

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Federal Center, Denver, Colorado 80225

In reply refer to:

Technical Letter  
Dribble-39  
August 10, 1964

Mr. James E. Reeves, Manager  
Nevada Operations Office  
U.S. Atomic Energy Commission  
P. O. Box 1676  
Las Vegas, Nevada

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TECHNICAL LETTER: DRIBBLE-39

HYDROGEOLOGY AT HYDROLOGIC TEST WELL HT-3  
AND  
CORRELATION OF AQUIFERS,  
TATUM DOME, LAMAR COUNTY, MISSISSIPPI

By

W. N. Lockwood

August 10, 1964

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Sincerely yours,

*William E. Hale*

William E. Hale  
Program Supervisor, Dribble  
General Hydrology Branch

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

Federal Center, Denver, Colorado 80225

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AND  
CORRELATION OF AQUIFERS,  
TATUM DOME, LAMAR COUNTY, MISSISSIPPI

By

W. N. Lockwood

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OF AQUIFERS, TATUM DOME, LAMAR COUNTY, MISSISSIPPI

By

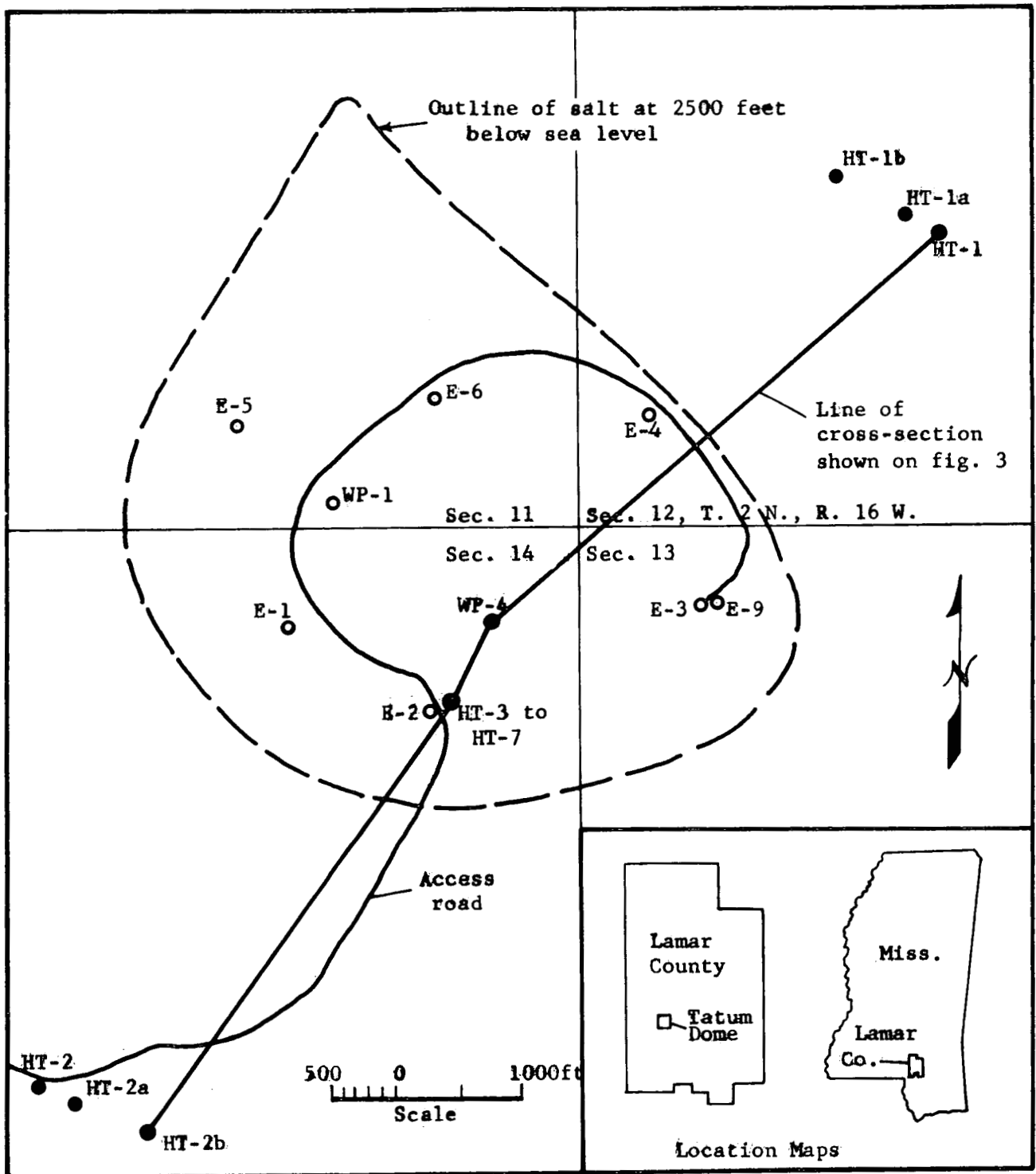
W. N. Lockwood

INTRODUCTION

This technical letter presents primarily the geologic information resulting from the drilling of Hydrologic Test Well HT-3, one of five hydrologic test wells drilled on top of Tatum Dome (fig. 1). The purposes for drilling the hydrologic test well over Tatum Dome were to determine (1) the depth, altitude, and thickness of the water-bearing strata and their geologic sequence, (2) coefficients of transmissibility of the aquifers, (3) the hydrostatic head and the head fluctuations in the various aquifers, and (4) the areal extent of the geologic formations and possible hydraulic connection between the aquifers. Results of the pumping tests and interpretation of the hydrologic conditions based on the hydrologic data obtained from these test wells will appear in subsequent technical letters.

Methods of Investigation

To meet the previously stated purposes, Hydrologic Test Well HT-3 was drilled on top of the Tatum salt dome, Lamar County, Miss., at coordinates 268,760 E and 535, 800 N (Mississippi state coordinate



Adapted from "Tatum Dome Test Holes Location Plan," U.S. Geol. Survey, Sept. 1961

Figure 1.--Map showing location of test wells and test holes, and geologic cross-section on and near Tatum Dome, Lamar County, Miss.



system). The test well is located about 650 feet southwest of test hole WP-4 (fig. 1) and is in the NE $\frac{1}{4}$  sec. 14, T. 2 N., R. 16 W., approximately 950 feet west and 1,350 feet south of the section lines. The elevation of the ground level at the site is 266.70 feet and that of the kelly bushing of the rotary drill rig was 278.55 feet above sea level. The test well was drilled to a depth of 1,064 feet.

