# GROUND-WATER RESOURCES OF THE NATCHEZ AREA, MISSISSIPPI

by E. H. Boswell and G. A. Bednar

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# CONTENTS

| | Page |
|---|---|
| Abstract | 1 |
| Introduction | 2 |
| Purpose and Scope | 2 |
| Description of the Area | 2 |
| Previous Investigations | 5 |
| Water Development and Use | 5 |
| Geohydrology | 22 |
| Water Quality | 38 |
| Freshwater Aquifers | 38 |
| Saline Water | 45 |
| Aquifer Contamination | 45 |
| Potential for Ground-Water Development | 47 |
| Summary | 49 |
| Selected References | 52 |

# ILLUSTRATIONS

Figures 1-6.--Maps showing:

| | |
|---|---|
| 1.--Location of study area in Adams County | 3 |
| 2.--Physiographic districts and drainage basins in Adams County | 4 |
| 3.--Locations of selected wells in Adams County | 19 |
| 4.--Location of wells in the Natchez area | 20 |
| 5.--Configuration of the bases of the moderately-saline, slightly-saline, and freshwater zones in Adams County | 23 |
| 6.--Locations of geohydrologic sections A-A', B-B', and C-C' | 24 |
| 7.--Geohydrologic section A-A' | 25 |
| 8.--Geohydrologic section B-B' | 26 |
| 9.--Geohydrologic section C-C' | 27 |
| 10.--Geohydrologic section D-D' | 28 |
| 11.--Map showing configuration of the top of limestone of Vicksburg age in the Natchez area | 30 |
| 12.--Map showing potentiometric surface of the Mississippi River alluvial aquifer, March 1963 | 32 |
| 13.--Hydrograph for well F50 in the Mississippi River alluvial aquifer | 33 |
| 14.--Hydrographs for water wells in Adams County | 36 |
| 15.--Graph showing water-level trends in the Natchez area, 1939-83 | 37 |
| 16.--Maps showing potentiometric surface in the 600-foot sand, April 1963 and June 1982 | 39 |
| 17.--Maps showing potentiometric surface in the 400-foot sand, 1961 and 1982 | 40 |

Page

18.--Graphs showing dissolved-solids concentrations and hardness of water in aquifers in the Natchez area---------------------------------- 42
19.--Variations in the chemical characteristics of water in the Natchez area--------------------- 43
20.--Graph showing silica concentrations in water from major aquifers in the Natchez area-------- 46
21.--Graph showing theoretical time-distance relations for pumping from Miocene aquifers---- 50

## TABLES

Table 1.--Geologic units and their lithologic characteristics----------------------------------------- 6
2.--Records of wells in Adams County----------------- 7
3.--Results of chemical analyses of water from selected wells in Adams County----------------- 41

## ABBREVIATIONS AND CONVERSION FACTORS

This report uses inch-pound units. The equivalent International System (SI) units may be obtained using the following factors:

| Multiply | By | To obtain |
|---|---|---|
| inch (in) | 25.4 | millimeters (mm) |
| foot (ft) | 0.3048 | meter (m) |
| mile (mi) | 1.609 | kilometers (km) |
| square mile ($mi^2$) | 2.590 | square kilometers ($km^2$) |
| cubic foot per second ($ft^3/s$) | 28.32<br>0.02832 | liters per second (L/s)<br>cubic meter per second ($m^3s$) |
| gallons per minute (gal/min) | 0.06309 | liters per second (L/s) |
| million gallons per day (Mgal/d) | 0.04381 | cubic meters per second ($m^3/s$) |
| feet per mile (ft/mi) | 18.9 | centimeters per kilometer (cm/km) |
| cubic feet per day per square foot $(ft^3/d)ft^2$ | 0.3048 | cubic meters per day per meter $(m^3/d)m$ |
| cubic feet per day per foot $(ft^3/d)ft$ or $ft^2/d$ | 0.0929 | cubic meters per day per meter $(m^3/d)/m$ |
| gallons per minute per foot of drawdown (gal/min)/ft) | 0.21 | liters per second per meter (L/s)/m |

Abbreviations

Milligrams per liter (mg/L)

The conversion from temperature in degrees Farenheit (°F) to temperature in degrees Celsius (°C) is expressed by: °C = (5/9) (°F-32).

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## ABSTRACT

The Natchez area, Mississippi, is supplied by ground water from aquifers in strata of Miocene and younger age. The largest public-supply withdrawals are from Miocene aquifers that occur at depths of 400 and 600 feet, but several public water-supply wells obtain water from a deeper Miocene stratum that occurs at a depth of about 1,000 feet. Some small water supplies are obtained from wells less than 200 feet deep that tap the post Miocene sediments in the uplands. Most of the ground water used in the area is from the Mississippi River alluvial aquifer.

The Mississippi River alluvial aquifer in 1983 was the source for about 38 million gallons per day of ground water, all for industrial use. Pumpage from Miocene aquifers in Adams County for public and industrial use was about 7.2 million gallons per day in 1982. The City of Natchez used 3.2 million gallons per day in 1982.

Water levels in some wells in the Miocene aquifers at Natchez had declined from about 70 feet above sea level in 1939 to about 30 feet below sea level in 1961. Since 1961 water levels in the cones of depression in the Miocene aquifers have shown much smaller declines, but the cone of depression has enlarged southward due to areal changes in pumping. Analysis of data indicates that the Miocene aquifers in the area can sustain withdrawals at or somewhat higher than the 1983 rate for at least 20 years. The Mississippi River alluvial aquifer, currently the source for very large industrial water supplies south of Natchez, has the potential to furnish very large quantities of water for municipal or industrial use north of Natchez.

Water in the major Miocene freshwater aquifers changes from a hard calcium-magnesium bicarbonate type to a soft sodium bicarbonate type with increasing depth. Water in the Natchez formation and Mississippi River alluvial aquifer is a hard calcium-magnesium bicarbonate type. All ground water in the area contains moderately high concentrations of dissolved solids (in the 300 to 400 milligrams per liter range). Silica, iron, manganese, and color are excessive in water from some wells, but water for most wells is acceptable for many uses.

# INTRODUCTION

In 1981, the U.S. Geological Survey and the City of Natchez, Miss., undertook an appraisal of the present and potential ground-water supply in the Natchez area. Ground-water data were needed to plan for the increasing demands being placed on water supply in the vicinity of Natchez.

## Purpose and Scope

This report describes the ground-water resources of the Natchez area. The emphasis of the report is on delineation of aquifers, analysis of areal variations in hydraulic characteristics of the aquifers, water-level changes, water quality, and water use. Although the studies were directed specifically toward the Natchez area, the report includes data for Adams County needed to establish the relation of aquifers in the Natchez area to the regional ground-water system.

Work for this study included analysis of water-use trends and water-level declines, determination of the interrelation of water-bearing zones, and identification of ground-water-quality problem areas. Contamination of ground water by oil-field brine, known to occur in the area, is being investigated as part of another study.

## Description of the Area

The Natchez area includes the City of Natchez in the west-central part of Adams County, Miss., and adjacent parts of Concordia Parish, La. The boundary between the states is a reach of the Mississippi River. Washington, Miss., is immediately east of the area and Vidalia, La., is immediately west of Natchez (fig. 1).

Annual precipitation at Natchez is about 54 inches. Monthly precipitation ranges from 1.65 inches in October to 6.13 inches in March. The mean annual air temperature is about 67°F.

The study area includes two markedly different districts of the Gulf Coastal Plain - the Loess (Bluff) Hills and the Mississippi Alluvial Plain (fig. 2). The alluvial plain, a nearly flat surface, is characterized by natural levees, oxbow lakes, and alluvial fans. The Loess Hills form a rugged, highly dissected area that borders the eastern side of the alluvial plain. Drainage is by the Mississippi River through tributary streams and direct runoff. St. Catherine Creek is the principal drainage in the immediate vicinity of Natchez (fig. 2).

The alluvial plain is subject to flooding by the Mississippi River. The highest stage of record at Natchez was 133.3 feet above sea level (58.0 feet above gage zero) in 1937 (U.S. Department of Housing and Urban Development, 1977, p. 5). The lowest stage of record is 14.7 feet above sea level. Occasional flooding in St. Catherine Creek basin is restricted to deep, relatively narrow valleys.

