STATE OF FLORIDA
STATE BOARD OF CONSERVATION

DIVISION OF GEOLOGY
Robert O. Vernon, *Director*

INFORMATION CIRCULAR NO. 56

TEST WELL EXPLORATION IN THE MYAKKA RIVER BASIN AREA, FLORIDA

By
H. Sutcliffe, Jr. and B. F. Joyner
U. S. Geological Survey

Prepared by the
UNITED STATES GEOLOGICAL SURVEY
in cooperation with the
DIVISION OF GEOLOGY
FLORIDA BOARD OF CONSERVATION
and the
BOARD OF COUNTY COMMISSIONERS OF SARASOTA COUNT

Tallahassee
1968

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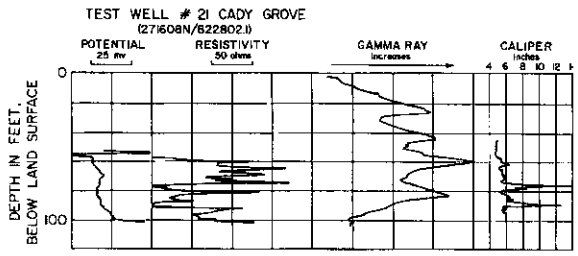
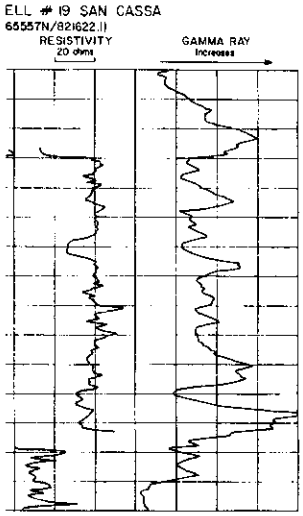
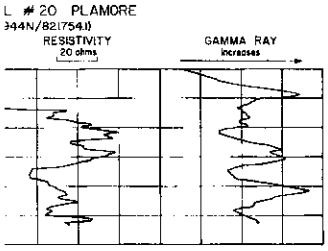


Figure 15. Geophysical log of test well No. 21, Cady Grove.



ıysical log of test well No. 19, San Cassa.



physical log of test well No. 20, Plamore.

TEST WELL EXPLORATION IN THE MYAKKA RIVER BASIN AREA, FLORIDA

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ABSTRACT

In recent years, difficulties encountered in obtaining ground-wate with acceptable chemical characteristics in the Myakka River basin ar the implementation of a test drilling program. Under this program, we and data collection were executed in such a manner that all water-p zones of the local aquifers, together with the quality and quantity of available, were effectively identified.

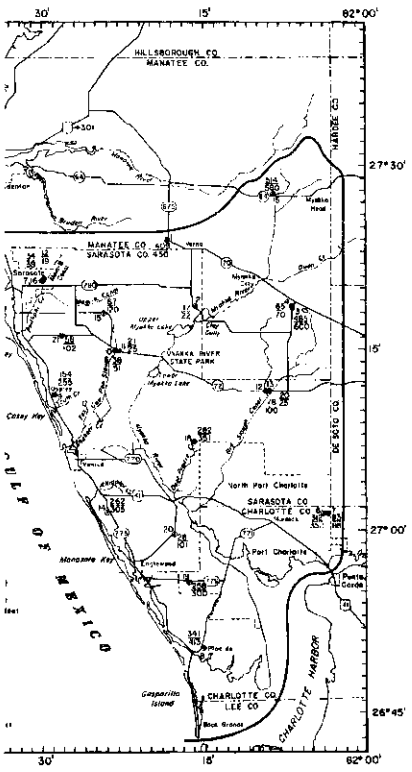
A step-drilling method was utilized which allowed the colle formation cuttings, water samples, and water-level data, from isolated the well as drilling proceeded. The step drilling procedure is descri driller's logs, geophysical logs, and chemical quality of water t presented.

INTRODUCTION

In the Myakka River basin area, figure 1, of southwest Florida aquifers are the most reliable and prolific sources of water. In thousands of wells of various diameters and depths, constructed b methods and finished in various ways, have been drilled in these aquif to the enactment of local well drilling laws in Sarasota and Manatee few records were kept of the methods of construction, materials pe water levels, water yields, or quality of the water from wells. Loc officals, aware of the rapid increase in population and ground-water u the increasing difficulties experienced by both public and private in obtaining water of the desired quantity and quality, requested Geological Survey investigate the water resources of the area.

An investigation of the water resources of the Myakka River bas U.S. Geological Survey in cooperation with Sarasota County and the D Geology, Florida Board of Conservation, was begun in February 1962 test wells was an integral part of this investigation.

The test-drilling program was necessary to identify the various within the water-bearing formations and to obtain samples of water fi aquifers for chemical quality determinations. Geological and ge methods were employed to gather data which would permit correlati test well data with geophysical logs obtained from a number of older v aiding the interpretation of the geohydrologic characteristics of areas the test well sites.



er basin area showing location of test wells.

THE TEST WELL PROGRAM

isted of drilling 21 test wells by the cable-tool ted to give a broad areal coverage in order to round-water conditions in the area. Consideration ground-water information was meager, where ere most needed, and where geologic evidence able quality might be located, in the selection of

data collected include:
ch aquifer penetrated,

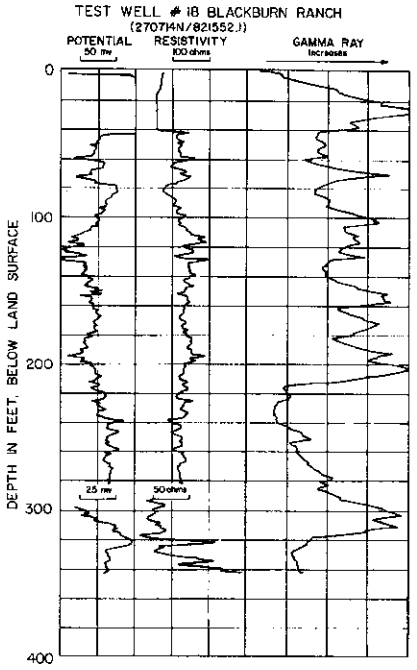
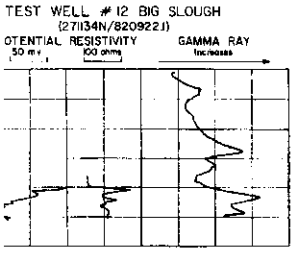
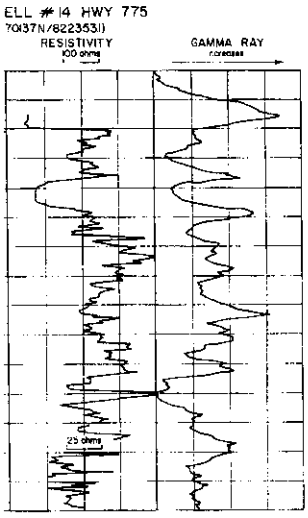


Figure 12. Geophysical log of test well No. 18, Blackburn Ranch.



hysical log of test well No. 12, Big Slough.



ıysical log of test well No. 14, Florida 775.

(2) chemical quality of water from each aquifer,
(3) materials penetrated during drilling,
(4) yield of each aquifer penetrated, and
(5) geophysical logs for well at completed depth.

The completed test wells were used as observation wells for ı water-level fluctuations and collecting water-quality data. Monitoring ol wells was continued upon completion of the project; this informa supplement similar data collected at several observation wells in the a the early 1930's. Water samples are collected periodically at selected ob wells so that seasonal variations in chemical quality can be determined.

PURPOSE OF THIS REPORT

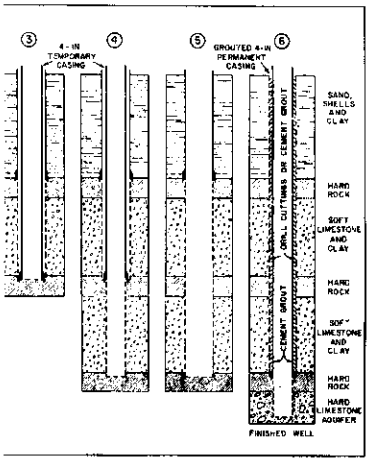
The purpose of this report is to describe the methods used and t the data collected during the exploratory water well drilling progr reports tentatively entitled "Water Resources of the Myakka River Ba and "Water Resource Records of the Myakka River Basin Area", to be ı by the Division of Geology, Florida Board of Conservation, will pr results and conclusions of this investigation and the hydrologic recor than test well data) collected.

ACKNOWLEDGEMENTS

Grateful acknowledgment is extended to: the Sarasota County Public Instruction, General Development Corporation, Florida Sate Department, Manatee County Highway Department, and Mr. Albert Bl all who granted permission to drill and maintain observation wells property. Appreciation is expressed to the Florida Board of Cons Division of Geology for its cooperation in providing well logging ser aiding in the interpretation of geologic contacts. Appreciation is also e to the Sarasota County Agent, Sarasota County Health Department, County Health Department, Smally, Wellford and Nalvin, consulting eng Sarasota County, and other helpful citizens whose interest, cooperat enthusiasm aided the project's completion.