Samples of cuttings were collected at 10-foot intervals. As collected, the samples were split into two parts: in the field, one unwashed part was studied megascopically for gross geologic properties; in the laboratory, the other part was washed clear of drilling mud for microscopic study of mineral and fossil materials. This detailed study of the samples was needed to facilitate stratigraphic correlation across the Tatum Dome area. The microscopic examination of the samples was used to prepare the descriptive lithologic log in table 1.

Upon completion of the drilling, geophysical logs were made for test well HT-3. The results of the microscopic examination of the samples, modified by the depths and lithology interpreted from the geophysical logs, were used to prepare the graphic lithologic log shown in figure 2. This lithologic log and the electric log were combined in figure 2 to assist in interpreting the sequence and the general characteristics of the sediments penetrated by test well HT-3, as well as to illustrate the interrelationship of the electric log and the properties of the sediments.

In test well HT-3, cores were obtained from the aquifer sands and the intervening silt and clay beds at depths based on the section penetrated in test hole E-7 located about 200 feet south of test well HT-3.

Table 1.--Lithologic log of hydrologic test well HT-3

(Datum is land surface, elevation 267 feet above mean sea level)

Note: Depth from marked depth intervals on sample sacks unadjusted to borehole geophysical logs. The depths given in this table differ slightly from the graphic lithologic log of figure 2, which has been adjusted to depths of lithologic interfaces indicated by the geophysical logs.

	Thickness (feet)	Depth (feet)	
No sample -----	3	3	
Sand, very fine to medium (0.0625-0.50-mm), sub- angular to rounded; light-gray, very fine sandstone; pyrite; limonite; carbonized wood ---	4	7	
No sample -----	10	17	
Siltstone, greenish-gray to light-gray; olive- green clay; sandy siltstone; cemented limonite -	10	27	
Clay, olive-green (50 percent); sand (50 percent), very fine to coarse (0.125-1.0-mm), angular to rounded; limonite; pyrite -----	10	37	
Silt, greenish-gray to light-gray; cream-colored dense limestone; limonite; pyrite -----	10	47	
No sample -----	11	58	
Clay, grayish-green; grayish-green to light-gray sandy siltstone; cream-colored dense limestone; pyrite -----	10	68	
Siltstone, greenish-gray to light-gray, sandy; cream-colored dense limestone; pyrite -----	10	78	
Sand, very fine to fine (0.0625-0.25-mm), angular to rounded; quartz; pink garnet; pink and white feldspar; pyrite -----	10	88	
Local Aquifer 1a	Sand, very fine to medium (0.0625-0.55-mm), angular to rounded; quartz; white feldspar; chert; pyrite -----	10	98
	Sand, very fine to fine (0.0625-0.25-mm), angular; quartz; white feldspar; pyrite -----	10	108