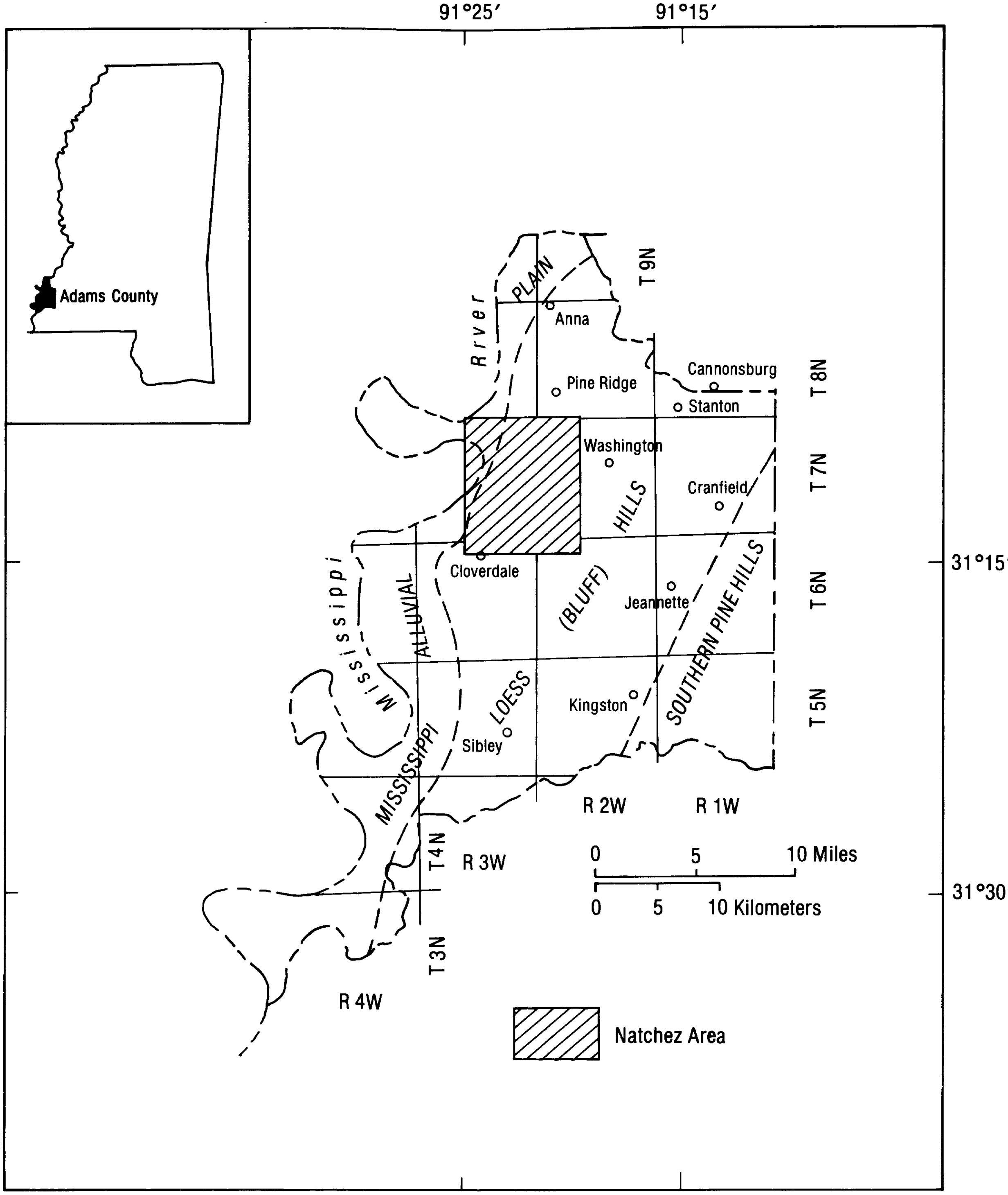



Figure 1.—Location of study area in Adams County

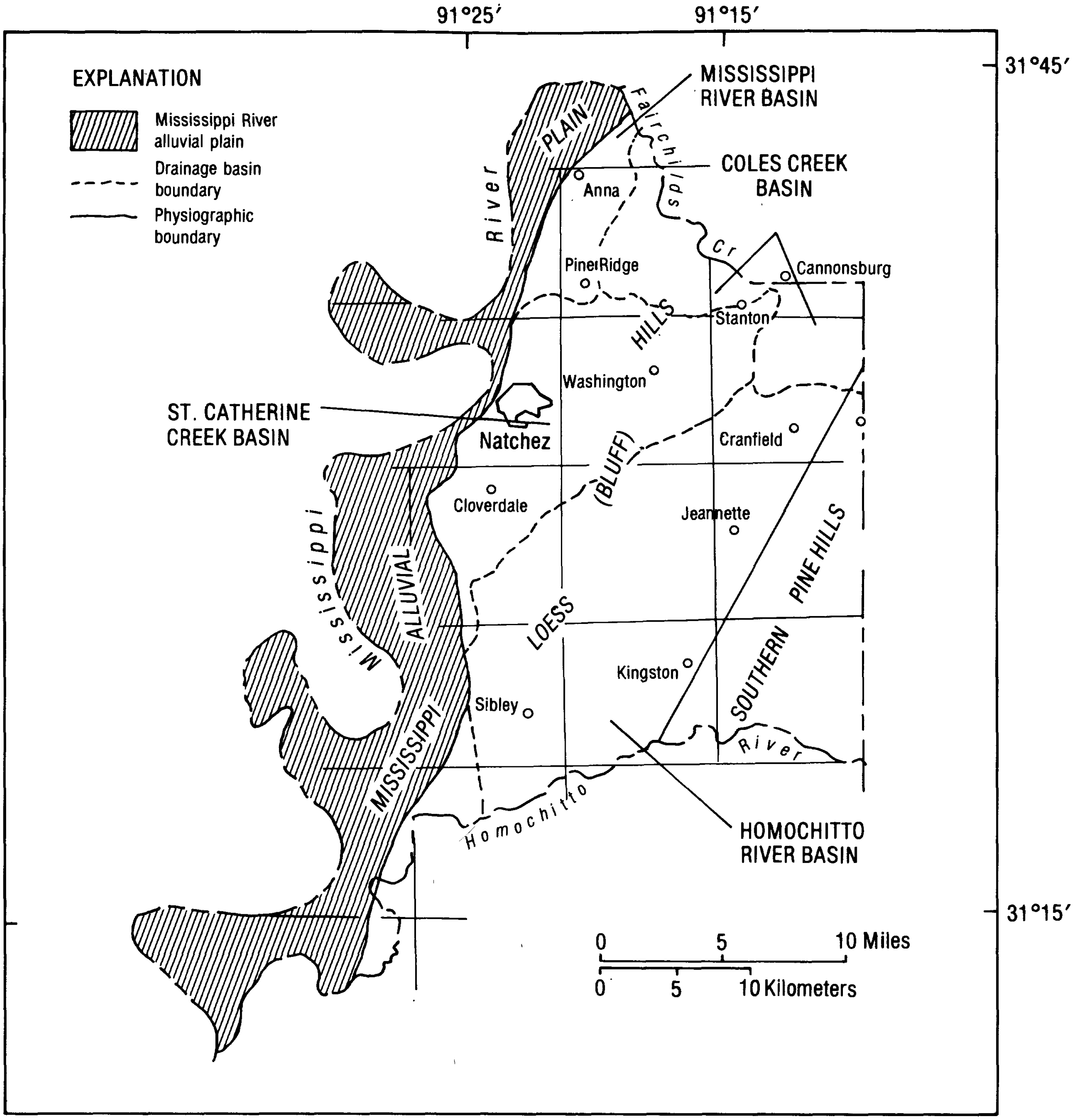



**Figure 2.—Physiographic districts and drainage basins in Adams County.**

## Previous Investigations

The water resources of the Natchez area were described by Callahan and others (1963, 1964) in reports on the availability of water for industry in southwestern Mississippi. Earlier data for the area were included in a report by Stephenson and others (1928).

Vestal, in 1942, included a brief discussion of ground-water resources in a report on the geology and mineral resources of Adams County. A more detailed description of water resources was included in a later geological report by Childress and others (1976).

# WATER DEVELOPMENT AND USE

Virtually all water used in the Natchez area and in Adams County is obtained from underground sources. Water-bearing sand beds (aquifers) occur in the alluvial deposits of the Mississippi River and in geologic units of Miocene and younger age that underlie the entire area (table 1). Although several water-bearing zones are present at most places, the largest quantities of ground water (several thousand gallons per minute to individual wells) are available from the Mississippi River alluvial aquifer. Elsewhere, wells can produce up to about 1,000 gal/min. Descriptions of typical wells in Adams County are presented in table 2 and locations of selected wells are shown in figures 3 and 4.

Although the Mississippi River is nearly unlimited in potential as a source of water, dependable surface-water supplies are limited in most of Adams County, and some streams have been subject to pollution for many years (Callahan and others, 1964, p. 21; Childress and others, 1976, p. 122). The largest source of surface water, excepting the Mississippi River, is the Homochitto River. These larger streams are not convenient sources of water for most of the county and the water would require treatment.

The municipal water system at Natchez was established about 1889 when two wells were drilled for a water plant located at the base of the bluffs (at location of well C11, fig. 4). A third well was drilled in 1918. The Devereaux Water Plant, located in the upland part of the area (fig. 4), started operating about 1940 and the old plant was later abandoned. Six wells at the Devereaux Water Plant have been supplemented by five wells drilled at other locations. In 1983, three 600-foot wells at the plant were replaced.

Table 1.--Geologic units and their lithologic characteristics in the Natchez area

| SYSTEM | SERIES | GROUP | STRATIGRAPHIC UNIT | THICKNESS (feet) | PHYSICAL CHARACTER | WATER-BEARING PROPERTIES |
|---|---|---|---|---|---|---|
| Quarternary | Holocene | | Alluvium | 0 - 200+ | Clay, silt, sand and gravel. | Deposits in tributary streams may yield as much as 100 gal/min. Mississippi River alluvium, 2,000 gal/min or more with specific capacities of 30 to 150 gal/min/ft of drawdown. Recharge to the aquifer depends partly on river stage. |
| | Pleistocene and Pliocene | | Loess | 0 - 50 | Brown calcareous silt. | Unimportant as an aquifer. Prevents recharge to aquifers, which restricts yield to streams. |
| | | | Natchez Formation and terrace deposits | 0 - 80 | Sand and gravel, mainly chert and quartz. Some grains of igneous rock. | Forms Natchez aquifer. Yields up to 300 gal/min. |
| Tertiary | Miocene and Oligocene | | Hattiesburg Formation, Catahoula Sandstone and Chickasawhay Limestone (undivided) | 0 - 2,200 | Clay, sand, and gravel. Pea gravel of polished black chert. | Municipal and industrial supplies. Yields 100 to 800 gal/min with specific capacities of 3 to 25 gal/min/ft of drawdown. Well in Natchez area are produced from irregular sand beds in Catahoula Sandstone. |
| | Oligocene | Vicksburg | Bucatunna Clay<br>Byram Formation<br>Glendon Limestone<br>Marianna Limestone | 160 | Clay, marl, and limestone. | Unimportant as an aquifer. |
| | | | Forest Hill Sand | 200 | Fine sand and carbonaceous clay. | Unimportant as an aquifer. |
| | Eocene | Jackson | Yazoo Clay | 450 | Clay. | Confining layer. |
| | | | Moody's Branch Formation | 25 | Sandy marl. | Unimportant as an aquifer. |
| | | Claiborne | Cockfield Formation | 570 | Sand and clay. | Saline water. |
| | | | Cook Mountain Formation | 150 -250 | Shale and sandy limestone. | Confining layer. |
| | | | Sparta Sand | 900 | Sand and shale. | Saline water. |

Table 2.--Records of wells in Adams County, Mississippi

Water-Bearing Units: MRVA, Mississippi River alluvial aquifer; TRCS, Terrace deposits; NTCZ, Natchez aquifer; MOCN, Miocene undifferentiated; CTHL, Catahoula Sandstone; CRNL "Citronelle Formation".