STEP-DRILLING METHODS

Step drilling is a method of test drilling which assures the isola water-bearing stratum so that the chemical quality and hydraulic he water can be determined as drilling progresses. Because wells drilled usual methods obtain water from several permeable zones, the quali water and level of water in an individual zone cannot be determi drilling is particularly well suited to the lower west coast of Florida b the type and character of the subsurface materials. The bulk of the s materials is clay, shale, limestone, and sandstone. These rocks do nc cave into the drill hole. The usual occurrence of clay above a limes permits the seating of temporary casing in a test hole because a casing s



ic steps of the step-drilling method.

lay, while the underlying limestone supports the
ep-drilling process where inner and outer casings
ght seals are a prerequisite for accurate measure-
ted strata.

ole-tool equipment involves six basic steps, as
involves driving and drilling a "surface" casing
o the ground until a stratum of consolidated rock
he casing is drilled out as the driving progresses.
rated are collected at 5- to 10-foot intervals using
e is found, a mixture of water and drill cutting is
ed into a bucket. A water sample is collected by
n the bucket after the cuttings have settled. As
are found (as in a limestone stratum below the
on the "surface" casing holds the water and sand
ut of the well.

head with the cable-tool bit, below the seated
r-bearing stratum is encountered. Cuttings are
ot interval as drilling proceeds and a water sample
m is bailed from the well. The depth to water is

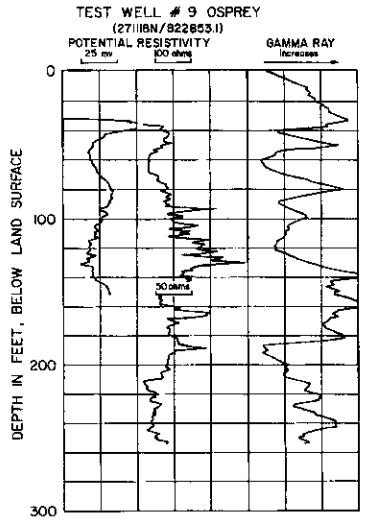


Figure 8. Geophysical log of test well No. 9, Osprey.

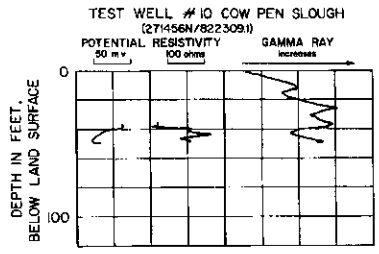
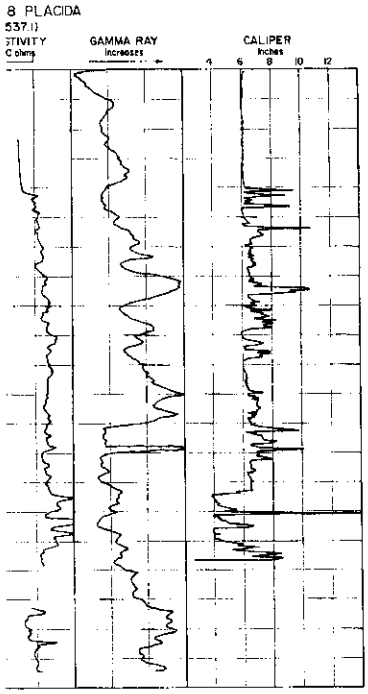


Figure 9. Geophysical log of test well No. 10, Cow Pen Slough.



ıysical log of test well No. 8, Placida.

measured by a steel tape, lowered into the well, and this information, ı with a log of the material penetrated as drilling progresses, is enteret driller's log. When the drill bit encounters a suitable rock on which to inner casing,the drilling is stopped.

Step 3 consists of installing the inner 4-inch casing equipped with shoe on the bottom and firmly seating this casing on the rock at the bc the hole. In actual practice, the casing may move down the hole a ı before a new seat is established.

Step 4 consists of drilling through the 4-inch casing with a 4-inch another water-bearing zone is found. again water samples and cut collected as drilling proceeds, and the level of water in this zone measure the next consolidated rock is reached, drilling is halted, and the 4-in casing is removed.

In step 5, the hole is reamed to the larger size, from the point w 4-inch casing was seated to the point where drilling stopped in step 4. ' the cuttings are removed and the hole is clean, the 4-inch casing is rep the hole and seated at the bottom, as shown in step 3, figure 2. By r steps 3, 4, and 5, a well can be drilled to any reasonable depth.

During the drilling process, a constant check is maintained on the wa inside the 4-inch casing and the water level in the annular space betv 4-inch casing and the sand casing. A differential between these wat indicates a good seal is formed by the casing shoe. Conversely, identic levels indicate a leak around the shoe, in which case the inner casing sl driven again until a firm seat is made.

When the final setting of 4-inch pipe is decided upon, the hole i condition illustrated by step 5 (fig. 2). Step 6 consists of positio permanent casing in the well within 1 or 2 feet of the bottom of t Twenty feet of cement grout is placed in the bottom of the well with a that the cement moves up the hole outside the 4-inch casing. The 4-inch then seated firmly on the bottom of the hole and driven slightly, to insu seat. Most of the grout on the inside of the casing is removed by bailing: is left standing until the cement sets. Next, drilling proceeds inside th casing and the well is completed with a know length of open hole in aquifer. The annular space between the 4-inch casing and the 6-inch hc the cement grout is filled with drill cuttings or cement grout, and th casing is removed for use at the next test site.

Seven inch inside diameter casing was originally specified for "sanc to provide adequate space for placing and removing the 4-inch inside inner casing. It was determined during the program that 6-inch inside casing could be subsituted for the 7-inch casing without affecting the ı the step-drilling method. Use of 6-inch casing had the decided advantage readily available from local suppliers while the 7-inch had to be special

TA COLLECTIONS

AND WATER SAMPLING

usually taken at 5-foot intervals to the first foot intervals thereafter. These samples were all well by bailer. They were forwarded to the ee for processing and storage in the cuttings file. he lithology and paleontology of rock materials logic age determinations which are necessary for g. Water samples, of 1-liter volume, were taken s. These samples were analyzed for their major

PHYSICAL METHODS

der the program was surveyed by geophysical cal geophysical data presented is a strip chart liation characteristics of the material in the earth roughout the length of some holes, a record of tential and gamma ray radioactivity was made. iameter of the bore hole were obtained where

gamma ray, may be correlated from well to well a the basis of the graphical representations of the beds. Reliable predictions of the thickness and trata in areas between test well sites can be made physical and driller's logs. Geophysical logs of 13 figures 3 - 15.

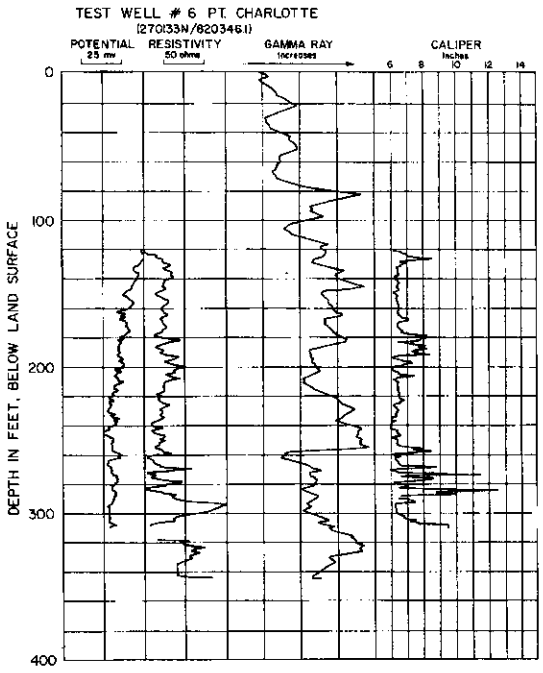


Figure 6. Geophysical log of test well No. 6, Port Charlotte.

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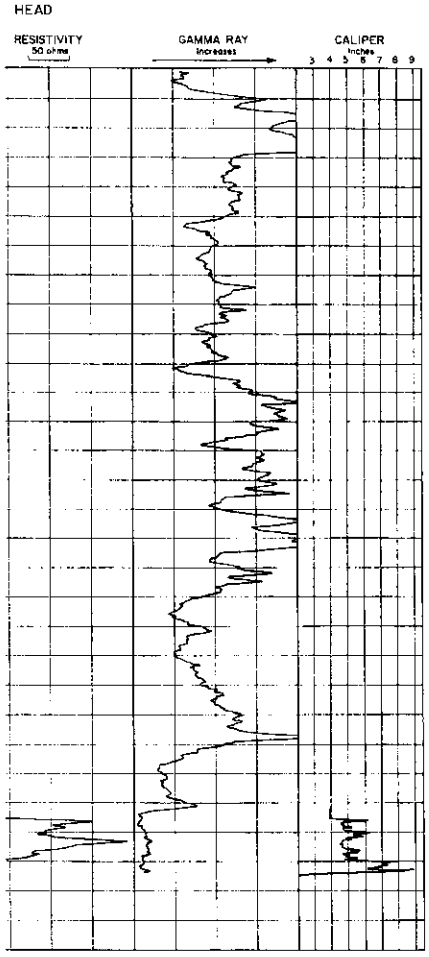

ıysical log of test well No. 5, Myakka Head.