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)	
Local Aquifer 1a	Sand (90 percent), fine to coarse (0.125-1.0-mm), angular with few larger rounded grains; quartz; white feldspar; greenish-gray clay (10 percent); pyrite -----	10	118
	Sand, silty, very fine to fine (0.0625-0.25-mm), angular; greenish-gray clay -----	10	128
	Siltstone, clayey, light-gray; pyrite -----	10	138
Local Aquifer 1b	Sand (90 percent), very fine to medium (0.0625- 0.50-mm), angular to rounded; pyrite; carbonized wood -----	10	148
	Sand, coarse (0.50-1.0-mm), well-sorted, rounded, highly spherical, highly polished; black and gray chert with rounded edges; pyrite -----	10	158
	Sand, very coarse (1.0-2.0-mm), well-sorted, highly spherical, highly polished; gray to black with rounded edges -----	10	168
	Sand, very coarse (1.0-2.0-mm), well-sorted, rounded, highly polished; very fine gravel; chert with rounded edges -----	10	178
	Silt, greenish-gray; fractured quartz and chert pebbles (10 percent), (basal gravel lying on greenish-gray silt) -----	10	188
	Clay, greenish-gray; light-gray siltstone; white, hard, dense, limestone pebbles; fractured chert and quartz -----	10	198
	Clay, greenish-gray; greenish-gray, sandy, silt- stone pebbles; fractured chert and quartz -----	10	208
	Silt, grayish-green; light-gray, calcareous sand- stone; light-gray, calcareous siltstone chips; large chert and quartz pebbles -----	10	218
	Silt, grayish-green; light-gray calcareous sand- stone; light-gray calcareous siltstone chips; large chert and quartz pebbles -----	10	228

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)
Clay, greenish-gray; light-gray, sandy, hard, slightly calcareous siltstone; pyrite -----	10	238
Clay, greenish-gray; grayish-green siltstone; light-gray, very fine sandstone; dense white limestone; pyrite -----	10	248
Clay, greenish-gray; grayish-green siltstone; light-gray very fine sandstone; dense white limestone; pyrite -----	10	258
Clay, greenish-gray; grayish-green siltstone; very fine light-gray sandstone; dense white limestone; pyrite -----	10	268
Clay, greenish-gray; greenish-gray sandy silt; very fine to fine (0.0625-0.25-mm) sand; fine sandstone; brilliant pyrite crystals -----	10	278
Clay, greenish-gray; greenish-gray silt; fine light-gray sandstone; pyrite crystals -----	10	288
Clay, greenish-gray; greenish-gray silt; fine light-gray sandstone; dense white limestone; pyrite -----	10	298
Clay, greenish-gray; white calcareous siltstone; hard white limestone; first appearance of micro- vertebrates; pyrite -----	10	308
Clay, greenish-gray; white calcareous siltstone; hard white limestone; microvertebrates; pyrite -	10	318
Clay, greenish-gray; greenish-gray silt; hard white limestone; fine white sandstone; Dog tooth spar variety calcite (crystal ingrowths of internal molds of small gastropods); microverte- brates; pyrite -----	10	328
Clay, greenish-gray; greenish-gray silt; hard white limestone; fine white sandstone; dog tooth spar variety calcite (crystal ingrowths of internal molds of small gastropods); microverte- brates; pyrite -----	10	338

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

		Thickness (feet)	Depth (feet)
	Clay, greenish-gray, soft; greenish-gray siltstone; dense, white limestone; fine, calcareous, cemented sandstone; microvertebrates; pyrite -----	5	343
	Clay, greenish-gray, soft; greenish-gray siltstone; fine, white, calcareous, cemented sandstone; dense white limestone; microvertebrates; pyrite -----	5	348
	Clay, greenish-gray, soft; greenish-gray siltstone; fine white sandstone; dense white limestone; dog tooth spar variety calcite crystals; pyrite; microvertebrates -----	10	358
	Clay, greenish-gray, soft; greenish-gray to light-gray, sandy, calcareous silt; white limestone; microvertebrates; pyrite -----	10	368
Local Aquifer 2	Sand, very fine to fine (0.0625-0.25-mm), angular to rounded; quartz; chert; greenish-gray clay; greenish-gray to light-gray silt; microvertebrates; pyrite -----	20	388
	Sand, fine to medium (0.125-0.50-mm), angular to rounded; quartz; very fine gravel; black chert and quartzite; greenish-gray to light-gray, sandy, calcareous siltstone; pyrite -----	10	398
Local Aquifer 1a	Clay, greenish-gray; greenish-gray sandy silt; fine to medium (0.125-0.50-mm) sand; quartz; last appearance of microvertebrates; pyrite -----	10	408
	Sand, fine to medium (0.125-0.50-mm), angular to rounded; quartz; gray to black chert; pyrite -----	10	418
	Sand, fine to coarse (0.125-0.50-mm), angular to rounded; quartz; brownish-gray to black chert; greenish-gray sandy silt; pyrite -----	10	428
	Sand, fine to coarse (0.125-1.0-mm), angular to rounded; quartz; brownish-gray to black chert; greenish-gray siltstone; pyrite -----	10	438
	Sand, fine to medium (0.125-0.50-mm), angular to rounded; quartz; brownish-gray to black chert; pyrite -----	10	448