Water Use: H, Domestic; N, Industrial; P, Public; S, Stock; I, Institutional; U, Unused; Z, other.

| WELL NO. | LOCATION SECT-TION | TOWN-SHIP | RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *A001 | 13 | 09N | 02W | IVANHOE ASSOC | 1970 | | 252 | 4 | 20 | MOCN | 25 | 05-70 | | H | 13 | |
| A005 | 13 | 09N | 02W | CHESTER HOOVER | 1960 | 85. | 262 | 4 | | CTHL | 28 | 09-81 | | H | | |
| *A006 | 32 | 09N | 02W | CHESTER HOOVER | 1979 | 85. | 265 | 4 | 10 | CTHL | 31 | 09-81 | | H | | |
| A007 | 19 | 09N | 02W | D D DRILLING | 1982 | 85. | 165 | 3 | 20 | MRVA | 20 | 05-82 | 50 | Z | | |
| A008 | 17 | 09N | 02W | DAVID NEW DRLG | 1983 | 65. | 90 | 3 | 20 | MRVA | 10 | 10-83 | 52 | Z | | |
| B003 | 60 | 08N | 01W | J SMITH | 1961 | 280 | 252 | | | MOCN | | - | | H | | 085 |
| *B004 | 08 | 08N | 03W | A B DILLE | 1961 | 260 | 760 | 4 | 20 | MOCN | 220 | 06-61 | | H | X | |
| B005 | 09 | 08N | 02W | RICHARD JUNKIN | 1960 | 85. | 45 | | | TRCS | | - | | U | | |
| B006 | 25 | 08N | 02W | PHILLIPS PETROLEUM | 1961 | 280 | 703 | | | MOCN | | - | | U | | 086 |
| B007 | 36 | 08N | 02W | KEN ISBELL | 1969 | | 280 | 2 | 5 | MOCN | 25 | 07-69 | 10 | H | | |
| B008 | 56 | 08N | 02W | SESSIONS | 1967 | 235 | 400 | 6 | 20 | MOCN | 180 | 11-67 | | U | | |
| B009 | 45 | 08N | 02W | S L MINSTON JR | 1968 | 230 | 400 | 6 | 20 | MOCN | 180 | 01-68 | | H | | |
| B010 | 10 | 08N | 03W | JUNKINS WILLIAM | 1968 | | 465 | 3 | 21 | MOCN | 175 | 06-68 | | H | | |
| B011 | 50 | 08N | 02W | J H PROBY | 1971 | | 173 | 2 | 5 | MOCN | 125 | 11-71 | 5 | H | | |
| B012 | 08 | 08N | 02W | HAROLD FROST | 1972 | | 80 | 4 | 10 | CTHL | 42 | 06-72 | 10 | H | | |
| B013 | 34 | 08N | 02W | HUGH OLIVER | 1975 | | 232 | 6 | 12 | MOCN | 170 | 05-75 | 7 | H | | |
| B023 | 16 | 08N | 02W | REBEL DRILLING CO | 1981 | | 537 | 3 | 20 | MOCN | 220 | 04-81 | 45 | Z | | |
| B024 | 15 | 08N | 02W | REATA DRILL CO | 1981 | | 495 | 3 | 20 | MOCN | 175 | 05-81 | 50 | Z | | |
| B025 | 60 | 08N | 01W | J T MARSH | 1960 | 360 | 262 | 4 | | CTHL | | - | | H | | |
| B026 | 30 | 08N | 02W | LAMAR FELTER | 1974 | 270 | 200 | 4 | | CTHL | 177 | 09-81 | | H | | |
| B027 | 45 | 08N | 02W | ADCO DRLG CO | 1981 | | 451 | 3 | 20 | MOCN | 180 | 10-81 | 42 | Z | | |
| B028 | 24 | 08N | 02W | ADCO PROD | 1981 | 140 | 497 | 3 | 20 | MOCN | 20 | 11-81 | 60 | Z | | |
| B029 | 02 | 08N | 03W | NEW HUGHES DRL CO | 1980 | 83. | 130 | 3 | 20 | MRVA | 15 | 12-80 | 52 | Z | | |
| B030 | 63 | 08N | 01W | B G FORTENBERRY | 1982 | 260 | 240 | 3 | 20 | MOCN | 100 | 01-82 | 52 | Z | | |
| B031 | 54 | 08N | 02W | REBEL DRL CO | 1982 | 210 | 398 | 3 | 15 | CTHL | 130 | 09-82 | 60 | Z | | |
| *B032 | 09 | 08N | 03W | FRANK JUNKIN | 1968 | 85. | 120 | 4 | | MRVA | | - | 50 | H | X | |
| B033 | 06 | 08N | 03W | SHAMROCK DRLG | 1983 | 160 | 580 | 3 | 20 | MOCN | 200 | 03-83 | 65 | Z | | |
| B034 | 71 | 08N | 02W | WILCOX DRILLING CO | 1983 | 240 | 304 | 3 | 16 | MOCN | 25 | 05-83 | | Z | | |
| B035 | 03 | 08N | 03W | DAVID NEW DRLG CO | 1983 | 115 | 110 | 3 | 20 | MRVA | 20 | 11-83 | 52 | Z | | |
| B036 | 34 | 08N | 02W | ZION FLOWER CHURCH | 1983 | 220 | 90 | 4 | 10 | MOCN | | - | 8 | H | | |