APPENDIX

A. Well Driller's logs
B. Chronological and water level logs
C. Chemical analyses of water
D. Geophysical logs

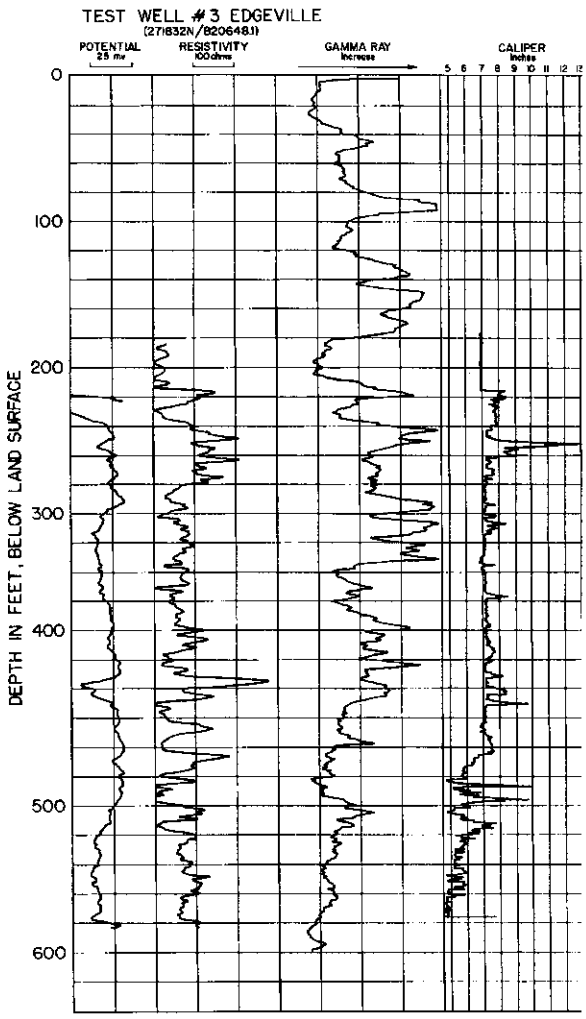

Figure 4. Geophysical log of test well No. 3, Edgeville.

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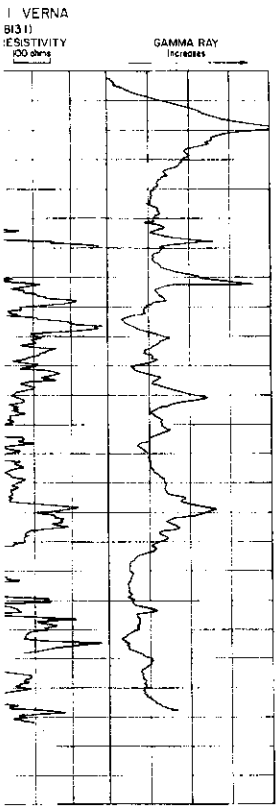

hysical log of test well No. 1, Verna.

APPENDIX A

The following table gives driller's name, depth at which various ma were encountered, and thickness of material for each well drilled ind program.

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.. WELL DRILLERS' LOG

Driller: M. Ballard, J.R. Guest

	Thickness *(feet)*	Depth *(feet)*
	10	10
	5	15
	5	20
ic	10	30
ic,		
	5	35
ic,		
	12	47
	3	50
	5	55
	40	95
	15	110
	2	112
	6	118
r		
	3	121
	4	125
	1	126
	1	127
	14	141
	3	144
	7	151
	1	152
	3	156
	3	159
	3	162
	18	180
	2	182
	3	185
	7	192
	3	195
	9	204
	1	205
	5	210
mestone	2	212
	4	216
	7	223
clay	10	233
	8	241
	4	245
	8	253
ter	6	259
	40	295
	15	310
r bearing	5	315
	9	324

APPENDIX D

The following graphs show data obtained from geophysical logging test wells drilled under the program.

TABLE 1. Continued

USGS Well No. 1 (continued)

Material	Thickness (feet)
Clay, blue, dry	3
Limestone	1
Clay, blue	2
Clay, blue and gray, with gravel, bailing necessary after drilling two feet	12
Clay, blue and gray	4
Limestone	1
Limestone and clay, blue	4
Limestone	2
Clay, white and limestone streaks	5
Limestone, hard	4
Clay, white and blue	3
Clay, white	6
Limestone, hard, water bearing	4
Limestone	25
Clay, white	2
Limestone, soft, sandy	20
Limestone, hard	4
Limestone	24

USGS Well No. 2 Driller: M. J

Old Myakka	
Sand	12
Sand and clay, white	7
Sand, black and gravel, with clay, white	3
Limestone	
Set Cook 0.010 screen from 17 to 21	

USGS Well No. 3 Driller: M. J

Edgeville, deep	
Sand, tan to gray, with some phosphate	45
Sand and little clay	35
Sand and little clay, green, heaves	5
Sand and little clay, with some phosphate	10
Sand, phosphatic	10
Sand and some clay, phosphatic	20
Sand, coarse, phosphatic	5
Sand and some clay, phosphatic	15
Sand, phosphatic	27
Clay, sandy	13
Clay, dark, sandy, phosphatic	5
Clay	6
Sandstone	2
Clay, sandy, very fine	17
Limestone, water bearing	1
Clay, blue	1
Limestone	4
Clay, blue	1

ABLE 1. Continued

Thickness *(feet)*	Depth *(feet)*
19	241
1	242
9	251
13	264
1	265
11	276
5	281
13	294
1	295
5	300
5	305
5	310
1	311
14	325
2	327
1	328
3	331
2	333
7	340
10	350
3	353
2	355
5	360
9	369
10	379
4	383
7	390
1	391
4	395
10	405
3	408
7	415
1	416
4	420
6	426
4	430
2	432
14	446
4	450
12	462
5	467
3	470
2	472
2	474
2	476
4	480
5	485
13	498

Table 3.--Continued

Date of collection	Depth of sample (feet)	Formation or deposit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids: Calculated	Dissolved solids: Residue at 180°C	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color
TEST WELL NO. 19, SANCASSA, STATE ROAD 776, USGS NO. 265557N-0821622.1																						
4- 1-66	68- 75	Hawthorn	8.4	--	152	94	7.6	588	13	162	60	1,330	.5	.5	.13	2,330	--	774	641	4,450	7.5	0
4- 4-66	100-150	Hawthorn	17	--	187	100	18	602	16	184	80	1,410	.7	.2	.11	2,520	2,990	898	741	4,680	7.8	0
4- 5-66	162-185	Hawthorn	16	--	228	176	36	972	26	170	452	2,000	1.2	.2	.11	3,990	4,530	1,330	1,190	6,000	7.7	[illegible]
4- 5-66	162-200	Hawthorn	16	--	82	92	18	588	16	164	74	1,370	.7	.1	.11	2,440	2,860	853	718	4,500	7.7	0
4- 7-66	202-225	Hawthorn	15	--	264	189	39	1,220	26	176	424	2,550	1.3	.3	.15	4,820	5,360	1,480	1,340	8,550	7.6	0
TEST WELL NO. 20, FLAYMORE, STATE ROAD 777, USGS NO. 265944N-0821754.1																						
4-18-66	20	Recent	10	--	217	15	1.4	208	.9	356	36	510	.2	.7	.12	1,170	1,320	604	313	2,240	7.8	20
4-19-66	28- 50	Recent	16	--	204	50	3.8	332	5.8	362	72	766	.3	.4	.09	1,630	1,830	719	422	3,070	7.6	20
4-19-66	28-101	Hawthorn	16	--	164	104	8.2	645	14	200	74	1,420	.6	.3	.06	2,550	2,980	846	682	4,700	7.8	10
5-20-66	28-101	Hawthorn	8.4	--	148	98	7.6	588	13	156	58	1,340	.5	.4	.07	2,340	2,860	781	653	4,450	7.9	5
3/ 5-20-66	28-101	Hawthorn	9.0	--	201	62	3.3	490	7.4	194	180	1,060	.5	1.4	.12	2,110	2,580	760	602	3,890	7.5	0
8- 4-66	28-101	Hawthorn	40	.02	172	107	7.6	680	14	192	126	1,490	.5	1.4	.03	2,730	3,240	878	720	4,956	7.7	5
TEST WELL NO. 21, CADY GROVE, HWY. 72, USGS NO. 271608N-0822802.1																						
4-21-66	58- 85	Hawthorn	8.2	--	144	60	1.9	39	3.5	278	346	68	.8	1.6	.10	810	860	608	380	1,230	7.6	20
8- 4-66	58-102	Hawthorn	34	.04	164	67	3.2	40	3.6	240	442	60	.7	3.4	.03	933	1,176	688	492	1,376	7.7	20

1/ After 2 hours flow at 100 gallons per minute.

2/ After 30 minutes flow at 10 gallons per minute.

3/ After 5 minutes pumping at 25 gallons per minute.

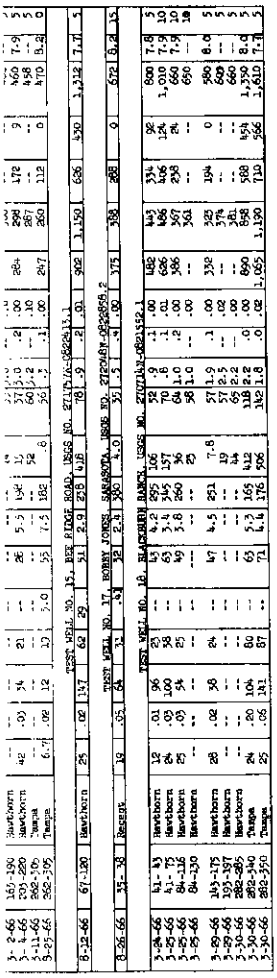

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TABLE 1. Continued

USGS Well No. 3 (continued) Material	Thickness *(feet)*
Clay, white and blue	4
Limestone, hard	12
Limestone	18
Limestone, soft, water bearing	8
Limestone, hard	6
Clay, white	17
Limestone	3
Limestone, soft	11
Limestone	9
Limestone, soft	14
USGS Well No. 4	**Driller: M**
Edgeville, shallow	
Sand, fine, brown and humus	20
Sand, fine, brown and clay, brown	5
Sand, fine, brown and less clay	5
Sand, fine, brown	10
Sand, fine with little clay, gray	5
Sand, fine	5
Sand, fine to medium, brown with little clay	5
Sand, fine to coarse with some clay	5
Sand, fine to coarse with less clay	5
Sand, fine to coarse with very little clay	5
Set 5 feet of Cook 0.010 screen, 65 to 70	
USGS well No. 5	**Driller: M**
Myakka Head	
Sand	38
Sand, gravel, and little clay	27
Sand, gravel, and clay	20
Sand, and clay	5
Clay, gray, sandy	30
Sand, and clay, blue	15
Sand	11
Clay, blue	4
Clay, gray, sandy, with gravel and limestone streaks	12
Sand, water bearing	3
Sand, clay, gray, and limestone streaks	12
Clay, blue, sandy	8
Clay, blue, and little gravel	10
Clay, blue	25
Clay, gray with gravel	5
Limestone, water bearing	4
Clay, gray	5
Limestone	6
Clay, gray	12
Limestone	3