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)
Aquifer 1a	Sand, fine to coarse (0.125-1.0-mm), rounded, highly spherical and highly polished; black, yellowish-brown and red chert, fractured; pyrite -----	10 458
	Sand, fine to coarse (0.125-1.0-mm), rounded, highly spherical and polished; black, yellowish-brown, gray and red chert, fractured -----	10 468
	No sample -----	19 487
	Sand, very fine to medium (0.0625-0.25-mm), angular to rounded; quartz; brownish-gray, black and red chert; pyrite crystals -----	11 498
	Clay, greenish-gray; greenish-gray, sandy, slightly calcareous siltstone; very coarse (1.0-2.0-mm) sand; very fine gravel; black, gray, brown, yellow and red chert (red and black often in same fragment) -----	10 508
	Clay, greenish-gray; greenish-gray to light-gray siltstone; fine to coarse (0.125-1.0-mm), angular to rounded sand; quartz; black, gray, brown, yellow and red chert, fractured -----	10 518
Aquifer 1b	Sand, fine to very coarse (0.125-2.0-mm), angular to rounded; very fine gravel; black, gray, brown, yellow and red chert; pyrite crystals ---	10 528
	Sand, gray, clayey, very fine to coarse (0.0625-1.0-mm); angular to rounded quartz; chert chips in much reduced amount; pyrite -----	10 538
	Sand, gray, very fine (0.0625-0.25-mm), angular to subangular; fine chert and quartz pebbles; gray sandy siltstone; pyrite crystals; carbonized wood -----	10 548
	Silt, gray, very sandy; gray siltstone; angular to rounded sand; quartz; black chert -----	10 558
	Siltstone, gray, sandy; very fine to fine (0.00625-0.25-mm) sand, angular to rounded; pyrite -----	10 568

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)
Sand, gray, very silty, fine to medium (0.125-0.50-mm), angular to rounded; quartz; black chert; gray, sandy siltstone; pyrite -----	10	578
Sand, gray, very silty, medium (0.25-0.50-mm), angular to rounded; quartz; black chert; pyrite-----	10	588
Sand, gray, very silty, medium (0.25-0.50-mm), angular to rounded; quartz; black chert; pyrite-----	10	598
Sand, coarse to very coarse (0.50-2.0-mm), rounded, highly spherical, highly polished; black to gray chert; pyrite cementing some sand grains and attached to chert -----	10	608
Sand, medium to very coarse (0.25-2.0-mm), angular to rounded, very high sphericity and highly polished; gray to black chert with pyrite attached -----	10	618
Aquifer 2a Sand, coarse to very coarse (0.50-2.0-mm), sub-rounded to rounded, very high sphericity, highly polished; gravel (3 percent); black to gray chert; pyrite cementing sand grains and attached to chert; carbonized and pyritized wood -----	10	628
Sand, coarse (0.50-1.0-mm) subrounded to rounded, very high sphericity, highly polished; dark-gray chert; red and yellow agate -----	10	638
Sand, medium to very coarse (0.25-2.0-mm), sub-rounded to rounded; highly polished quartz; very fine gravel; olive-green, sandy, soft siltstone; pyrite -----	10	648
Sand, coarse to very coarse (0.50-2.0-mm), sub-rounded to rounded; very fine gravel; black to gray chert; quartz; greenish-gray siltstone ----	10	658
Sand, coarse to very coarse (0.50-2.0-mm), sub-rounded to rounded; gravel (10 percent); chert and quartz pebbles; greenish-gray siltstone ----	10	668