* Wells included in this report

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | TOWN-SHIP | RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B037 | 35 | 08N | 01W | B G FORTENBERRY | 1983 | 190 | 290 | 3 | 20 | MOCN | 140 | 10-83 | 50 | Z | - | |
| B038 | 24 | 08N | 02W | BG FORTENBERRY DRLG | 1983 | 200 | 490 | 3 | 20 | MOCN | 150 | 11-83 | 52 | Z | | |
| B040 | 58 | 08N | 01W | ENERGY DRLG | 1984 | 290 | 245 | 3 | 20 | MOCN | 110 | 03-84 | 50 | Z | | |
| B041 | 28 | 08N | 02W | REBEL DRLG | 1984 | 260 | 405 | 3 | 20 | MOCN | 200 | 05-84 | 50 | Z | | |
| *C001 | 16 | 07N | 03W | NATCHEZ | 1939 | 220 | 451 | 16 | 50 | MOCN | 262 | 10-81 | 200 | P | X | |
| *C002 | 16 | 07N | 03W | NATCHEZ | 1939 | 238 | 607 | 16 | 60 | MOCN | 243 | 06-82 | 305 | U | X | |
| *C003 | 16 | 07N | 03W | NATCHEZ | 1939 | 232 | 444 | 16 | 45 | MOCN | 265 | 09-55 | 300 | P | X | |
| *C004 | 16 | 07N | 03W | NATCHEZ | 1939 | 214 | 608 | 16 | 60 | MOCN | 242 | 06-76 | 250 | P | X | |
| *C005 | 16 | 07N | 03W | NATCHEZ | 1949 | 212 | 421 | 16 | 50 | MOCN | 194 | 04-49 | 400 | P | X | |
| *C006 | 16 | 07N | 03W | NATCHEZ | 1948 | 212 | 656 | 16 | 60 | MOCN | 241 | 05-76 | 524 | U | X | |
| *C007 | 16 | 07N | 03W | NATCHEZ | 1953 | 210 | 613 | 16 | 60 | MOCN | 158 | 08-53 | 200 | P | X | |
| *C008 | E | 27T | 7NR | INT PAPER CO | 1970 | 65. | 156 | 26 | 70 | MRVA | 22 | 02-70 | 15 | U | | 097 |
| *C009 | 29 | 07N | 03W | HENRY CHATMAN | 1969 | | 250 | 2 | 7 | MOCN | 190 | 12-69 | 7 | H | | |
| C010 | 08 | 07N | 03W | JOSEPH JUNKUN | 1967 | | 365 | 6 | 20 | MOCN | 145 | 10-67 | | H | | |
| *C011 | 15 | 07N | 03W | CITY OF NATCHEZ | 1926 | 90. | 400 | 18 | | MOCN | 66 | 03-61 | | U | | |
| *C012 | E | 27T | 7NR | BILL STAHIMAN | 1952 | 230 | 600 | 4 | | MOCN | 230 | 06-82 | | H | | |
| C014 | 16 | 07N | 03W | ARMSTRONG TIRE | 1938 | 202 | 470 | 12 | 60 | MOCN | 238 | 06-82 | 524 | N | | |
| C015 | 14 | 07N | 03W | ARMSTRONG TIRE | 1944 | 209 | 592 | 16 | 60 | MOCN | 241 | 06-82 | 674 | N | | |
| C016 | 14 | 07N | 03W | ARMSTRONG TIRE | 1947 | 207 | 455 | 12 | 50 | MOCN | 257 | 06-82 | 500 | N | X | |
| C017 | 14 | 07N | 03W | ARMSTRONG TIRE | 1947 | 197 | 586 | 12 | 50 | MOCN | 234 | 07-56 | 536 | N | | |
| C018 | 14 | 07N | 03W | ARMSTRONG TIRE | 1956 | 203 | 467 | 16 | 50 | MOCN | 272 | 06-82 | 554 | N | X | |
| *C019 | WS | 4TO | NRO | NATCHEZ PORT | 1961 | 78. | 507 | 10 | 20 | MOCN | 92 | 06-82 | | N | X | 087 |
| *C020 | W | 27T | 7NR | NATCHEZ PORT | 1961 | 100 | 142 | 4 | | MOCN | 50 | 06-61 | 70 | N | X | |
| *C022 | 26 | 07N | 03W | J M JONES LBM | 1961 | 60. | 280 | 6 | 20 | MOCN | 44 | 09-61 | 150 | N | X | |
| *C023 | | 07N | 03W | JONES LUMBER CO | | 160 | 370 | 8 | | CTHL | 134 | 06-61 | | U | | |
| C027 | 57 | 07N | 02W | L THORNBROUGH | 1970 | | 126 | 2 | 7 | MOCN | 85 | 05-70 | 7 | H | | |
| C030 | E | 27T | 7NR | INT PAPER CO | 1970 | 65. | 191 | 26 | 105 | MRVA | 23 | 04-70 | 15 | U | | 094 |
| *C031 | E | 16T | 7NR | NATCHEZ | 1964 | 210 | 442 | 16 | 60 | MOCN | 248 | 06-82 | 500 | P | | |
| *C032 | E | 16T | 7NR | NATCHEZ | 1964 | 210 | 575 | 16 | 260 | MOCN | 228 | 10-81 | 503 | P | | |
| *C033 | 54 | 07N | 03W | DIAMOND INTER CORP | 1965 | 90. | 655 | 12 | 40 | MOCN | 32 | 07-83 | 350 | N | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *C034 | 28 | 07N | 03W | DIAMOND INTER CORP | 1964 | 90. | 674 | 12 | 94 | MOCN | 90 | 12-65 | 350 | N | | |
| *C035 | 54 | 07N | 03W | DIAMOND INTER CORP | 1965 | 90. | 679 | 12 | 40 | MOCN | 81 | 10-83 | 350 | N | | |
| *C036 | 54 | 07N | 03W | DIAMOND INTER CORP | 1966 | 90. | 150 | 18 | 30 | MRVA | 77 | 11-66 | 500 | N | | |
| *C037 | 29 | 07N | 03W | DIAMOND INTER CORP | 1970 | 90. | 560 | 16 | 71 | MOCN | 96 | 04-70 | 500 | N | | 098 |
| C038 | 51 | 07N | 03E | H R KINNISON | 1970 | | 195 | 2 | 5 | MOCN | 157 | 11-70 | 6 | H | | |
| C039 | 50 | 07N | 03W | CHARLES YOUNG | 1970 | | 198 | 2 | 5 | MOCN | 161 | 11-70 | 7 | H | | |
| C040 | 55 | 07N | 03W | JACK HUBER | 1972 | | 138 | 2 | 7 | MOCN | 45 | 10-72 | 5 | H | | |
| C041 | 12 | 07N | 03W | BUCKLES LMBR CO | 1973 | | 335 | 4 | 20 | MOCN | 150 | - | 60 | H | | |
| C042 | 50 | 07N | 03W | LONGWOOD | 1973 | | 195 | 4 | 10 | MOCN | 160 | 02-73 | | H | | |
| C043 | W | 16T | 7NR | NATCHEZ(TESTHOLE) | 1938 | 246 | | | | | | - | | U | | 012 |
| C044 | 50 | 09N | 04W | H GOETZMAN | 1973 | | 209 | 4 | 20 | MOCN | 155 | 07-73 | 50 | H | | |
| *C045 | 27 | 07N | 03W | CALUMET PETRO | 1974 | 73. | 478 | 6 | 30 | MOCN | 79 | 06-82 | | U | | 127 |
| C046 | 24 | 07N | 03W | NEW HUGHES | 1979 | 210 | 540 | 5 | 10 | MOCN | 200 | 05-79 | | Z | | |
| C047 | 12 | 07N | 03W | NATCHEZ | 1979 | 180 | | | | | | - | | | | 142 |
| *C048 | 16 | 07N | 03W | NATCHEZ | 1980 | 183 | 578 | 16 | 61 | MOCN | 207 | 10-81 | 500 | P | X | 145 |
| *C050 | 16 | 07N | 03W | NATCHEZ | 1980 | 210 | 864 | 16 | 71 | MOCN | 159 | 10-81 | 536 | P | X | 148 |
| C062 | 55 | 07N | 03W | REBEL DRLG CO | 1981 | 70. | 556 | 3 | 20 | CTHL | 50 | 01-82 | 42 | Z | | |
| *C063 | 48 | 07N | 02W | JOHNS MANVILLE | 1958 | 119 | 599 | 16 | 60 | MOCN | 114 | 10-81 | 560 | N | | |
| *C064 | 16 | 07N | 03W | NATCHEZ | 1983 | 205 | 650 | 16 | 50 | CTHL | 203 | 01-83 | 750 | P | | 202 |
| *C065 | 48 | 07N | 02W | JOHNS MANVILLE | 1946 | 119 | 402 | 12 | 50 | MOCN | 69 | 12-61 | 250 | U | X | |
| *C066 | 48 | 07N | 02W | JOHNS MANVILLE | 1946 | 119 | 428 | 12 | 45 | MOCN | | - | | U | | |
| *C067 | 48 | 07N | 02W | JOHNS MANVILLE | 1947 | 117 | 436 | 12 | 44 | MOCN | 69 | 06-82 | | U | | |
| *C068 | 48 | 07N | 02W | JOHNS MANVILLE | 1953 | 118 | 595 | 16 | 60 | MOCN | 97 | 11-53 | 488 | N | | |
| *C069 | 48 | 07N | 02W | JOHNS MANVILLE | 1957 | 119 | 597 | 16 | 60 | MOCN | 105 | 09-57 | 480 | N | | |
| *C071 | 16 | 07N | 03W | NATCHEZ | 1983 | 240 | 655 | 16 | 50 | CTHL | 247 | 06-83 | 750 | P | | 251 |
| C072 | 06 | 07N | 03W | SHAMROCK DRILLING CO | 1983 | 140 | 175 | 3 | 20 | MOCN | 25 | 07-83 | 52 | Z | | |
| *C073 | 16 | 07N | 03W | NATCHEZ | 1983 | 220 | 616 | 16 | 61 | CTHL | 230 | 08-83 | 750 | P | | |
| C074 | 39 | 07N | 03W | MELROSE ENTERPRISE | 1983 | 160 | 210 | 4 | 20 | MOCN | 70 | 07-83 | 85 | I | | |
| C075 | 39 | 07N | 03W | MELROSE ENTERPRISE | 1983 | 160 | 220 | 4 | 20 | MOCN | 75 | 07-83 | 85 | I | | |
| C076 | 44 | 07N | 03W | BLANTON | 1983 | 160 | 260 | 4 | 10 | MOCN | 200 | 08-83 | 23 | H | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECTION | TOWNSHIP | RANGE | OWNER | DATE DRILLED | ALTITUDE (FT) | WELL DEPTH (FT) | CASING DIAM (IN) | SCREEN LENGTH (FT) | AQUIFER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANALYSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C077 | S2 | TO | N R | NATCHEZ BLUFF | 1984 | 180 | | | | | | - | | | | 256 |
| C078 | S2 | TO | N R | NATCHEZ BLUFF | 1984 | 255 | | | | | | - | | | | 257 |
| C079 | 5 | 07N | R03 | NATCHEZ BLUFF | 1984 | 50. | | | | | | - | | | | 258 |
| C080 | 4 | 07N | R03 | NATCHEZ BLUFF | 1984 | 226 | | | | | | - | | | | 259 |
| C081 | T | 7N | 03W | NATCHEZ BLUFF | 1984 | 205 | | | | | | - | | | | 260 |
| C082 | 7 | 07N | R03 | NATCHEZ BLUFF | 1984 | 100 | | | | | | - | | | | 261 |
| C083 | 4 | 07N | R03 | NATCHEZ BLUFF | 1984 | 100 | | | | | | - | | | | 262 |
| C084 | 4 | 07N | R03 | NATCHEZ BLUFF | 1984 | 158 | | | | | | - | | | | 263 |