TABLE 1. Continued

Thickness *(feet)*	Depth *(feet)*
2	257
2	259
2	261
7	268
6	274
9	283
5	288
3	291
4	295
4	299
11	310
3	313
13	326
5	331
13	344
6	350
3	353
1	354
2	356
2	358
2	360
12	372
13	383
22	405
5	410
5	415
11	426
4	430
5	435
9	444
3	447
1	448
2	450
5	455
3	458
4	462
14	476
14	490
5	495
5	500
5	505
25	530
30	560

Driller: Calloway

Thickness *(feet)*	Depth *(feet)*
25	25
5	30

Table 3.--Continued

Date of collection	Depth of sample (feet)	Formation or deposit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids: Calculated	Dissolved solids: Residue at 180°C	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color
TEST WELL NO. 9, OSPREY, USGS NO. 271118N-0822853.1																						
1-18-66	37- 40	Hawthorn	27	.03	125	19	--	31	3.0	307	95	84	.5	.2	.00	536	508	390	138	890	7.9	15
1-18-66	37- 45	Hawthorn	28	.06	78	23	--	29	3.5	190	82	78	.5	.2	.00	416	440	289	134	700	8.0	10
1-19-66	37- 90	Hawthorn	29	--	101	25	.90	43	4.4	248	122	85	.5	.4	.10	532	616	356	153	888	8.0	10
1-21-66	94-100	Hawthorn	34	--	144	62	2.3	61	4.1	320	340	90	.8	.4	.00	894	1,050	617	355	1,360	7.9	10
1-21-66	94-110	Hawthorn	--	--	--	--	--	--	--	--	436	75	.6	--	.10	--	--	--	--	1,275	--	--
1-24-66	94-115	Hawthorn	28	--	200	81	3.8	59	4.4	276	588	95	.8	.3	.10	1,190	1,400	836	610	1,720	7.9	10
1-24-66	94-125	Hawthorn	--	--	--	--	--	--	--	--	588	90	.9	--	.10	--	--	--	--	1,700	--	--
1-24-66	94-154	Hawthorn	--	--	--	--	--	--	--	--	572	90	1.0	--	.10	--	--	--	--	1,700	7.9	--
2- 1-66	154-171	Hawthorn	44	--	56	25	1.4	41	4.8	276	14	62	2.0	.3	.00	385	381	244	18	670	8.1	5
2- 3-66	154-220	Hawthorn	--	--	--	--	--	--	--	--	25	68	2.3	--	.10	--	--	--	--	720	--	--
2- 3-66	154-255	Hawthorn, Tampa	27	.00	310	126	10	47	6.8	178	1,040	100	1.6	.1	.10	1,747	2,013	1,303	1,157	2,300	7.9	5
8-25-66	154-255	Hawthorn, Tampa	26	.02	450	158	13	59	6.2	168	1,540	110	1.4	.0	.04	2,430	2,860	1,788	1,650	2,835	7.5	0
TEST WELL NO. 10, COW PEN SLOUGH, USGS NO. 271456N-0822309.1																						
2-10-66	38- 45	Hawthorn	24	--	77	35	.50	55	3.1	346	45	90	.6	.2	.00	500	531	336	53	910	7.9	5
TEST WELL NO. 11, COW PEN SLOUGH, USGS NO. 271456N-0822309.2																						
11-29-66	21- 25	Recent	.7	--	11	4.4	--	14	2.0	64	.0	31	.1	.4	.02	96	84	46	0	238	7.1	10
TEST WELL NO. 12, BIG SLOUGH, USGS NO. 271134N-0820922.1																						
2-15-66	40- 50	Recent	23	--	69	19	.60	99	2.6	312	66	90	1.2	.4	.06	526	539	250	0	900	8.1	0
2-16-66	64- 78	Hawthorn	18	--	66	25	1.1	100	1.9	324	73	100	1.3	.2	.10	545	557	269	4	980	8.0	5
8-12-66	78-100	Hawthorn	45	.02	71	24	1.1	99	1.7	310	74	108	1.2	.2	.00	577	600	277	25	966	7.8	0

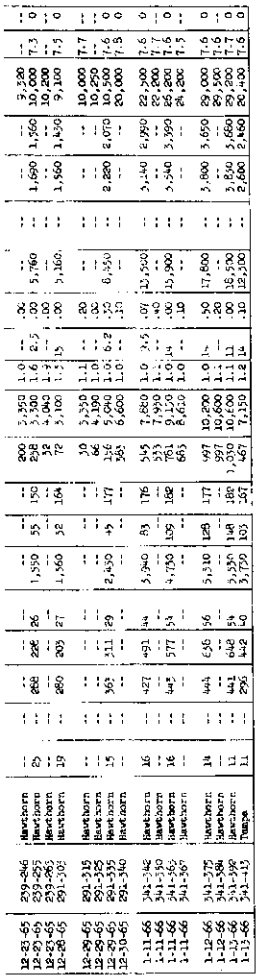

TABLE 1. Continued

USGS Well No. 6 (continued)

Material	Tickness *(feet)*
Sand, gray with shells	10
Sand, coarse and clay, mixed	5
Sand, coarse, gravel, and clay, mixed	10
Sand, coarse, and clay	10
Clay, dark, sandy	10
Clay, light gray, and shell, mixed	5
Clay, hard, dry, and shell	5
Clay, light gray, and sand, coarse, black, mixed	5
Clay, very sandy, very fine	15
Clay, dark, sandy	5
Clay, white, and limestone gravel	10
Clay, sandy	5
Clay, blue	2
Limestone	3
Sandstone, and clay	10
Sandstone, hard	3
Clay, white, sandy	1
Limestone	2
Limestone, and clay	4
Limestone, and clay, sandy	5
Limestone, and clay, white, sandy	5
Limestone, and clay, mixed	16
Clay, white	6
Limestone	3
Limestone, white and brown, water bearing	5
Limestone, brown, and clay, white, water bearing	5
Limestone, brown, clay, white, water bearing, flow	5
Clay, white, and limestone, brown	5
Clay, white, and limestone, white	10
Limestone, brown	5
Clay, white, and limestone, mixed	25
Limestone	2
Clay, gray, and sand, black pepper, mixed	16
Limestone	7
Limestone, soft	5
Limestone	10
Limestone, water bearing, cavity from 286 to 287	5
Limestone, crumbly	5
Limestone, white	10
Limestone, crumbly, water bearing, more flow	5
Limestone, white	10
Limestone, water bearing	5
Limestone, water bearing, little flow	5
Limestone, hard, white	10
Limestone, hard, white, water bearing, more flow	5

ABLE 1. Continued

	Thickness *(feet)*	Depth *(feet)*
	5	350
		Driller: Calloway
	25	25
	5	30
	10	40
	5	45
	10	55
	10	65
	10	75
	5	80
lay,		
	10	90
:		
		Driller: M. Ballard
	30	30
	5	35
	5	40
	2	42
	8	50
	5	55
ıe sand	15	70
	5	75
	5	80
	5	85
	1	86
	4	90
	5	95
	5	100
	5	105
	5	110
	2	112
per	3	115
per	7	122
	3	125
	5	130
	10	140
, cavity at 155	20	160
	5	165
	5	170
ıy	10	180
	10	190
m 192 to 194	15	205