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)	
Aquifer 2a	Sand, medium gray, very silty, very fine to medium (0.0625-0.50-mm), angular to rounded; quartz; black chert; grayish-green siltstone; pyrite-cemented sands -----	10	678
	Sand, medium gray, silty, medium to coarse (0.25-1.0-mm), angular to subrounded; some highly spherical; gray to black chert; pyrite -----	10	688
	Sand, silty, medium to very coarse (0.25-2.0-mm), subrounded to rounded, moderate to highly spherical grains; gray to black chert; pyrite --	10	698
	Sand, medium gray, silty, medium to coarse (0.25-1.0-mm), angular to rounded; greenish-gray to light-gray siltstone; gray, black, red and yellow chert -----	10	708
	Sand, gray, silty, medium to coarse (0.25-1.0-mm), subrounded to rounded; greenish-gray siltstone; black chert -----	10	718
	Sand, gray, silty, coarse (0.50-1.0-mm), angular to rounded, highly spherical; quartz; black chert; greenish-gray siltstone; greenish-gray clay -----	10	728
No sample -----	5	733	
Aquifer 2b	Sand, gray, silty, medium to coarse (0.25-1.0-mm), subrounded to rounded; quartz; black chert; greenish-gray siltstone -----	10	743
	Sand, gray, silty, coarse (0.50-1.0-mm), angular to rounded to highly spherical; black chert; greenish-gray siltstone; greenish-gray clay; pyrite -----	10	753
	No sample -----	5	758
	Sand, coarse (0.50-1.0-mm), subrounded to rounded, highly spherical and highly polished; black chert, angular to rounded -----	10	768



Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)	
Aquifer 2b	Sand, coarse (0.50-1.0-mm), angular to rounded, highly spherical and polished; black chert; pyrite -----	10	778
	Sand, coarse to very coarse (0.50-2.0-mm), angular to rounded; quartz; gray to black chert -----	10	788
	Sand, coarse to very coarse (0.50-2.0-mm), angular to rounded; quartz; black chert; very fine gravel; chert and quartz pebbles; pale greenish-gray clay; pale greenish-gray siltstone; pyrite-----	10	798
	Sand, very fine to coarse (0.0625-1.0-mm), angular to rounded, some highly spherical; black chert; greenish-gray siltstone; pale green clay; gray limestone -----	10	808
	Sand, medium to coarse (0.25-1.0-mm), angular to rounded, some highly spherical and polished; black chert; gray to white limestone, dense; grayish-green siltstone -----	10	818
Aquifer 3	Sand, medium (0.25-0.50), angular to rounded, some highly spherical and polished; black chert; pyrite -----	10	828
	No sample -----	10	838
	Sand, fine to medium (0.125-0.50-mm), angular to rounded; gravel, very fine; chert and quartz pebbles; brown, medium crystalline limestone. Brown crystalline limestone from 840 ft to 842 ft; brown sandy silt from 842 ft to 848 ft. Base of Catahoula at 840 ft -----	10	848
	No sample -----	13	861
	Clay, hard, bluish-gray (core) -----	1	862
	No sample -----	4	866
	Sand, dark gray, very silty, very fine to fine (0.0625-0.125-mm); marine shells, foramanifera, ostracods (core) -----	8	874

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)
Clay, hard, gray (core) -----	10	876
Sandstone, gray, fossiliferous, ostracods, forami- fera and marine shells (core) -----	3	879
Sandstone, gray, calcareous, fossiliferous, marine ostracods (core) -----	4	883
Sand, fine to medium (0.125-0.50-mm), angular to rounded; gray to white limestone, fine-grained to dense; fossiliferous (cuttings) -----	5	888
Limestone, light- to dark-gray, dense, grained texture, finely crystalline, sandy, fossilifer- ous (gastropods) -----	10	898
Limestone, light- to dark-gray, dense, grained texture, finely crystalline and sandy, fossiliferous (gastropods); fine to medium sand (0.125-0.50-mm), angular to rounded -----	10	908
Sand, very fine to medium (0.0625-0.25-mm), angular to rounded; quartz -----	10	918
Sand, very fine to medium (0.0625-0.25-mm), angular to rounded; gray to white, dense, grained texture and finely crystalline limestone	5	923
Sandstone, light gray, coarse (0.50-1.0-mm), tightly cemented with crystalline calcite (false cap rock) -----	15	938
Sand, coarse (0.50-1.0-mm), angular to rounded, with dense to finely crystalline limestone fragments -----	5	943
Limestone, light gray, medium crystalline; sand, very coarse (1.0-2.0-mm), angular to rounded ----	5	948
Sand, coarse to very coarse (0.50-2.0-mm), angular to rounded; light-gray, grained texture to finely crystalline limestone -----	5	953

Table 1.--Lithologic log of hydrologic test well HT-3--Continued

	Thickness (feet)	Depth (feet)
Sand, coarse to very coarse (0.50-2.0-mm), angular to rounded; light-gray, grained texture to finely crystalline limestone -----	5	958
Sand, coarse to very coarse (0.50-2.0-mm), angular to rounded; light- to dark-gray, medium crystalline limestone (increasing in amount) -----	5	963
Limestone, light-gray to medium-gray, medium crystalline; coarse (0.50-1.0-mm) angular to rounded sand -----	5	968
Limestone, light-gray to medium-gray, medium crystalline; coarse sand -----	5	973
Sand, medium to coarse (0.25-1.0-mm), angular to subrounded; gray to brownish-gray medium crystalline limestone -----	5	978
No sample -----	86	1,064 T.D.