| C085 | 4 | 07N | R03 | NATCHEZ BLUFF | 1984 | 50. | | | | | | - | | | | 264 |
| C086 | 4 | 07N | R03 | NATCHEZ BLUFF | 1984 | 200 | | | | | | - | | | | 265 |
| C087 | 1 | 07N | R03 | NATCHES BLUFF | 1984 | 80. | | | | | | - | | | | 266 |
| C088 | 1 | 07N | RR3 | NATCHEZ BLUFF | 1984 | 75. | | | | | | - | | | | 267 |
| C089 | 5 | 07N | R03 | NATCHEZ BLUFF | 1984 | 45. | | | | | | - | | | | 269 |
| *D001 | 12 | 07N | 02W | MISS POWER LT | 1951 | 192 | 456 | 12 | 75 | MOCN | 89 | 06-82 | 490 | U | | |
| *D002 | 14 | 07N | 02W | MISS POWER LT | 1949 | 215 | 324 | 12 | 60 | MOCN | 94 | 03-61 | 510 | E | | |
| *D003 | 14 | 07N | 02W | MISS POWER LT | 1949 | 215 | 499 | 12 | 45 | MOCN | 142 | 06-82 | 480 | E | | |
| *D004 | 14 | 07N | 02W | MISS POWER LT | 1951 | 189 | 477 | 12 | 60 | MOCN | 77 | 03-61 | 500 | E | | |
| D005 | 42 | 07N | 02W | MRS WOODS | 1960 | 280 | 461 | 3 | | CTHL | 208 | 03-61 | | H | | |
| *D011 | 87 | 07N | 02W | JOHNS MANVILLE | 1947 | 124 | 429 | 12 | 44 | MOCN | 66 | 04-61 | 300 | U | | |
| *D013 | 87 | 07N | 02W | JOHNS MANVILLE | 1955 | 119 | 600 | 16 | 60 | MOCN | 111 | 06-55 | 638 | N | X | |
| *D017 | 57 | 07N | 02W | OAKLAND WTR WKS | 1951 | 160 | 161 | 6 | 22 | MOCN | 84 | 06-82 | 165 | P | | |
| *D018 | 57 | 07N | 02W | OAKLAND WTR WKS | 1951 | 160 | 165 | 4 | 23 | MOCN | 115 | 10-56 | 65 | P | | |
| *D019 | 57 | 07N | 02W | OAKLAND WTR WKS | 1956 | 160 | 135 | 10 | 32 | MOCN | 87 | 07-56 | 366 | P | | |
| *D020 | WS | 2TO | NRO | ADAMS CO W A | 1966 | 260 | 543 | 12 | 60 | MOCN | 152 | 06-82 | 472 | P | | 068 |
| *D021 | 71 | 07N | 02W | NATCHEZ TRACE | 1948 | 140 | 100 | 2 | | NTCZ | 21 | -68 | | U | | |
| D022 | 57 | 07N | 02W | MIKE SMITH | 1969 | | 115 | 2 | 7 | MOCN | 103 | 04-69 | 7 | H | | |
| D023 | 02 | 07N | 02W | TED MONCRIEF | 1969 | | 260 | 2 | 10 | MOCN | 60 | 07-69 | 9 | H | | |
| D024 | W | 30T | 7NR | ADAMS CO W A | 1966 | 250 | 543 | 17 | 60 | MOCN | 155 | 10-66 | 500 | P | X | |
| D025 | 39 | 07N | 02W | ANDREW ROBINSON | 1970 | | 178 | 4 | 10 | MOCN | 63 | 08-70 | 8 | H | | |
| D026 | 33 | 07N | 02W | W J REED | 1970 | | 136 | 4 | 10 | MOCN | 56 | 06-70 | 20 | H | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D028 | 57 | 07N | 02W | B R QUINN | 1970 | | 93 | 4 | 10 | MOCN | 68 | 12-70 | 20 | H | | |
| *D029 | 27 | 07N | 02W | ST CATHERINE | 1967 | 200 | 410 | 8 | 20 | MOCN | 230 | 06-82 | 295 | N | | |
| D030 | 96 | 07N | 02W | MCNEELY | 1967 | | 155 | 6 | 20 | MOCN | 50 | 11-67 | | U | - | |
| D031 | 96 | 07N | 04W | TERRACE MOTEL | 1968 | | 112 | 4 | 20 | MOCN | 40 | 08-68 | | C | | |
| D032 | 13 | 07N | 02W | WILLIE BRYANT | 1972 | | 132 | 2 | 6 | MOCN | 70 | 02-72 | 5 | H | | |
| *D033 | 47 | 07N | 02W | T L JAMES | 1972 | 340 | 447 | 4 | 10 | MOCN | 241 | 06-82 | | U | | |
| D034 | 54 | 07N | 02W | J C CAMPBELL | 1973 | | 137 | 2 | 5 | MOCN | 95 | 03-73 | 5 | H | | |
| *D035 | 13 | 07N | 02W | MISS POWER LT | 1974 | 182 | 355 | 12 | 50 | MOCN | 90 | 07-74 | 400 | N | | 121 |
| D037 | 44 | 07N | 02W | DAVE DOLLAR | 1974 | | 335 | 2 | 7 | CTHL | 185 | 05-74 | 5 | H | | |
| D038 | 44 | 09N | 02W | S H BIXLEY | 1974 | | 230 | 4 | 10 | MOCN | 165 | 09-74 | 15 | H | | |
| D039 | 44 | 07N | 02W | J P SEALE | 1975 | | 286 | 2 | 5 | CTHL | 155 | 02-75 | 5 | H | | |
| *D040 | WS | 4T0 | NR0 | BRYANDALE INC | 1977 | 293 | 1030 | 4 | 7 | CTHL | 221 | 06-82 | 75 | P | | 138 |
| *D041 | WS | 2T0 | NR0 | ADAMS CO W A | 1978 | 240 | | | | | | - | | U | | 139 |
| D042 | 27 | 07N | 02W | ADAMS CO W A | 1978 | 280 | | | | | | - | | | | 140 |
| *D043 | 17 | 07N | 02W | BROADMOOR UTL | 1960 | 200 | 180 | 6 | 20 | CTHL | 107 | 09-81 | 150 | U | | |
| *D044 | 17 | 07N | 02W | BROADMOOR UTL | 1962 | 200 | 180 | 4 | 20 | CTHL | 107 | 09-81 | 50 | U | | |
| *D045 | 17 | 07N | 02W | BROADMOOR UTL | 1979 | 205 | 150 | 10 | 15 | MOCN | 111 | 06-82 | 250 | P | | 141 |
| *D046 | 27 | 07N | 02W | ADAMS CO W A | 1979 | 240 | 958 | 12 | 60 | CTHL | 205 | 10-81 | 500 | P | X | 163 |
| *D052 | 12 | 07N | 02W | MISS POWER AND LT | 1981 | 200 | 483 | 12 | 79 | MOCN | 119 | 11-81 | 500 | N | X | 159 |
| D055 | 19 | 07N | 02W | R L HENSLEY | 1960 | 190 | 170 | | | CTHL | 70 | 09-81 | | H | | |
| D056 | 51 | 07N | 02W | RAYBORN DRILLING | 1962 | 215 | 165 | 4 | 10 | CTHL | 95 | 01-62 | 25 | H | | |
| D057 | 28 | 07N | 02W | ST CATHERIN GRAVEL | 1932 | 195 | 90 | 6 | | CTHL | 20 | 01-80 | 30 | I | | |
| D059 | 61 | 07N | 02W | LARY HOLDER | 1978 | 295 | 240 | 4 | | MOCN | 166 | 09-81 | | H | | |
| D060 | 34 | 07N | 02W | R WILSON | 1981 | 205 | 150 | 4 | | MOCN | 110 | 05-82 | | H | X | |
| *D061 | 27 | 07N | 02W | ADAMS CO W A | 1979 | 275 | 971 | 12 | 61 | CTHL | 194 | 01-80 | 500 | P | | |
| D062 | 60 | 07N | 02W | ENERGY DRL CO | 1982 | 260 | 503 | 3 | 20 | HBRG | 180 | 09-82 | 50 | Z | | |
| D063 | 87 | 07N | 02W | JAMES MARLOW | 1965 | 190 | 190 | | | MOCN | | - | | H | | |
| D064 | 27 | 07N | 02W | FRANK PENNINGTON JR | 1983 | 300 | 280 | 4 | 20 | MOCN | 210 | 06-83 | 60 | H | | |
| D065 | 44 | 07N | 02W | GARY BOYD | 1983 | | 280 | 4 | 20 | MOCN | 200 | 07-83 | 20 | H | | |
| D066 | 30 | 07N | 02W | ENERGY DRLG CO | 1983 | 210 | 570 | 3 | 20 | MOCN | 150 | 11-83 | 52 | Z | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D067 | ES | 7TO | NRO | DALE POLK GRAVEL CO | 1983 | 410 | 300 | 8 | 30 | MOCN | 206 | 05-83 | 310 | N | | |
| *E002 | 46 | 07N | 01W | CHEVRON OIL CO | 1946 | 385 | 490 | 10 | 60 | MOCN | 248 | 08-57 | 465 | U | X | |
| E003 | W | 46T | 7NR | CHEVRON OIL CO | 1958 | 385 | 453 | 10 | 60 | MOCN | 247 | 10-81 | 475 | U | | |
| *E004 | 62 | 07N | 01W | SERO PUNCHES | 1961 | 405 | 513 | 3 | | MOCN | 277 | 06-61 | | Z | X | 088 |
| E005 | 55 | 07N | 01W | JAS BASS | 1969 | | 150 | 4 | 10 | MOCN | 90 | 09-69 | 20 | H | | |
| E006 | 14 | 07N | 01W | LUTHER THOMAS | 1969 | | 353 | 2 | 7 | MOCN | | 01-69 | | H | | |
| E007 | 80 | 07N | 01W | BENNIE LEWIS | 1972 | | 152 | 2 | 5 | MOCN | 115 | 06-72 | | H | | |
| E008 | 09 | 07N | 01W | FREDDY BREELAND | 1973 | | 121 | 2 | 7 | HBRG | 71 | 08-73 | 5 | H | | |
| E009 | 05 | 07N | 01W | KATIE B GAYLOR | 1974 | | 100 | 2 | 7 | MOCN | 65 | 02-74 | 5 | H | | |
| E010 | 42 | 07N | 01W | THOMAS FLOYD | 1974 | | 305 | 4 | 10 | CTHL | 240 | 05-74 | 15 | H | | |
| E018 | 20 | 07N | 01W | D D DRILLING | 1981 | | 530 | 3 | 20 | MOCN | | - | 40 | Z | | |
| E020 | 08 | 07N | 01W | NATCHEZ PK TH1 | 1982 | 240 | | | | | | - | | | | 195 |
| E021 | 08 | 07N | 01W | NATCHEZ PARK TH2 | 1982 | 319 | | | | | | - | | | | 198 |
| E022 | 08 | 07N | 01W | NATCHEZ PARK TH3 | 1982 | 283 | | | | | | - | | | | 199 |
| E023 | 08 | 07N | 01W | NATCHEZ PARK TH4 | 1982 | 290 | | | | | | - | | | | 200 |
| E024 | 08 | 07N | 01W | NATCHEZ PARK TH5 | 1982 | 278 | | | | | | - | | | | 201 |
| E025 | 59 | 07N | 01W | GEORGE BRICE | 1983 | 380 | 200 | 4 | 15 | MOCN | 140 | 05-83 | 14 | H | | |
| E026 | 23 | 07N | 01W | BG FORTENBERRY | 1983 | 375 | 602 | 3 | 20 | MOCN | 270 | 08-83 | 52 | Z | | |
| E027 | 33 | 07N | 01W | ENERGY DRLG CO. | 1984 | 320 | 635 | 3 | 20 | MOCN | 300 | 03-84 | 52 | Z | | |
| E028 | 61 | 07N | 01W | ENERGY DRLG CO | 1984 | 400 | 110 | 4 | 20 | CRNL | 80 | 03-84 | 40. | Z | | |
| E029 | ES | 8TO | NRO | ADAMS CO W A | 1984 | 418 | 1220 | 6 | 20 | CTHL | 343 | 05-84 | 73 | T | X | 255 |