Table 3.--Continued

Date of collection	Depth of sample (feet)	Formation or deposit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids: Calculated	Dissolved solids: Residue at 180°C	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color
TEST WELL NO. 6, PORT CHARLOTTE, USGS NO. 270135N-0820346.1																						
11- 8-65	88	Recent	--	--	77	20	--	--	--	--	20	130	.9	--	.13	--	--	--	--	850	7.9	10
11-10-65	125-176	Hawthorn	21	.01	66	32	--	62	6.8	246	11	160	1.2	.0	.07	481	504	296	94	890	8.1	10
11-10-65	183-190	Hawthorn	--	--	57	42	--	--	--	--	11	240	1.8	--	.13	--	--	315	--	1,100	8.0	5
11-11-65	183-200	Hawthorn	--	--	60	38	--	--	--	--	10	215	1.6	--	.05	--	--	306	--	1,100	7.8	5
11-11-65	183-235	Hawthorn	22	.01	62	36	--	78	8.[illegible]	218	8.0	208	1.5	.0	.04	531	560	302	124	1,100	7.9	5
11-15-65	247-260	Hawthorn, Tampa	26	.00	78	--	--	170	9.[illegible]	196	192	330	1.7	.0	.05	965	1,020	446	285	1,700	7.7	5
11-16-65	247-317	Hawthorn, Tampa	--	--	106	81	--	--	--	--	264	640	1.2	--	.05	--	--	602	--	2,700	7.7	0
1/ 11-16-65	247-317	Hawthorn, Tampa	23	.00	92	71	--	248	8.5	164	250	510	1.3	1.8	.03	1,270	1,330	522	387	2,350	7.9	5
11-29-65	312-320	Tampa	--	--	103	85	--	--	--	--	288	700	1.0	--	.04	--	--	--	--	2,900	7.1	5
11-29-65	312-325	Tampa	--	--	109	77	--	--	--	--	282	680	1.0	--	.08	--	--	--	--	2,900	6.9	5
2/ 11-29-65	312-325	Tampa	21	--	75	84	25	385	14	156	274	720	1.1	1.7	.00	1,650	1,820	561	433	2,750	7.9	0
TEST WELL NO. 7, PORT CHARLOTTE, USGS NO. 270133N-082034.62																						
12- 2-65	83- 88	Recent	23	--	105	26	2.5	90	3.1	340	32	185	.6	.8	.20	633	630	372	94	1,050	7.8	5
11-30-66	83- 88	Recent	1.1	--	32	36	--	193	7.1	52	74	378	.1	3.3	.01	751	804	228	186	1,420	7.1	5
TEST WELL NO. 8, PLACIDA, USGS NO. 265017N-0821537.1																						
12- 6-65	42	Recent	4.5	--	355	753	20	6,510	207	241	1,350	11,800	.5	15	.00	21,100	--	4,910	3,810	33,500	7.7	0
12- 6-65	62- 70	Recent	--	--	--	--	--	--	--	--	1,670	11,700	.5	--	.20	--	--	--	--	35,900	7.5	--
12- 7-65	62- 72	Recent	--	--	--	--	--	--	--	--	1,860	13,900	.4	--	.00	--	--	--	--	38,000	--	--
12- 7-65	62- 80	Recent	--	--	--	--	--	--	--	--	1,880	14,900	.7	--	.00	--	--	--	--	42,200	--	--
12- 7-65	62- 85	Recent	--	--	--	--	--	--	--	--	1,990	15,100	.6	--	.20	--	--	--	--	42,200	7.4	--
12- 8-65	84- 90	Recent	--	--	--	--	--	--	--	--	1,920	15,500	.9	--	.00	--	--	--	--	43,000	--	--
12- 8-65	84- 97	Recent	11	--	558	949	39	8,610	318	215	1,980	15,600	.8	19	.30	28,200	--	5,340	5,160	43,500	7.5	0
12- 9-65	84-112	Recent	14	--	490	773	38	7,040	241	151	1,500	12,700	.7	12	.40	22,800	--	4,450	4,320	36,000	7.7	0

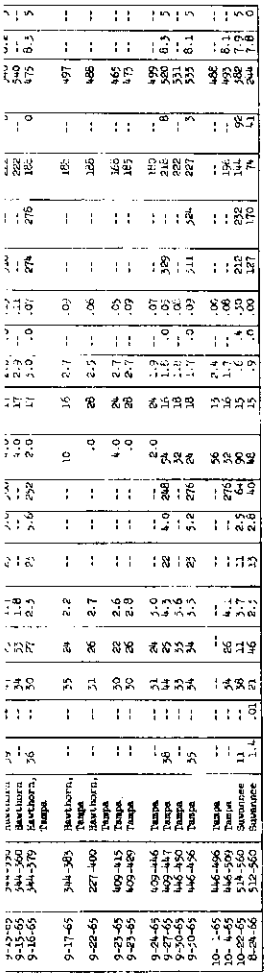

TABLE 1. Continued

USGS Well No. 8 (continued)

Material	Thickness *(feet)*
Clay, white, limestone, white, and sand, Phosphatic	20
Clay, blue, with limestone and sand, phosphatic	10
Limestone, white, clay, blue, and sand, phosphatic	5
Rock, black, white and clear, hard from 243 to 245	5
Sand, black, and clay, white	5
Shell, rock, and sand, black	5
Rock, and sand, black	5
Rock, coarse, sand, black, and some clay, white	5
Clay, white and rock	10
Clay, gray	5
Clay, white	10
Clay, gray	5
Limestone, and shell	7
Cavity	4
Shell bed, water bearing, very salty	1
Limestone, white with shells	3
Limestone, crumbly, with very little clay	5
Limestone, crumbly	10
Limestone, fine	15
Limestone, hard, brown, fine	10
Limestone, white	5
Limestone, brown	4
Cavity	4
Limestone, brown	2
Cavity	2
Limestone, hard, brown, fine	13
Limestone, brown, with phosphatic sand streaks, 381 to 384	5
Limestone, brown, with clay	12
Clay, white, with limestone	8
Limestone, brown, and clay, white	8

USGS Well No. 9 Driller; M.

Osprey	
Sand, brown	15
Sand, brown, and shell	10
Sand, brown, and clay	11
Gravel	1
Limestone, White	2
Cavity	1
Limestone, white, and clay, gray	4
Clay, gray	5
Limestone, hard, white	3
Clay, gray	18
Clay, light gray, and limestone	19
Clay, gray	1

.BLE 1. Continued

	Thickness *(feet)*	Depth *(feet)*
	5	95
	1	96
	2	98
	9	107
	1	108
	5	113
	1	114
	19	133
	11	144
	2	146
	8	154
	1	155
ing		
	10	165
	4	169
	1	170
	1	171
	1	172
	16	188
	4	192
	19	211
	6	217
	1	218
	2	220
	7	227
	4	231
	15	246
	4	250
	5	255

Driller: M. Ballard

Thickness *(feet)*	Depth *(feet)*
10	10
5	15
5	20
5	25
10	35
4	39
6	45
2	47
4	51

Driller: M. Ballard

Thickness *(feet)*	Depth *(feet)*
10	10
5	15
5	20

Table 3.--Continued

Date of collection	Depth of sample (feet)	Formation or deposit	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Phosphate (PO_4)	Dissolved solids: Calculated	Dissolved solids: Residue at 180°C	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Non-carbonate	Specific conductance (micromhos at 25°C)	pH	Color
TEST WELL NO. 3, EDGEVILLE, USGS NO. 271832N-0820648.1--CONTINUED																						
6-23-65	217-276	Hawthorn	25	.01	48	21	--	22	1.6	280	4.4	9.0	.7	.0	.11	268	286	208	0	440	7.5	10
6-23-65	276-327	Hawthorn, Tampa	6.8	.01	36	14	--	8.4	1.5	168	3.2	12	1.0	.0	.11	166	186	148	10	309	7.1	10
6-24-65	276-350	Tampa	42	.02	51	32	--	23	3.0	316	4.4	30	2.9	.0	.23	345	356	260	1	550	7.5	10
6-25-65	351-365	Tampa	43	.03	50	33	--	23	3.2	320	4.8	26	2.6	.0	.24	344	368	260	0	545	7.7	5
6-25-65	351-385	Tampa	53	.03	55	37	--	22	3.4	344	4.0	29	3.0	1.4	.06	377	396	288	6	592	7.4	10
6-29-65	416-430	Tampa	34	.01	56	36	--	15	4.1	244	91	13	2.4	.0	.06	372	418	288	88	610	7.6	5
6-30-65	416-485	Tampa	25	.00	82	42	--	19	3.4	228	191	20	1.5	.0	.07	496	574	376	189	740	7.5	5
7-20-65	485-495	Tampa	23	--	50	30	6.1	17	6.0	180	114	16	1.9	.0	.09	353	378	256	108	570	8.0	5
7-21-65	485-510	Tampa	20	--	60	30	6.1	16	5.7	180	142	20	1.8	.0	.12	391	396	260	132	611	8.0	5
7-21-65	485-520	Tampa	17	--	51	28	5.9	14	4.5	180	108	16	1.8	.0	.07	335	342	248	101	545	8.0	5
7-21-65	485-530	Tampa	--	--	50	30	6.4	--	--	--	136	15	1.6	--	.06	--	--	[illegible]	--	550	--	--
7-21-65	485-540	Tampa	22	--	77	39	8.6	14	4.3	194	200	17	1.7	.0	.09	480	510	[illegible]	204	740	8.0	5
7-22-65	485-575	Tampa	26	--	87	42	11	12	3.7	164	256	20	1.7	.0	.15	551	--	402	251	818	8.1	5
7-22-65	485-600	Tampa	25	--	91	44	12	12	3.7	176	284	20	1.5	.0	.08	580	612	422	278	850	8.1	5
8-23-66	487-600	Tampa	18	.04	84	31	7.9	20	3.8	184	184	22	1.4	.2	.00	455	544	346	195	735	7.9	40
TEST WELL NO. 4, EDGEVILLE SHALLOW WELL, USGS NO. 271832N-0820648.2																						
8-24-66	65-70	Recent	14	.05	83	29	7.4	16	3.4	180	162	18	1.2	.0	.00	416	508	[illegible]	186	695	7.8	50
TEST WELL NO. 5, MYAKKA HEAD, USGS NO. 272735N-0820834.1																						
8-30-65	116-120	Recent	26	--	50	25	.26	14	2.1	308	4.0	8.0	.7	.0	.12	262	--	225	0	475	8.1	5
9- 1-65	162-165	Recent	--	--	41	22	.57	--	--	--	6.0	13	.8	--	.12	--	--	194	--	465	--	--
9- 3-65	225-228	Hawthorn	--	--	29	26	.80	--	--	--	3.0	10	1.6	--	.11	--	--	180	--	480	--	--
9- 3-65	227-254	Hawthorn	34	--	49	24	.70	23	3.7	288	4.0	30	1.6	.0	.11	312	--	222	0	526	8.0	5