Two coring attempts were made with a standard diamond coring bit at depths between 362 and 382 feet, but no cores were recovered. A 3-inch-diameter Christensen rubber-sleeve coring device was used for all subsequent coring and the core recovery was acceptable. More detailed descriptions of the cores and of the coring operations are given in Technical Letter Dribble-31 (Beetem and Janzer, 1963), but descriptions of some cores were used to make the lithologic log of table 1 more complete. A record of cored intervals and amount of recovery are included in table 2.

Section 14, T. 2 N., R. 16 W.  
 Datum: Land surface, elevation 267 feet above sea level  
 Lithology from microscopic examination of drill cuttings and cores,  
 modified by interpretation of borehole geophysical logs.

VERTICAL SCALE  
 1 in. = 50 ft

U.S. Geological Survey  
 June 1963

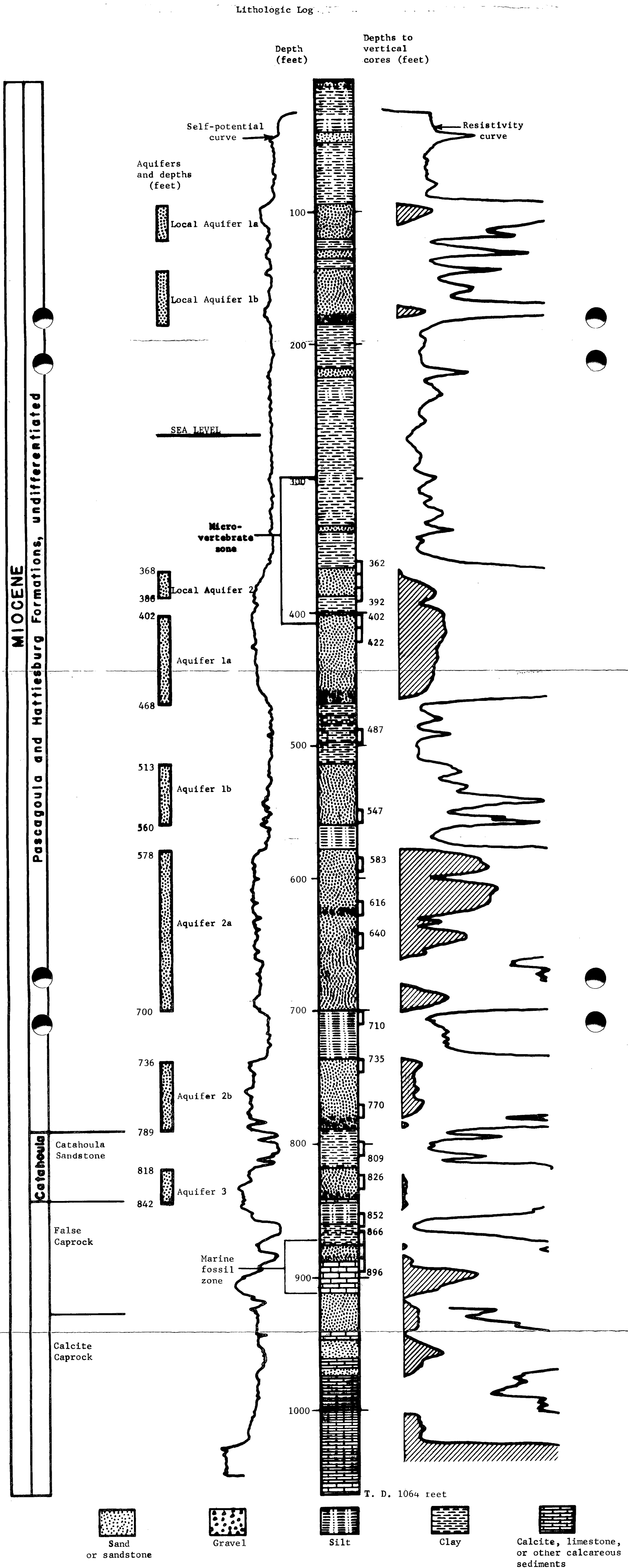


Figure 2.--Lithologic and electrical log of Hydrologic Test Well HT-3, showing aquifers and cored intervals.