| F001 | 10 | 06N | 03W | INT PAPER CO | 1949 | 93. | 227 | 18 | 76 | MRVA | 46 | 04-49 | 20 | N | X | |
| F002 | 10 | 06N | 03W | INT PAPER CO | 1949 | 105 | 228 | 18 | 80 | MRVA | 100 | 05-54 | 20 | N | X | |
| F003 | 10 | 06N | 03W | INT PAPER CO | 1949 | 99. | 218 | 18 | 70 | MRVA | 90 | 09-54 | 20 | N | | |
| F004 | 10 | 06N | 03W | INT PAPER CO | 1949 | 112 | 240 | 18 | 80 | MRVA | 80 | 05-54 | 20 | N | X | |
| F005 | 10 | 06N | 03W | INT PAPER CO | 1949 | 114 | 242 | 18 | 80 | MRVA | 80 | 05-64 | 20 | N | | |
| F006 | 10 | 06N | 03W | INT PAPER CO | 1949 | 114 | 241 | 18 | 80 | MRVA | 80 | 05-54 | 20 | N | | |
| F007 | 10 | 06N | 03W | INT PAPER CO | 1949 | 109 | 211 | 18 | 64 | MRVA | 80 | 05-54 | 20 | N | | |
| F008 | 10 | 06N | 03W | INT PAPER CO | 1949 | 123 | 242 | 18 | 80 | MOCN | 90 | 05-54 | 20 | N | X | |
| F009 | 10 | 06N | 03W | INT PAPER CO | 1949 | 109 | 241 | 18 | 80 | MRVA | 85 | 05-54 | 20 | N | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F010 | 10 | 06N | 03W | INT PAPER CO | 1949 | 112 | 203 | 18 | 60 | MRVA | 85 | 05-54 | 20 | U | | |
| F011 | 10 | 06N | 03W | INT PAPER CO | 1949 | 104 | 191 | 16 | 60 | MRVA | 117 | 09-54 | 20 | U | | |
| F012 | 14 | 06N | 03W | INT PAPER CO | 1952 | 75. | 212 | 18 | 60 | MRVA | 125 | 09-54 | 20 | U | X | |
| F013 | 14 | 06N | 03W | INT PAPER CO | 1952 | 73. | 213 | 18 | 60 | MRVA | 35 | 03-52 | 20 | N | | |
| F014 | 14 | 06N | 03W | INT PAPER CO | 1952 | 83. | 209 | 18 | 60 | MRVA | 42 | 01-52 | 20 | N | | |
| F015 | 14 | 06N | 03W | INT PAPER CO | 1952 | 74. | 209 | 18 | 60 | MRVA | 31 | 01-52 | 20 | N | | |
| *F016 | 20 | 06N | 03W | INT PAPER CO | 1958 | 54. | 201 | 30 | 50 | MRVA | 52 | 03-58 | 20 | N | X | |
| F017 | 14 | 06N | 03W | INT PAPER CO | 1952 | 73. | 220 | 18 | 60 | MRVA | 92 | 06-52 | 20 | N | | |
| *F018 | 20 | 06N | 03W | INT PAPER CO | 1952 | 73. | 232 | 18 | 60 | MRVA | 98 | 08-60 | 20 | N | X | |
| F019 | 20 | 06N | 03W | INT PAPER CO | 1952 | 85. | 238 | 18 | 60 | MRVA | 105 | 11-81 | 20 | U | | |
| F020 | 19 | 06N | 03W | INT PAPER CO | 1952 | 99. | 251 | 36 | 60 | MOCN | 102 | 04-55 | 20 | N | X | |
| F021 | 14 | 06N | 03W | INT PAPER CO | 1960 | 77. | 184 | 30 | 30 | MRVA | 87 | 01-60 | 20 | N | X | |
| *F022 | 19 | 06N | 03W | INT PAPER CO | 1955 | 85. | 264 | 30 | 60 | MOCN | 107 | 10-60 | 20 | N | X | |
| F023 | 19 | 06N | 03W | INT PAPER CO | 1955 | 75. | 250 | 30 | 60 | MOCN | 91 | 03-59 | 20 | N | | |
| F024 | 30 | 06N | 03W | INT PAPER CO | 1960 | 75. | 188 | 18 | -14 | MOCN | 89 | 03-61 | 20 | N | X | |
| F025 | 30 | 06N | 03W | INT PAPER CO | 1956 | 85. | 254 | 38 | 60 | MOCN | 93 | 09-59 | 20 | U | X | |
| F026 | 30 | 06N | 03W | INT PAPER CO | 1956 | 120 | 250 | 18 | 46 | MOCN | 102 | 10-57 | 20 | U | | |
| F029 | 25 | 06N | 03W | REBEL DRLG | 1982 | 250 | 630 | 3 | 20 | CTHL | 300 | 02-82 | 62 | Z | | |
| F033 | 43 | 06N | 03W | MARIO BAVONI | 1961 | 180 | 133 | 2 | 7 | MOCN | 72 | 01-61 | | H | | |
| F035 | ES | 0T0 | NR0 | PAUL GREEN | | 140 | 254 | 2 | 6 | MOCN | 176 | 11-61 | | H | | 089 |
| F045 | 19 | 06N | 03W | INT PAPER CO | 1971 | 90. | 264 | 30 | 60 | MOCN | 105 | 05-71 | 25 | N | | |
| F048 | 21 | 06N | 03W | FURGUSON | 1967 | 70. | 190 | 6 | 20 | MRVA | 45 | 10-67 | | U | | |
| *F050 | 02 | 06N | 04W | INT PAPER CO | 1960 | 68. | 152 | | | MRVA | 20 | 01-74 | | U | | |
| *F068 | 10 | 06N | 03E | INT PAPER CO | 1969 | 110 | | | | MRVA | | - | | U | | 096 |
| F069 | 30 | 06N | 03W | INT PAPER CO | 1969 | 100 | | | | MRVA | | - | | U | | 095 |
| F071 | 10 | 06N | 04W | IVANHOE ASSOC | 1968 | | 150 | 2 | 10 | MOCN | 19 | 04-68 | 10 | H | | |
| *F072 | 07 | 06N | 04W | ANDERSON FARMS | 1972 | | 130 | 3 | | MOCN | 22 | 07-72 | | H | | |
| *F073 | 22 | 06N | 03W | ANDERSON FARMS | 1972 | | 115 | 4 | 10 | MOCN | 15 | 08-72 | | H | | |
| F074 | 16 | 06N | 03W | FATHERLAND BAPT | 1972 | | 168 | 2 | 7 | MOCN | 138 | 12-72 | 5 | H | | |
| *F075 | 02 | 06N | 03W | TRINITY HIGH SC | 1973 | 190 | 800 | 7 | 20 | MOCN | 205 | 10-73 | | H | | 116 |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECTION | LOCATION TOWNSHIP | LOCATION RANGE | OWNER | DATE DRILLED | ALTITUDE (FT) | WELL DEPTH (FT) | CASING DIAM (IN) | SCREEN LENGTH (FT) | AQUIFER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANALYSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *F076 | 07 | 06N | 03W | ST CATHERINE | 1960 | 100 | 165 | 4 | 20 | MOCN | 122 | 09-81 | 60 | N | | |
| F077 | 10 | 06N | 04W | NATCHEZ HUNT CB | 1973 | | 90 | 2 | 7 | MRVA | 16 | 09-73 | 5 | H | | |
| F078 | 43 | 06N | 03W | INT PAPER CO | 1978 | 180 | 250 | 8 | 130 | MOCN | 30 | 04-77 | 300 | N | | 134 |
| F079 | 43 | 06N | 03W | INT PAPER CO | 1977 | 185 | 155 | 12 | -45 | MOCN | 30 | 04-77 | 600 | N | | 136 |
| F092 | 14 | 06N | 03W | FLOYD MCCALIP | 1949 | 160 | 266 | 4 | | CTHL | 174 | 09-81 | | H | | |
| F093 | 43 | 06N | 03W | INT PAPER RESEARCH | 1981 | 170 | 260 | 8 | 50 | CTHL | | - | | H | | |
| *F094 | 43 | 06N | 03W | INT PAPER RESEARCH | 1981 | 170 | 260 | 12 | | CTHL | 31 | 09-81 | | I | | |
| *F082 | 26 | 06N | 03W | GOUSETT PHILLIP | 1957 | 174 | | | | | | | | U | | |
| F095 | 30 | 06N | 03W | | 1980 | 270 | | 4 | | MOCN | | - | 10 | H | | |
| F096 | 39 | 06N | 03W | HUGH PEARSON III | 1976 | 220 | 169 | 2 | 10 | CTHL | 80 | 01-76 | | H | | |
| F097 | 32 | 06N | 03W | REBEL DRLG CO | 1981 | | 135 | 3 | 20 | MRVA | 20 | 12-81 | 52 | Z | | |
| F098 | 31 | 06N | 03W | B G FORTENBERRY | 1981 | | 140 | 3 | 20 | MOCN | 35 | 12-81 | 42 | Z | | |
| F099 | 19 | 06N | 03W | REBEL DRLG | 1982 | | 370 | 3 | 20 | MOCN | 100 | 02-82 | 55 | Z | | |
| F100 | 14 | 06N | 03W | INT PAPER CO | 1982 | 75. | 226 | 16 | 63 | MOCN | 28 | 02-52 | | N | X | |
| F101 | 19 | 06N | 03W | INTERNATIONAL PAPER | 1982 | 85. | 238 | 18 | 64 | MOCN | 43 | 02-52 | | U | X | |
| F102 | 30 | 06N | 03W | INT PAPER CO | 1982 | 90. | 259 | 18 | 60 | MOCN | 98 | 03-56 | | N | X | |
| F103 | 34 | 06N | 03W | REBEL DRL CO | 1982 | 50. | 127 | 3 | 15 | MOCN | 20 | 10-82 | 50 | Z | | |
| F105 | 16 | 06N | 03W | PARCO DRILLING | 1981 | 200 | 382 | 3 | 20 | MOCN | 124 | 06-81 | 50 | Z | | |
| F106 | 20 | 06N | 03W | B G FORTENBERRY CO. | 1981 | 50. | 95 | 3 | 20 | MRVA | 20 | 06-81 | 45 | Z | | |
| F107 | ES | S19 | 06N | INTER PAPER CO | 1983 | 77. | 234 | 18 | 60 | MOCN | 87 | 02-83 | 20 | N | | |
| F108 | 02 | 06N | 04W | B G FORTENBERRY | 1983 | 48. | 90 | 3 | 20 | MOCN | 40 | 09-83 | 52 | Z | | |
| F109 | 28 | 07N | 03W | INTERNATIONAL PAPER | 1983 | 160 | 195 | 4 | 20 | MOCN | 145 | 09-83 | 80 | I | | |
| F153 | 26 | 23N | 07W | LARRY THORNHILL | | 146 | 120 | 18 | | | 29 | 04-82 | | I | | |
| G002 | 43 | 06N | 02W | MARLIN EXPLOR | 1961 | 291 | | | | | 170 | 09-61 | | | | 090 |
| *G005 | 38 | 06N | 02W | ADAMS CO W A | 1966 | 280 | | | | | | - | | U | | 067 |
| *G007 | 41 | 06N | 02W | ADAMS CO W A | 1966 | 220 | 267 | 10 | 50 | MOCN | 62 | 05-66 | 300 | U | | 069 |
| *G008 | 41 | 06N | 02W | ADAMS CO W A | 1966 | 220 | 267 | 10 | 50 | MOCN | 62 | 05-66 | 300 | P | | 070 |
| *G009 | 16 | 06N | 02W | SOUTHWOOD LODGE | 1970 | | 215 | 4 | 10 | MOCN | 90 | 08-70 | | H | | |
| *G010 | 36 | 06N | 02W | H STINESPRING | 1960 | | 146 | 2 | 6 | MOCN | 90 | 08-60 | | H | | |
| G011 | 09 | 06N | 02W | ADAMS CO W A | 1972 | 365 | | | | MOCN | | - | | U | | 107 |