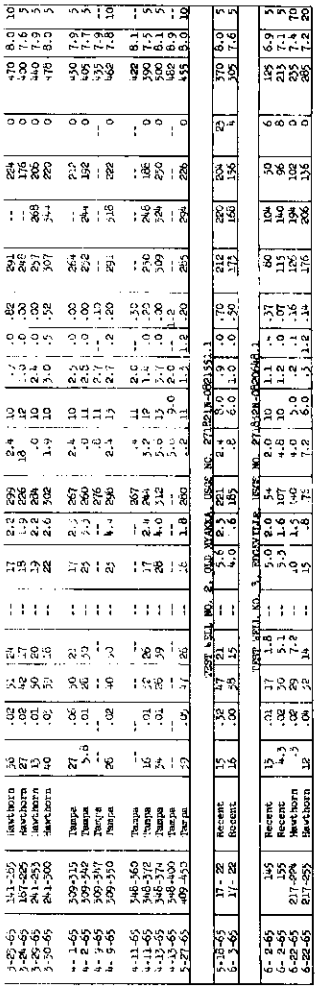

TABLE 1. Continued

USGS Well No. 11 (continued) Material	Thickness *(feet)*	
Sand, fine	5	
Finish: Fine gravel pack, 21 to 25		
USGS Well No. 12		Driller: M
Big Slough, deep		
Sand	10	
Sand, and little clay	15	
Clay, blue	15	
Clay, gray, sandy	7	
Sand, shell, and some gravel, water bearing	12	
Clay, blue, sandy	5	
Limestone	1	
Clay, gray, sandy	5	
Clay, gray, sandy, with some gravel	8	
Limestone, water bearing	5	
Clay, gray	2	
Limestone, crumbly, and clay	15	
USGS Well No. 13		Driller: M
Big Slough, shallow		
Sand	10	
Sand, with little clay	15	
Finish: Gravel packed 20 to 25		
USGS Well No. 14		Driller: T.
Florida 775		
Sand, with some shell	20	
Sand, and shell	5	
Gravel, shell, and some clay	5	
Clay, gravel and shell	5	
Gravel, and sand	6	
Sandstone	3	
Limestone, crumbly, and sandstone, water bearing	1	
Limestone, hard	2	
Limestone, crumbly, and sandstone	1	
Limestone, hard	1	
Limestone, crumbly, and sandstone	1	
Limestone, hard	2	
Clay, gray	1	
Limestone	2	
Clay, gray	10	
Limestone	1	
Clay, gray	7	
Limestone	2	
Clay, blue	20	
Shale, gray	5	
Shale, white	2	

ION OF GEOLOGY

BLE 1. Continued

	Thickness (feet)	Depth (feet)
	3	105
	10	115
	5	120
	5	125
	5	130
	5	135
	5	140
	15	155
	10	165
	5	170
	5	175
	10	185
	12	197
	8	205
	5	210
	5	215
ing	5	220
	7	227
	3	230
	10	240
	5	245
	5	250
	10	260
s	8	268
	7	275
	5	280
	5	285
ater		
	20	305
	Driller: J. R. Guest	
	20	20
	15	35
ıks,		
	20	55
	5	60
	6	66
	11	77
ater		
	13	90
	2	92
treaks	3	95
	5	100
	5	105
	5	110
	5	115
ıring	5	120

APPENDIX C

The following table gives results of chemical analysis of water samples t from each well during drilling.

TABLE 1. Continued

USGS Well No. 16 Driller: C
Bobby Jones, shallow

Material	Thickness *(feet)*
Landfill, and sand, light brown, mixed	10
Sand, light brown	9
Finish: Fine gravel pack from 12 to 19	

USGS Well No. 17 Driller: C
Bobby Jones, deep

Landfill, and sand, light brown, mixed	10
Sand, light brown	9
Sand, gray	1
Sand, brown	3
Clay, muddy, green, and sand	6
Sand, gray	4
Sand and gravel	5
Finish: Open-bottom casing	

USGS Well No. 18 Driller: H.
Blackburn Ranch

Sand	10
Clay, white, sandy	5
Clay, green, and sand	5
Sand, white, water bearing	10
Sand, gray, and mud, white	5
Sand, white, and mud	6
Limestone, water bearing	5
Limestone, crumbly, sandy	14
Limestone, muddy	8
Clay, muddy, gray	6
Limestone, water bearing	5
Clay, gray and green	7
Clay, firm, white, sandy	27
Limestone, crumbly, white, water bearing	17
Limestone, hard, white	9
Clay, white	20
Limestone	6
Clay, white, sandy, with limestone streaks	14
Limestone, crumbly	5
Clay, white, sandy	7
Limestone, firm, white, water bearing	7
Clay, white, sandy	39
Rock	2
Clay, firm, white	26
Limestone, soft, white	17
Limestone, white	3
Clay, white	30
Limestone, light tan, many small cavities, water bearing	36

ABLE 1. Continued

	Thickness (feet)	Depth (feet)
	Driller: Troutman	
	5	5
	10	15
	15	30
	20	50
	5	55
	5	60
	1	61
	4	65
	5	70
	5	75
	3	78
	2	80
	10	90
	8	98
	7	105
	25	130
	5	135
s	5	140
	5	145
	10	155
	5	160
	10	170
	5	175
	5	180
r bearing	15	195
streaks	15	210
	5	215
ter bearing	10	225
	10	235
e streaks	10	245
ite	10	255
	5	260
	5	265
	5	270
ater		
	30	300
	Driller: Troutman	
	5	5
	5	10
	11	21
	5	26
	4	30
	2	32
	3	35
	5	40

TABLE 2. Continued

USGS Well No. 20
Playmore

Date	Time	Casing depth (feet)	Hole depth (feet)	Water level*	Remarks
(1965)					
Apr. 18	8:00 am				Spud in
		20	20		Water sample
Apr. 19	8:00 am	28	40	2.9	4 inch casing
		28	50		Water sample
		28	101		Water sample
	1:30 pm	28	101	1.8	4 inch casing
May 20	12:00 noon	28	101		Pump test
	12:05 pm	28	101		5 minutes at 25 gpm

USGS Well No. 21
Cady Grove

Apr. 20	9:10 am				Spud in
		32	55	7.2	6 inch casing
Apr. 21	8:30 am	32	55	6.8	6 inch casing
		58			Set 4 inch casing
		58	85		Water sample
	1:00 pm	58	102	7.5	

ABLE 2. Continued

ole pth eet)	Water level*	Remarks
39	12	4 inch casing
84	1.0	6 inch casing
39	6.2	4 inch casing
		Set 4 inch casing
39	1.9	6 inch casing
65	.0	4 inch casing
39	1.0	6 inch casing
65	+1.0	4 inch casing
75		Water sample. Pull casing and ream
		Set 4 inch casing
97		Water sample
93	3.0	6 inch casing
65	.0	4 inch casing
93	1.0	6 inch casing
65	+2.5	4 inch casing. Pull 4 inch casing and ream
82		Logging
		Set 4 inch casing
85		Water sample
40		Water sample
50		Water sample
82	.12	6 inch casing
51	+8.7	4 inch casing
		Spud in
		Drive 6 inch casing
75		Water sample
75	1.5	6 inch casing
		Set 4 inch casing
00	1.6	6 inch casing. 4 inch casing - dry
50		Water sample
50	1.3	6 inch casing. Pull casing and ream
		Set 4 inch casing
85	1.5	4 inch casing, water sample
00		Water sample
		Pull casing and ream
		Ran 4 inch casing
25		Water sample, pull 4 inch casing
50		Logged
		Ran 4 inch casing
85		Salty
85	+12.25	4 inch casing
00	+14	

TABLE 1. Continued

USGS Well No. 20 (continued)

Material	Thickness *(feet)*
Clay, blue	5
Clay, blue, with limestone gravel, mixed	25
Clay, light green	7
Limestone, soft	1
Clay, gray	7
Limestone, hard	2
Clay, light gray, and limestone, mixed	8
Limestone, soft, water bearing	6

USGS Well No. 21 Driller: Tr

Cady Grove

Sand, medium to fine, and soil	10
Sand, medium to fine	10
Sand, medium to coarse, with some phosphate	5
Limestone, medium hard, brown, clay streaks, phosphatic	8
Clay, blue green, with streaks of limestone	9
Limestone, white to tan, and shell	1
Clay, blue green	12
Shale, gray green	5
Shale, with limestone and shells	10
Limestone, gray, water bearing at 70	30
Shale, white	2

TABLE 2. Continued

Date	Time	Casing depth *(feet)*	Hole depth *(feet)*	Water level*	Remarks
(1965)					
Feb. 25	5:00 pm	41	92	5.5	
Feb. 28		103			Set 103 ft. casing. Casing following drill
		102	103		Water sample, casing seated at 103
	5:00 pm	103	120	4.5	4 inch casing
Mar. 1	8:00 am	103	120	3.1	4 inch casing
			153		Pull casing and ream
		153			Set 4 inch casing
Mar. 2		163	190		Water sample, casing following drill to 163. Seated at 163
Mar. 3	8:00 am	163	190	1.1	4 inch casing
		163	203		Pull casing and ream
		203			Set 4 inch casing
Mar. 4		203	220	2.2	Water sample
			268		End drilling
Mar. 7		41	268		Pull casing and ream. Wait on logger
Mar. 8		41	252		Log
Mar. 9		262			Ream, set 4 inch casing
Mar. 10					Rained out
Mar. 11		262	305		Water sample
USGS Well No. 15					
Bee Ridge Extension					
Mar. 18	8:00 am				Spud in
		45	65		6 inch casing
Mar. 22					Hole filling
		67			Ream, set 4 inch casing
		67	120		Water sample
USGS Well No. 16					
Bobby Jones, shallow					
Mar. 24	8:00 am	12	19		
USGS Well No. 17					
Bobby Jones, deep					
Mar. 24	11:00 am	34	38		
USGS Well No. 18					
Blackburn Ranch					
Mar. 24					Spud in
		41	43		Water sample
	5:00 pm	41	43	1.3	6 inch casing
		41	75		Water sample
Mar. 25		84			Set 4 inch casing
		84	116		Water sample
		84	130		Water sample
	5:00 pm	41	84	1.3	6 inch casing