Table 2.--Coring record for hydrologic test well HT-3

Core run number	Hydrologic unit	Coring depth interval (feet) referred to land surface	Core recovery (feet)	Type of core barrel
1	Local Aquifer 2	362-372	0	Conventional
2	do	372-382	0	Do
3	do	382-392	9.0	Rubber sleeve
4	Aquifer 1a	402-412	4	Do
5	do	412-422	1	Do
6	Clay	487-497	10	Do
7	Sand and clay	547-557	7	Do
8	Aquifer 2a	583-593	9.5	Do
9	do	616-626	10	Do
10	do	640-650	10	Do
11	Sand and clay	700-710	9	Do
12	Aquifer 2b	735-745	7	Do
13	do	770-780	7.5	Do
14	Clay	799-809	10	Do
15	Aquifer 3	826-836	0	Do
16	do	852-862	1	Do
17	False caprock	866-876	10	Do
18	do	876-886	10	Do
19	do	886-896	9.5	Do

## HYDROGEOLOGY AT TEST WELL HT-3

The geology of the Pascagoula-Hattiesburg Formation (undifferentiated) and of the Catahoula Sandstone in the vicinity of test well HT-3 has been described in some detail in Technical Letters Dribble-6 and 7 (Armstrong and others, 1961), and Dribble-15, 19, and 29 (Eargle, 1962a and b and 1963). In this technical letter, primary attention is given to a description of the aquifers in well HT-3.

The main water-bearing zones have been referred to as aquifers 1, 2, and 3 (fig. 3). The aquifers commonly are separated into several parts by a clay or siltstone bed. In this case, the parts then are designated as 1a, 1b, or 2a, 2b, etc. Those aquifers near the land surface, from which water is taken for local use, are called local aquifers.

### Aquifer 3

Aquifer 3, (or the Catahoula sand) at 818 to 842 feet, is a medium-to-coarse-textured sand with a fine basal gravel resting upon a finely crystalline marine limestone. Good wells could be developed in this aquifer but their success would be controlled by the relative thinness of the sand.

### Aquifer 2

Aquifer 2, at 578 to 700 feet, is a coarse sand with some very fine gravel. Aquifer 2b, at 736 to 789 feet, is a coarse-textured sand with a very fine basal gravel. Good water wells could be developed in both aquifers 2a and 2b.