Table 2.--Records of wells in adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | TOWN-SHIP | RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G012 | 09 | 06N | 02W | ADAMS CO W A | 1972 | 360 | | | | | | - | | U | | 108 |
| G013 | 09 | 06S | 02W | ADAMS CO W A | 1972 | 375 | | | | | | - | | U | | 110 |
| G014 | W | 09T | 6NR | ADAMS CO W A | 1972 | 356 | | 8 | | MOCN | 340 | 02-73 | | U | | 111 |
| G015 | 09 | 06N | 02W | ADAMS CO W A | 1973 | 356 | 560 | 4 | 65 | MOCN | 343 | - | | U | | 112 |
| G016 | 09 | 06N | 02W | ADAMS CO W A | 1973 | 366 | | | | | | - | | U | | 113 |
| *G017 | 09 | 06N | 02W | ADAMS CO W A | 1973 | 356 | 569 | 12 | 60 | MOCN | 355 | 10-81 | 412 | P | | |
| G018 | E | 09T | 6NR | ADAMS CO W A | 1973 | 342 | | | | | | - | | U | | 117 |
| *G019 | 41 | 06N | 02W | ADAMS CO W A | 1973 | 245 | 140 | 4 | | MOCN | | - | | U | | 118 |
| G020 | 36 | 06N | 02W | SETH SMITH | 1965 | 320 | 300 | | | MOCN | | - | | H | | |
| G021 | 41 | 06N | 02W | ADAMS CO W A | 1974 | 223 | 880 | 4 | 40 | MOCN | 160 | 02-74 | | U | | 119 |
| G022 | 43 | 06N | 02W | NO 1 OGDEN | 1974 | 360 | | | | MOCN | | - | | U | | 120 |
| *G023 | 41 | 06N | 02W | ADAMS CO W A | 1974 | 226 | 878 | 12 | 40 | MOCN | 165 | 10-74 | 450 | U | | 122 |
| *G024 | 41 | 06N | 02W | ADAMS CO W A | 1974 | 227 | 888 | 12 | 40 | MOCN | 163 | 10-74 | 450 | P | | 123 |
| G028 | 24 | 06N | 02W | LUTHER DAVIS | 1955 | 270 | 165 | 3 | | | | 09-81 | | H | | |
| G030 | 03 | 06N | 02W | NEW HUGHES | 1982 | 330 | 84 | 3 | 20 | MOCN | 45 | 02-82 | 42 | Z | | |
| G031 | 51 | 06N | 02W | NEW HUGHES | 1982 | 300 | 220 | 3 | 20 | CTHL | 80 | 06-82 | 50 | Z | | |
| G032 | 44 | 06N | 02W | B G FORTENBERRY | 1982 | 375 | 473 | 3 | 20 | MOCN | 230 | 06-82 | 52 | Z | | |
| G033 | 39 | 06N | 02W | RICHARD CROOK | 1984 | 300 | 185 | 4 | 20 | MOCN | 50 | 04-84 | 30 | H | | |
| *H001 | 25 | 06N | 01W | FEDERAL GOV | 1967 | 285 | 465 | 6 | 20 | MOCN | 126 | 11-67 | | R | | |
| H002 | 24 | 06N | 01E | CHARLES FLEMING | 1974 | | 196 | 2 | 7 | MOCN | 156 | 10-74 | 5 | H | | |
| *H004 | 44 | 06N | 01W | CLARENCE JACKSON | 1980 | 242 | 110 | 4 | 10 | MOCN | 55 | 10-80 | 26 | H | | |
| H005 | 77 | 06N | 01W | REBEL DRILLING | 1981 | 285 | 410 | 3 | 20 | MOCN | 100 | 05-81 | 45 | Z | | |
| H006 | 77 | 06N | 01W | REBEL DRILLING | 1981 | 285 | 536 | 3 | 20 | MOCN | 180 | 05-81 | 50 | Z | | |
| H007 | 47 | 06N | 01W | REBEL DRILLING | 1981 | | 536 | 3 | 20 | MRVA | 230 | 05-81 | 50 | Z | | |
| *H010 | 02 | 06N | 01W | ST REGIS HUNT C | 1969 | | 427 | 2 | 7 | MOCN | 420 | 02-69 | 10 | H | | |
| H011 | 23 | 06N | 01W | WINDY H BAP CH | 1970 | | 218 | 2 | 7 | MOCN | 138 | 09-70 | 7 | H | | |
| H016 | RR | 45T | 6NR | JAMES WILLARD | 1955 | 195 | 75 | 2 | | MOCN | 30 | 01-55 | | H | | |
| H017 | 45 | 06N | 01W | J M THONAS | 1970 | 205 | 160 | 4 | | MOCN | 89 | 09-81 | | H | | |
| H018 | 44 | 06N | 01W | DALE EXPL. | 1981 | 220 | 360 | 3 | 20 | CTHL | 150 | 12-81 | 52 | Z | | |
| H019 | 77 | 06N | 01W | REBEL DRILLING CO | 1981 | 300 | 390 | 3 | 20 | CTHL | 120 | 12-81 | 42 | Z | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | TOWN-SHIP | RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H020 | 45 | 06N | 01W | THEOLA HAZEL | 1977 | 180 | 100 | | | MOCN | | - | | H | X | |
| H021 | 45 | 06N | 01W | J.CARTER | 1982 | 215 | 120 | 4 | | MOCN | 40 | 05-82 | | H | X | |
| H022 | 27 | 06N | 01W | REBEL DLG CO | 1982 | 300 | 515 | 3 | 20 | MOCN | 220 | 11-82 | 52 | Z | | |
| H023 | 27 | 06N | 01W | REBEL DRL | 1982 | 300 | 395 | 3 | 20 | MOCN | 120 | 11-82 | 52 | Z | - | |
| H025 | 47 | 06N | 01W | REBEL DRLG | 1983 | 300 | 495 | 3 | 20 | MOCN | 180 | 10-83 | 52 | Z | | |
| H026 | 54 | 06N | 01W | DALE EXPLORATION CO | 1983 | 260 | 200 | 4 | 10 | MOCN | 60 | 09-83 | 12 | H | | |
| H028 | 43 | 06N | 01W | REBEL DRLG CO | 1984 | 295 | 453 | 3 | 20 | MOCN | 160 | 01-84 | 52 | Z | | |
| H126 | 21 | 23N | 05W | UNKNOWN | | 141 | 110 | 16 | | MRVA | 34 | 04-82 | | I | | |
| H024 | 45 | 06N | 01W | WALLACE WILLARD | 1983 | 200 | 75 | 4 | 10 | MOCN | 40 | 06-83 | 60 | H | | |
| J002 | 32 | 05N | 03W | HAMILTON | 1967 | 180 | 260 | 6 | 20 | MOCN | 120 | 09-67 | | H | | |
| J003 | 15 | 05N | 03W | PEUGH | 1967 | 172 | 505 | 6 | 20 | MOCN | 220 | 09-67 | | H | | |
| *J006 | 23 | 05N | 03W | JEROME ARNOLD | 1972 | 140 | 125 | 4 | 10 | MOCN | 60 | 09-81 | 20 | H | | |
| J008 | 19 | 05N | 03W | ST CATH READY M | 1972 | | 194 | 2 | 5 | MOCN | 155 | 05-72 | 4 | H | | |
| J009 | 03 | 05N | 03W | WILLIE KING | 1972 | | 194 | 2 | 5 | MOCN | 143 | 07-72 | 5 | H | | |
| J010 | 20 | 05N | 03W | TRACEWAY MOTO-C | 1972 | | 89 | 2 | 5 | MOCN | 20 | 09-72 | | H | | |
| J011 | 03 | 05N | 03W | JOHNNIE BROWN | 1973 | | 215 | 2 | 5 | MOCN | 115 | 04-73 | 5 | H | | |
| J012 | 26 | 05N | 03W | MORRIS DOUGHTY | 1973 | | 175 | 2 | 7 | MOCN | 92 | 08-73 | 5 | H | | |
| *J013 | 30 | 05N | 03W | MCCANN FARMS | 1978 | 47. | 135 | 18 | 60 | MRVA | 10 | 07-78 | 45 | I | | |
| *J014 | 29 | 05N | 03W | MCCANN FARMS | 1978 | 46. | 150 | 18 | 60 | MRVA | 7 | 07-78 | 50 | I | | |
| *J015 | WS | S31 | 05N | MCCANN FARMS | 1978 | 75. | 150 | 18 | 60 | MRVA | 4 | 07-78 | 45 | I | | |
| *J016 | 19 | 05N | 03W | MCCANN FARMS | 1978 | 110 | 165 | 18 | 60 | MRVA | 18 | 07-78 | 45 | I | | |
| J023 | 26 | 05N | 03W | REBEL DRILLING | 1981 | 140 | 84 | 3 | 20 | MOCN | 2 | 06-81 | | Z | | |
| J024 | 16 | 05N | 03W | NEW HUGHES | 1981 | 54. | 145 | 3 | 20 | MOCN | 15 | 08-81 | 50 | Z | | |
| J025 | 16 | 05N | 03W | TRACE DRLG CO | 1981 | 180 | 110 | 3 | 20 | MRVA | 20 | 09-81 | 50 | Z | | |
| J026 | 15 | 05N | 03W | JOHNIE BROWN | 1981 | 215 | 214 | 2 | | | | - | | H | | |
| J027 | 16 | 05N | 03W | CORNWELL | 1981 | 255 | 536 | 3 | 20 | MOCN | 220 | 10-81 | 42 | Z | | |
| J028 | 16 | 05N | 03W | REATA DRLG CO | 1981 | 86. | 80 | 3 | 20 | MOCN | 1 | 10-81 | 52 | Z | | |
| J029 | 32 | 05N | 03W | TRACE DRLG | 1982 | 147 | 280 | 3 | 20 | MOCN | 60 | 01-82 | 50 | Z | | |
| J030 | 19 | 05N | 03W | REBEL DRILLING | 1982 | 216 | 530 | 3 | 20 | CTHL | 180 | 01-82 | 45 | Z | | |
| J031 | 09 | 05N | 03W | PIERCE-BUTLER | 1981 | 260 | 210 | 4 | 10 | MOCN | 150 | 08-81 | 10 | H | X | |
| J032 | 26 | 05N | 03W | KENNETH ISBELL | 1981 | 88. | 170 | 4 | 10 | MOCN | 95 | 08-81 | 50 | H | | |
| J033 | 15 | 05N | 03W | FORTENBERRY DRL | 1982 | 200 | 90 | 3 | 20 | MOCN | | - | | Z | | |
| J034 | 27 | 05N | 03W | ENERGY DRL | 1982 | 90. | 174 | 3 | 14 | MOCN | 72 | 10-82 | 40 | Z | | |
| J035 | WS | 9T0 | NR0 | D D DRL | 1983 | 240 | 515 | 3 | 20 | MOCN | 230 | 02-83 | 52 | Z | - | |
| J036 | 15 | 05N | 03W | CHARLES HUDSON | 1983 | 200 | 168 | 4 | 10 | MOCN | 100 | 07-83 | 6 | H | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| J037 | 15 | 05N | 03W | ENERGY DRLG CO | 1984 | 200 | 450 | 3 | 20 | MOCN | 150 | 01-84 | 52 | Z | | |
| J038 | 10 | 05N | 03W | ANNIE CLARK | 1984 | 180 | 70 | 4 | 10 | MOCN | 10 | 03-84 | 60 | I | | |
| J039 | 19 | 05N | 03W | ENERGY DRLG | 1984 | 240 | 201 | 4 | 20 | MOCN | 90 | 04-84 | 55 | Z | | |
| K001 | 05 | 05N | 02W | SERIO PUNCHES | 1961 | 272 | 523 | 3 | | MOCN | 190 | 06-61 | | Z | X | 091 |
| K002 | 14 | 05N | 02W | EDWARD L SALMON | 1963 | 160 | 480 | 4 | | MOCN | 65 | 09-63 | | H | X | |
| K004 | 15 | 05N | 02W | MRS F.C.HOWARD | 1963 | 180 | 82 | 2 | | MOCN | | - | | H | X | |
| K005 | RP | 15T | 5NR | WM MC ILWAIN | 1963 | 180 | 450 | 2 | | MOCN | | - | | H | X | |
| K006 | 11 | 05N | 02W | ARMSTRONG | 1967 | | 265 | 6 | 20 | MOCN | 125 | 11-67 | | H | | |
| *K007 | 13 | 05N | 02W | MARVIN BROWN | 1968 | | 165 | 2 | 5 | MOCN | 18 | 09-68 | 4 | H | | |
| *K008 | 18 | 05N | 02W | JAMES WHITLEY | 1973 | | 152 | 2 | 5 | MOCN | 120 | 03-73 | 5 | H | | |
| K009 | 21 | 05N | 02W | B V THOMPSON | 1973 | | 152 | 2 | 5 | MOCN | 70 | 06-73 | 5 | H | | |
| K010 | 10 | 05N | 02W | HENRY J RANSOM | 1973 | | 189 | 2 | 5 | MOCN | 83 | 10-73 | 5 | H | | |
| K011 | 21 | 05N | 02W | SLINGO LODGE | 1975 | | 165 | 2 | 7 | MOCN | 77 | 05-75 | 6 | H | | |
| K014 | 08 | 05N | 02W | ENERGY DRILL CO. | 1981 | 318 | 575 | 3 | 20 | MOCN | 200 | 03-81 | 40 | Z | | |
| K015 | 22 | 05N | 02W | REBEL DRLG CO | 1981 | 110 | 120 | 3 | 20 | MRVA | 15 | 11-81 | 50 | Z | | |
| K016 | 05 | 05N | 02W | D D DRILLING | 1981 | 220 | 265 | 3 | 20 | CTHL | 120 | 12-81 | 52 | Z | | |
| K017 | 28 | 05N | 02W | ENERGY DRLG CO | 1982 | 94. | 80 | 3 | 20 | MOCN | 15 | 01-82 | 52 | Z | | |
| K018 | 28 | 05N | 02W | ENERGY DRILLING | 1982 | 95. | 100 | 3 | 20 | MOCN | 10 | 02-82 | 60 | Z | | |
| K019 | 18 | 05N | 02W | TRACE DRLG | 1982 | 200 | 290 | 3 | 20 | MOCN | 80 | 06-82 | 42 | Z | | |
| K020 | 22 | 05N | 02W | SLIGO ENERGY DRL | 1982 | 75. | 103 | 3 | 10 | MOCN | 13 | 10-82 | 50 | Z | | |
| K021 | 11 | 05N | 02W | ENERGY DRL | 1982 | 200 | 203 | 3 | 16 | MOCN | 70 | 11-82 | 50 | Z | | |
| K022 | 08 | 05N | 02W | ENERGY DRLG CO | 1982 | 260 | 620 | 3 | 20 | MOCN | 250 | 01-82 | 52 | Z | | |
| K023 | 11 | 05N | 02W | MRS GEORGE ARMSTRONG | 1984 | | 305 | 4 | 20 | MOCN | 110 | 01-84 | | H | | |
| K024 | 18 | 05N | 02W | TRACE DRLG | 1984 | 170 | 200 | 3 | 20 | MOCN | 60 | 05-84 | 50 | Z | | |
| L001 | WS | 9TO | NRO | M Q PETERSON | 1961 | 250 | 447 | | | | 127 | 07-61 | | | | 092 |
| L002 | 12 | 05N | 01W | / B TROTTER | 1961 | 200 | 394 | | | | | - | | | | 093 |
| L004 | RR | 25T | 5NR | JERRY WALTERS | 1963 | 170 | 85 | 2 | | MOCN | 36 | 07-61 | 3 | H | X | |
| L005 | 12 | 05N | 01W | GLEN STENSON | 1963 | 220 | 380 | 2 | | MOCN | 2 | 01-55 | | H | X | |
| L006 | 32 | 05N | 01W | WELLS CRK CLUB | 1968 | | 68 | 2 | 5 | MOCN | 10 | 10-68 | | H | - | |
| L008 | 29 | 05N | 01W | WEBB CARTER | 1972 | | 138 | 2 | 7 | MOCN | 50 | 09-72 | 5 | H | | |