SION OF GEOLOGY

ABLE 2. Continued

ole pth :et)	Water level*	Remarks
54	.1	6 inch casing
		Pulling sand casing
54		Dry
71	16.8	Water sample
75	16.8	4 inch hole
75	+7.7	4 inch hole
17	12.9	
17	+4.0	4 inch hole
20		Water sample
55		Water sample
55	+8.8	4 inch hole
		6 inch casing
15		Water sample
51	2.6	6 inch hole
25	5	4 inch casing
25		Water sample
30		Driving casing
30		Water sample
54		Drive 6 inch casing
78		Water sample
78	.3	6 inch casing
78	+.7	6 inch casing
78		Set and cement. 4 inch casing
10		Water sample
10	+.4	4 inch hole
15	5.5	4 inch hole
15		Water sample
		Spud in
10		Water sample
10	7.2	6 inch casing
15		Water sample
5		Water sample
15		Water sample

APPENDIX B

The following table gives driller's notes made during drilling of each we

)GICAL AND WATER-LEVEL LOGS
bove (+) land-surface datum)

e h t)	Water level*	Remarks
		Spud in
5		Water sample
1	48	
2	90	Water sample, bailed 5 min. at 10 gpm
5	13.36	Water sample
		Set 4 inch casing
0		Water sample
		Reset 4 inch casing
5		Water sample
5	17.3	4 inch casing
5	12	7 inch casing
5	20	Water sample
		Reset 4 inch casing
3	145	4 inch casing
0	12	7 inch casing
3	145	Water sample
3	74	4 inch casing
0	15	7 inch casing
9	42	4 inch casing
0	15.7	7 inch casing
0		Water sample
9	14.2	Both pipes, seal broken
		Reset 4 inch casing
5		Water sample
5	35.7	4 inch casing
5	16.5	7 inch casing
2	200	4 inch casing
5	16.4	7 inch casing
2		Water sample
		Crown sheve broken
2	28.1	4 inch casing
5	16.1	7 inch casing
		Reset 4 inch casing
7	17	4 inch casing
5	16.9	7 inch casing
7		Water sample
0		Water sample
7	16.1	4 inch casing
5	16.1	7 inch casing
		Redrove 4 inch casing
1	55.5	4 inch casing
5	17.2	7 inch casing
0		Water sample
2		Water sample
		No work

TABLE 2. Continued

USGS Well No. 8 (continued)

Date	Time	Casing depth *(feet)*	Hole depth *(feet)*	Water level*	Remarks
(1966)		341	363		Water sample
		341	367		Water sample
Jan. 12	9:30 am	341	367	+13.25	4 inch casing
		341	375		Water sample
		341	384		Water sample
Jan. 13	9:00 am	341	385	+12.5	4 inch casing
		341	392		Water sample
		341	413		Water sample
	12:30 pm	341	413	+12.5	4 inch casing. Tear down machine

USGS Well No. 9

Osprey					
Jan. 14					Set up rig
Jan. 18	8:00 am				Spud in
	12:00 noon	37			6 inch sand casing
		37	40		Water sample
		37	45		Water sample
Jan. 19	9:00 am	37	50	2.5	6 inch casing
		37	90		Water sample
	4:30 pm	37	90	3.0	6 inch casing
Jan. 20					Rained out
Jan. 21	8:30 am	37	90	1.8	6 inch casing
		94			Set 4 inch casing
	11:30-3:30				Rain
		94	100		Water sample
		94	110		Water sample
		37	94	2.6	6 inch casing
		94	110	1.8	4 inch casing
Jan. 24	8:30 am	37	94	1.2	6 inch casing
		94	110	0.3	4 inch casing
		94	115		Water sample
		94	125	3.0	Water sample
		94	154	16.8	Water sample
	5:30 pm	37	94	1.0	6 inch casing
		94	154	.4	4 inch casing
Jan. 25	9:15 am	37	94	2.3	6 inch casing
		94	154	.3	4 inch casing
	9:15 am				Pull casing
	10:00 am				Start logging
	3:30 pm				End logging
	4:30 pm	37	154	.6	6 inch casing
Jan. 26					Rained out
Jan. 27	8:00 am	37	154	.1	6 inch casing
	3:30 pm				Reaming
	5:15 pm	154			Set 4 inch casing
	6:15 pm	37	154	.3	6 inch casing

ABLE 2. Continued

lc th :t)	Water level*	Remarks
.7	+3.0	6 inch casing
		Run 4 inch casing
5		Water sample
5	+2.0	6 inch casing
0	+3.5	4 inch casing
2		Water sample
.5		Water sample
0	+4.5	4 inch casing. Pulled 4 inch casing
0	+2.0	6 inch casing. Ream hole
		Install 4 inch casing
9	+2.0	6 inch casing
9	Dry	4 inch casing
.1		Water sample
6		Water sample
5		Water sample
5		Water sample
		Shut down for Christmas
9	+2	6 inch casing
0	+3.5	4 inch casing. Pull casing & ream
0	+2	6 inch casing
0		Install 4 inch casing
3		Water sample
0	4.9	4 inch casing
0	+4.1	4 inch casing
.5		Water sample
5		Water sample
5		Water sample
5	+14.75	4 inch casing
5	+15	4 inch casing
0		Water sample
0	+13.75	4 inch casing
0	+14.5	4 inch casing
		Pull 4 inch casing
0	+5	6 inch casing
		Logging
0	+5	6 inch casing
		Logging
5	+5	Reaming, 6 inch casing
5	+5.75	6 inch casing
0		Set and grout
		4 inch casing, 60 bags
0	+4.5	6 inch casing
		Add 60 bags grout
		Pull 6 inch casing
2		Water sample
0		Water sample

TABLE 2. Continued

USGS Well No. 1 (continued)

Date	Time	Casing depth (feet)	Hole depth (feet)	Water level*	Remarks
(1965)					
Apr. 13	8:00 am	348	372	55.1	4 inch casing
	8:00 am	106	345	16.6	7 inch casing
	3:00 pm	348	400	55.6	4 inch casing
	3:00 pm	106	345	24.9	7 inch casing
		348	374		Water sample
		348	400		Water sample
Apr. 14	8:00 am	106	400	25.9	7 inch casing
	2:00 pm	106	392	19.2	7 inch casing
					Lost reaming tools
Apr. 15-26					Well closed for recovering tools and logging
Apr. 22	8:00 am	106	400	16.7	7 inch casing
	5:00 pm	106	400	19.2	7 inch casing
Apr. 27	8:00 am	106	400	18.4	7 inch casing
		409			Reset 4 inch casing
	5:00 pm	106	403	17.2	7 inch casing
		409	409	28.2	4 inch casing
Apr. 28	8:00 am	409	409	18.3	4 inch casing
		106	405	16.5	7 inch casing
Apr. 30	5:00 pm	106	405	17.5	7 inch casing
	5:00 pm	409	450	59.0	4 inch casing
May 27		409	450	52.0	Water sample
		409	450	85	45 min. pumping 7 gpm
		409	450	87	1½ hours pumping 7 gpm
		409	450	85	4 hours pumping 7 gpm
USGS Well No. 2					
Old Myakka					
May 17	6:00 pm	22	22		Spud in
May 18		17	22		Water sample
June 3		17	22	7	Pumped 3 gpm for 2 hours
USGS Well No. 3					
Edgeville, deep					
May 24					Spud in
May 25		35			Driving casing, broke drivehead
May 26					Repair drivehead
May 27		88			Drive casing
May 28		123			Drive casing
May 29-31					Not working-Holiday
June 2		145	145	12	Water sample
June 2		155	155	12	Water sample
		158			Drive casing
June 3-9					Out of casing
June 10		179			Drove casing, rain ½ day
June 11-12					Driller injured
June 14					Drove casing, sand heaved up to 11

BLE 2. Continued

e h t)	Water level*	Remarks
		Casing on ledge
5	30	7 inch casing
5		Hole filled to 197 feet, shut down ½ day, rain
7		Hole filled again. Sand still heaving.
5	14.8	7 inch casing „still caving
3	25.2	7 inch casing
3	9.5	7 inch casing
4	9.5	Water sample
5	27.9	7 inch casing. Water sample
9	27.8	7 inch casing
6		Water sample
		Set 4 inch casing
7	28	Water sample
9	28.4	7 inch casing
0	41.4	4 inch casing
0		Water sample
		Reset 4 inch casing
1	27.6	7 inch casing
1	42.8	4 inch casing
5	37.2	Water sample
5	37.2	Water sample
1	29.6	7 inch open hole
1	26	7 inch open hole
1	26.6	7 inch open hole, rained out
1	26.6	7 inch open hole
0	28.2	7 inch open hole. Rained out.
0	27.6	7 inch open hole
		4 inch casing reset.
6	25	7 inch casing
0	65	4 inch casing
6	27.5	7 inch casing
0	30.9	4 inch casing
0		Water sample
6	27.5	7 inch casing
5	41.3	4 inch casing
6	30.1	7 inch casing. Pumped hole 8 hours dd 41.3 at 10 gpm. Broke derrick pulling pipe.
5	27.2	4 inch casing
5		Water sample
		Rig in shop, putting on new derrick
5	25.5	7 inch open hole
0	26.1	7 inch open hole
0	25.3	7 inch open hole
5	26.2	7 inch open hole. Rain off and on all day

