocene, Catahoula sandstone, Heterostegina Zone, limestone	2.74	1.88	31.4	.2

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS42	1,602	2-1602	Miocene, Catahoula sandstone, Heterostegina Zone, limestone	2.80	1.45	48.2	0.0002
42 43	1,577	2-1577	do	2.73	1.75	35.9	---
44	1,543	2-1543	do	2.76	1.85	33.0	.004
45	1,511	2-1511	Miocene, Catahoula sandstone, Heterostegina Zone, clay	2.79	1.60	42.7	.0005
46	1,481	2-1481	Miocene, Catahoula sandstone, Heterostegina Zone, limestone	2.75	1.65	40.0	.002
47	1,416	2-1416	Catahoula sandstone, clay	2.77	1.68	39.4	.003
48	1,406	2-1406	Miocene, Catahoula sandstone, clay	2.77	1.86	32.9	.001
49	1,397	2-1397	Miocene, Catahoula sandstone, sand, clayey	2.71	1.98	26.9	.001

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS50	1,385	2-1385	Miocene, Catahoula sandstone, sand, clayey	2.68	1.98	26.1	0.0007
43 ^a 51	1,365	2-1365	Miocene, Catahoula sandstone, sand	----	----	----	---
^a 52	1,338	2-1338	do	----	----	----	---
53	1,321	2-1321	do	2.68	1.91	28.7	.0008
^a 54	1,302	2-1302	Miocene, Catahoula sandstone, sand, clayey	----	----	----	---
55	1,289	2-1289	do	2.68	2.12	20.9	.0003
56	1,267	2-1267	Miocene, Catahoula sandstone, sand	2.67	1.55	41.9	.002
57	1,251	2-1251	Miocene, Catahoula sandstone, clay	2.73	2.00	26.7	.0002
58	1,235	2-1235	do	2.73	1.94	28.9	.0002

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS59	1,226	2-1226	Miocene, Catahoula sandstone, clay	2.72	2.01	26.1	0.0002
60	1,205	2-1205	Miocene, Hattiesburg, sand	2.77	1.90	31.4	.002
61	1,185	2-1185	do	2.67	1.80	32.6	.2
62	1,162	2-1162	do	2.69	1.77	34.2	2
63	1,129	2-1129	do	2.68	1.70	36.6	.005
64	1,095	2-1095	Miocene, Hattiesburg, clay	2.67	1.77	33.7	.006
65	1,082	2-1082	do	2.70	1.93	28.5	.0009
66	1,066	2-1066	do	2.71	1.85	31.7	.001
67	1,052	2-1052	do	2.71	1.86	31.4	.002
^a 68	1,034	2-1034	do	----	----	----	----
69	1,008	2-1008	Miocene, Hattiesburg, sand	2.73	1.87	31.5	.0007

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
^a 62MIS70	978	2-978	Miocene, Hattiesburg, sand	-----	-----	-----	---
71	940	2-940	do	2.69	1.86	30.9	0.04
72	921	2-921	do	2.66	1.71	35.7	.02
^a 73	903	2-903	do	-----	-----	-----	---
74	888	2-888	do	2.72	1.88	30.9	.03
75	863	2-863	Miocene, Hattiesburg-Pascagoula, clay	2.68	1.65	38.4	.0004
76	842	2-842	do	2.69	1.58	41.3	.002
77	812	2-812	Miocene, Hattiesburg-Pascagoula, sand	2.65	1.67	37.0	.3
78	797	2-797	do	2.64	1.75	33.7	.04
79	771	2-771	Miocene, Hattiesburg-Pascagoula, clay	2.71	1.93	28.8	.0003
80	756	2-756	Miocene, Hattiesburg-Pascagoula, silt	2.72	1.79	34.2	.0006

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS81	724	2-724	Miocene, Hattiesburg-Pascagoula, silt	2.69	1.56	42.0	0.0008
82	711	2-711	Miocene, Hattiesburg-Pascagoula, clay	2.71	1.88	30.6	.04
83	694	2-694	Miocene, Hattiesburg-Pascagoula, sand	2.65	1.52	42.6	2
84	648	2-648	do	2.70	1.72	36.3	.02
85	621	2-621	do	2.70	1.66	38.5	.002
86	582	2-582	Miocene, Hattiesburg-Pascagoula, sand, clayey	2.72	1.75	35.7	.001
87	567	2-567	Miocene, Hattiesburg-Pascagoula, clay, sandy	2.70	1.95	27.8	.0005
88	559	2-559	Miocene, Hattiesburg-Pascagoula, sand	2.72	1.91	29.8	.0004
89	549	2-549	Miocene, Hattiesburg-Pascagoula, sand, clayey	2.74	1.69	38.3	.0005

Table 2.--Laboratory analysis data for samples from Hydrologic Test Hole 2, SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 14,

T. 2 N., R. 16 W.--Continued

Laboratory sample number	Depth (feet)	Field number	Geologic unit and description	Specific gravity of solids	Dry unit weight (g per cc)	Porosity, total (percent)	Coefficient of permeability (gpd per sq ft)
62MIS90	530	2=530	Miocene, Hattiesburg-Pascagoula, sand, clayey	2.70	1.79	33.7	0.0007
91	490	2=490	Miocene, Hattiesburg-Pascagoula, clay	2.74	1.58	42.3	.002
92	461	2=461	Miocene, Hattiesburg-Pascagoula, sand, silty	2.70	1.82	32.6	.002
93	450	2=450	Miocene, Hattiesburg-Pascagoula, silt	2.72	1.88	30.9	.001
94	407	2=407	Miocene, Hattiesburg-Pascagoula, sand	2.66	2.07	22.2	.02
95	380	2=380	do	2.67	1.85	30.7	.3
96	2,182	2=2182	Eocene, Yazoo clay	2.79	1.82	34.8	.002

^a Samples released to Quality of Water. No laboratory analyses have been made.