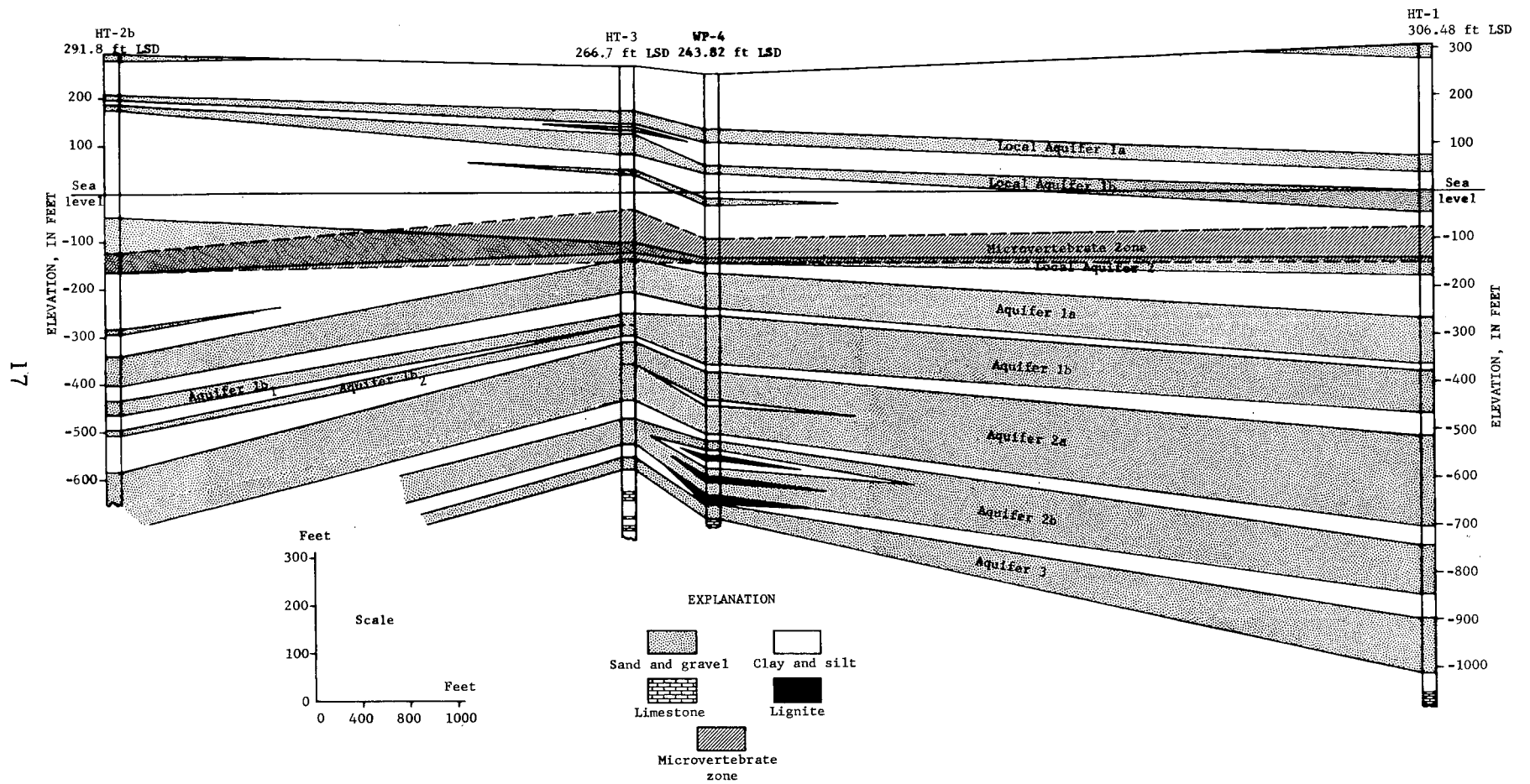


Figure 3.--Cross-section showing correlation of aquifers across Tatum Dome, based on correlation of a persistent microvertebrate zone.

## Aquifer 1

Aquifer 1 lies in two parts at depths of 402 to 468 feet and at 513 to 560 feet. In well HT-3, only a 10-foot-thick clay bed separates Local Aquifer 2 from Aquifer 1a--the upper part of Aquifer 1. Aquifer 1a is fairly coarse textured, especially at its base where there is some scattered fine gravel. Good wells could be developed in Aquifer 1a providing the well screens were designed properly to eliminate excess entry of sand.

Aquifer 1b, at 513 to 560 feet, is separated from Aquifer 1a by a thick bed of clay and siltstone, and is separated further into upper and lower units by a bed of siltstone. This aquifer is a fine-textured sand with many clay streaks and would not provide a good source of water for wells.

## Local Aquifers

There are two well-developed local aquifers at test well HT-3; these will be designated as Local Aquifers 1 and 2 in descending order, with Local Aquifer 1 subdivided into two parts.

Local Aquifer 1a lies in the interval of 94 to 120 feet and is primarily very fine to fine angular sand. This fine texture would make it difficult to develop a well in Aquifer 1a. Local Aquifer 1b, at 143 to 185 feet, is composed mostly of coarse to very coarse, rounded quartz sand with a well-developed, very fine, basal gravel. This sand should be coarse enough to screen easily and result in development of good wells.

Local Aquifer 2 lies in the interval of 368 to 388 feet. It is relatively fine-textured and probably would not make a satisfactory aquifer.



## CORRELATION OF AQUIFERS

The correlation of aquifers across Tatum Dome, previously based upon stratigraphic position alone, has been strengthened by paleontological evidence.

A zone containing fish, amphibia, and mammal microfossils (fig. 4) was discovered in well HT-3 at a depth of 298 to 408 feet. This zone lies directly above, and includes, Local Aquifer 2. Microvertebrates were not found in any other interval in the well. Thus, if this same fossil horizon were to be found in the same general stratigraphic position in respect to Local Aquifer 2 in other wells over the dome, then a reasonable correlation could be made across the dome.

Core hole WP-4 contained abundant microvertebrates at intervals 355 to 365 feet and 389 to 391 feet located above a water sand at 420 feet. Exploratory hole E-1 contained microvertebrates at the intervals 330 to 340 feet and 350 to 410 feet, directly above a water sand at 410 feet. Observation well HT-2b contained microvertebrates in a fine sand (local sand) in the interval 415 to 455 feet above a water sand at 590 feet. Multitest well HT-1 had microvertebrates from cuttings at 390 feet to 460 feet and from a core at 407 feet. The above wells are located on the top of the dome and on its northeast and southwest flank. The greatest distance between the wells is 9,500 feet (fig. 1).



Figure 4.--Photographs of fossils from microvertebrate zone across top of Tatum Dome.  
(Magnification approximately 20 X)

The microvertebrate horizon appears to be a correlative unit of the Pascagoula-Hattiesburg formation (undifferentiated) in the Tatum Dome area. The water sand, known as Local Aquifer 2, lying below the microvertebrate horizon thus can be correlated throughout the area underlain by the Tatum Dome (fig. 3).

Correlation of the water sands by means of heavy minerals would entail additional study to determine their usefulness. It was noted, however, that multicolored cherts--red, yellow, brown, black and gray--seemed to be more concentrated in aquifer 1a, and parts of 1b to a depth of 528 feet. All cherts below 528 feet were for the most part black or gray.

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