TABLE 2. Continued

Date	time	Casing depth (feet)	Hole depth (feet)	Water level*	Remarks
USGS Well No. 6 (continued)					
(1965)					
Nov. 29		312	320		Water sample
		312	325		Water sample
		312	325		Water sample 30 min. later
Nov. 30		312	350	+22	
USGS Well No. 7					
Port Charlotte					
Dec. 2					Set up
	4:00 pm				Set screen and pump
	4:30 pm	83	88	22	Sample, pumping 2.5 gpm
USGS Well No. 8					
Placida					
Dec. 3	8:00 am				On location
	2:30 pm				Spud in
		22			Drove sand casing
Dec. 6	12:00 noon	42			Drove sand casing
	2:00 pm	42	42	5	Water sample
	5:00 pm	62	70	Land sur.	Water sample
Dec. 7	7:30 am	62	70	Land sur.	6 inch water level
	8:30 am	62	72		Water sample
	10:00 am	62	80		Water sample
	10:30 am	62	85		Water sample
	12:30 pm				Shut down
Dec. 8	12:30 pm	62	86	+.5	6 inch casing
	4:20 pm	84			Drove casing to cut off sand
		84	90		Water sample
		84	97		Water sample
Dec. 9	7:15 am	84	105	+1.5	6 inch casing
		84	112		Water sample
		84	125		Water sample
Dec. 10	9:00 am	84	135	+1.5	6 inch casing
	5:20 pm				Reaming hole
Dec. 14	10:00 am	84	135	+1.5	6 inch casing
	2:00 pm	136			Ran 4 inch casing
		136	148		Water sample
		136	155		Water sample
Dec. 14	6:00 pm	136	155	+2.0	4 inch casing
Dec. 15	7:00 am	136	155	+2.0	4 inch casing
		84	136	+1.5	6 inch casing
	5:30 pm	136	184		Water sample
		136	187	+1.5	4 inch casing

BLE 2. Continued

le th t)	Water level*	Remarks
9	37.5	4 inch casing
6	36.1	6 inch casing
9	39.6	4 inch casing
9	39.6	Water sample. Pumped 1 hour at 10 gpm. Pulled 4 inch casing
9	36.8	6 inch open hole
0	36	6 inch open hole
5	36.8	6 inch hole reaming
5	36.1	6 inch hole. Reamed to 513 ft.
3	36.3	6 inch open hole
		Install and cement 4 inch casing
3	35.8	6 inch casing
3	46.9	4 inch casing
3	36.8	6 inch casing
0	55.9	4 inch casing
3	35.8	6 inch hole
0	46.8	4 inch hole
0		Water sample. Contaminated with cement
0		Water sample. Contaminated with cement
3	35.8	6 inch casing
0	53.8	4 inch casing
0	38.1	4 inch hole. Water sample. Pumped 1 hour at 10 gpm
		Set up
		Drove casing
8		Water sample
5		Drive and drill out
6		Drive and drill
6	60	Water sample. Set 4 inch casing
0	5.15	Water sample. 4 inch casing. Test pumped 2 hours at 10 gpm
0	+	Water sample (flowing about 10 gpm)
5		Water sample. Pull liner and ream
		Reset 4 inch casing
0		Water sample
.7	+18	Water sample. 100 gpm, estimated
.7	+18	Water sample after 2 hours flow, 100 gpm
		Pulled casing and logged
		Set permanent 4 inch casing
		Grouted with 60 bags
		Checked well for grout and pulled sand casing

TABLE 2. Continued

USGS Well No. 3 (continued)

Date	Time	Casing depth *(feet)*	Hole depth *(feet)*	Water level*	Remarks
(1965)					
July 20	6:00 am	217	485	25.4	7 inch open hole
		485			Reset 4 inch casing
		485	495	30.4	Water sample
	6:00 pm	217	485	25.2	7 inch casing
		485	505	30.4	4 inch casing
July 21	7:00 am	217	485	25.2	7 inch casing
		485	505	25.5	4 inch casing. Casing leaking. Drove again.
		485	510	25.2	Water sample
		485	520		Water sample
		485	530		Water sample
		485	540		Water sample
	2:00 pm	217	485	25.2	7 inch casing
July 21	2:00 pm	485	540	26.3	4 inch casing. Raining. Shut down.
July 22	6:30 am	217	485	25.2	7 inch casing
	6:30 am	485	540	25.9	4 inch casing. Drove 4 inch casing to seat
		485	575		Water sample
		485	600		Water sample
	6:00 pm	217	485	26.2	7 inch casing
		485	600	31.4	4 inch casing. Test pump 4 hours.
July 23-25					Not on rig
July 26	6:30 am	217	485	25	7 inch casing
	6:30 am	485	600	26.9	4 inch casing
	2:00 pm				Log hole until 6:00 pm
July 27					Reset casing and cement casing
July 28	6:30 am	217	485	24.7	7 inch casing
	6:30 am	485	600	25	4 inch casing
	6:00 pm	217	485	24.9	7 inch casing
	6:00 pm	485	600	31.3	4 inch casing
USGS Well No. 4					
Edgeville, shallow					
July 30		20	20		Spud in
July 31		70	70		Rain at 2:00 pm
Aug. 1-3					Too wet to work on location
Aug. 4		65	70		Set screen. Rain
Aug. 5		65	70		Swabbing and bailing. Water sample
USGS Well No. 5					
Myakka Head					
Aug. 25					Set up rig
Aug. 26		82			Drive casing
Aug. 27		116			Drive casing. Rain. Shut down at 2:00 pm
Aug. 30		116	120		Water sample. Rain. Shut down at 2:15 pm

BLE 2. Continued

e h /)	Water level*	Remarks
)		Rain. Shut down at 4:40 pm
;		Water sample
)		Drive and drill
;		Drill a head
;	35.4	6 inch open hole
3		Water sample
		Seated casing
1		Water sample
		Set 4 inch casing
5	36.6	6 inch open hole
5	33.0	6 inch casing
5	58.4	4 inch casing
0		Water sample
5		Water sample
5	23	6 inch casing
5	58.4	4 inch casing
5	31.5	6 inch casing
5	37.8	4 inch casing. Shut down. High wind and rain
5	33	6 inch open hole. Shut down for rain at 10:00 am
2	32.9	6 inch open hole
		Reset 4 inch casing
0		Water sample
5	34.2	6 inch casing
5	39	4 inch casing
5	30	6 inch casing
5	37.8	4 inch casing
8		Water sample
4		Water sample
5	35.1	6 inch casing
4	34.9	4 inch casing
5	31.3	6 inch casing
4	31.4	4 inch casing
4	32.9	6 inch open hole
		Reset 4 inch casing
0		Water sample
0		Water sample
4	32.7	6 inch casing
0	42.8	4 inch casing
4	30.6	6 inch casing
0	39.4	4 inch casing
9		Water sample
4	30.8	6 inch casing
3	39.8	4 inch casing
4	30.5	6 inch casing

TABLE 2. Continued

USGS Well No. 5 (continued)

Date	Time	Casing depth *(feet)*	Hole depth *(feet)*	Water level*	Remarks
(1965)					
		344	383	38.0	4 inch casing
		344	383	37.8	Water sample. 5 hour P.T. at 10 gpr DD 2 feet. Pull 4 inch casing
	5:00 pm	227	383	36.7	6 inch open hole
Sept. 20	7:00 am	227	383	36.7	6 inch open hole
	1:00 pm	227	383	37.6	6 inch open hole. Rain
Sept. 21	7:00 am	227	383	36.8	6 inch open hole
	5:00 pm	227	383	36.9	6 inch open hole
Sept. 22	7:00 am	227	383	36.6	6 inch open hole
		227	400		Water sample
		409			Reset 4 inch casing
	5:00 pm	227	409	36.8	6 inch casing
		409	409	36.8	4 inch casing
Sept. 23	7:00 am	227	409	36.5	6 inch casing
		409	409	36.5	4 inch casing
		409	415		Water sample
		409	429		Water sample
	5:00 pm	227	409	36.5	6 inch casing
		409	430	48.4	4 inch casing
Sept. 24	7:00 am	227	409	36.5	6 inch casing
		409	430	43.0	4 inch casing
		409	446		Water sample
Sept. 24	5:00 pm	227	409	36.5	6 inch casing
		409	447	44.6	4 inch casing
Sept. 27	7:00 am	227	409	36.3	6 inch casing
		409	447	40.2	4 inch casing
		409	447		Water sample. Pumped 4 hours at 1 gpm. Pulled 4 inch casing
	5:00 pm	227	447	36.3	6 inch hole
Sept. 28	7:00 am	227	447	36.2	6 inch hole
	3:00 pm	227	430	37.3	6 inch hole. Rain in pm
Sept. 29	7:00 am	227	430	36.6	6 inch hole
		446			Reset 4 inch casing
	5:00 pm	227	446	36.8	6 inch casing. Shut down 6 hours f rain
		446	448	41.3	4 inch casing
Sept. 30	7:00 am	227	446	36.4	6 inch casing
		446	448	41.3	4 inch casing
		446	450		Water sample
		446	456		Water sample
	3:30 pm	227	446	36.3	6 inch casing
		446	475	38.4	4 inch casing. Raining, Shutdown 3 pm
Oct. 1	7:00 am	227	446	36.2	6 inch casing
		446	475	38.5	4 inch casing
		446	496		Water sample
	5:00 pm	227	446	36.1	6 inch casing