Table 2.--Records of wells in Adams County, Mississippi--Continued

| WELL NO. | LOCATION SECT-TION | LOCATION TOWN-SHIP | LOCATION RANGE | OWNER | DATE DRIL-LED | ALTI-TUDE (FT) | WELL DEPTH (FT) | CAS-ING DIAM (IN) | SCREEN LENGTH (FT) | AQUI-FER | WATER LEVEL DEPTH (FT) | WATER LEVEL DATE | PUMP GAL/MIN | WATER USE | ANAL-YSIS | ELECTR LOG |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *L010 | 20 | 05N | 01W | NEW HUGHES | 1979 | 210 | 247 | 5 | 10 | MOCN | 165 | 06-79 | 5 | Z | | |
| L017 | 09 | 05N | 01W | REATA DRILLING | 1981 | 220 | 350 | 3 | 20 | MOCN | | - | 50 | Z | | |
| *L018 | RR | 20T | 5NR | U S FOREST CAMP 1 | 1981 | 270 | 460 | 2 | | CTHL | | - | | H | | |
| *L019 | 27 | 05N | 01W | LUKE GREEN | 1974 | 100 | 35 | 1 | | TRCS | 29 | 01-74 | | H | | |
| L020 | 29 | 05N | 01W | CLYDE WILLIAMS | 1950 | 130 | 100 | 4 | | MOCN | | - | | H | | |
| L021 | 01 | 05N | 01W | REATA DRL CO | 1982 | 260 | 453 | 3 | 20 | MOCN | 160 | 11-82 | 52 | Z | | |
| L022 | 16 | 05N | 01W | SHAMROCK DRL CO | 1982 | 200 | 120 | 3 | 20 | MOCN | 120 | 11-82 | 50 | Z | | |
| L023 | 29 | 05N | 01W | ADCO PROD CO | 1982 | | 475 | 3 | 20 | MOCN | 100 | 12-82 | 52 | Z | | |
| L024 | 01 | 05N | 01W | BIG G DRLG | 1983 | 240 | 410 | 3 | 20 | MOCN | 100 | 03-83 | 40 | Z | | |
| L025 | 28 | 05N | 01W | ENERGY DRLG | 1983 | 120 | 90 | 3 | 15 | MOCN | 40 | 03-83 | | Z | | |
| L026 | 20 | 05N | 01W | WILCOX DRILLING | 1983 | 200 | 100 | 3 | 15 | MOCN | 6 | 06-83 | | Z | | |
| L027 | 09 | 05N | 01W | MARJONIE NELSON | 1983 | 200 | 104 | 4 | 15 | MOCN | 50 | 05-83 | 17 | H | | |
| L126 | 15 | 22N | 06W | JEFCOTE | 1984 | 136 | 118 | 8 | 40 | MRVA | 30 | 05-84 | 800 | I | | |
| *M001 | 08 | 04N | 03W | THOMAS ARMSTRONG | 1978 | 57. | 102 | 10 | 30 | MRVA | 20 | 05-78 | 10 | I | | |
| *M002 | 08 | 04N | 03W | THOMAS K ARMSTRONG | 1978 | 75. | 102 | 10 | 30 | MRVA | 20 | 05-78 | 10 | I | | |
| M005 | 04 | 04N | 03W | REBEL DRLG CO | 1981 | 75. | 116 | 3 | 20 | MRVA | 15 | 04-81 | 50 | Z | | |
| M006 | 21 | 04N | 04W | WILCOX DRLG | 1981 | 45. | 130 | 3 | 20 | MRVA | 10 | 09-81 | 50 | Z | | |
| M008 | 77 | 06N | 01W | REBEL DRLG CO | 1981 | 240 | 495 | 3 | 20 | MOCN | 100 | 08-81 | 45 | Z | | |
| M009 | 04 | 04N | 03W | REBEL DRLG | 1982 | | 95 | 3 | 20 | MRVA | 15 | 06-82 | 50 | Z | | |
| M010 | 11 | 04N | 03W | PARCO DRLG CO | 1982 | 45. | 90 | 3 | 20 | MRVA | 20 | 10-82 | 52 | Z | | |
| M011 | 05 | 04N | 03W | D D DRLNG | 1983 | 120 | 194 | 4 | 20 | MOCN | 70 | 07-83 | 50 | Z | | |
| M012 | 01 | 04N | 04W | DAVID NEW DRILLING | 1983 | 46. | 120 | 3 | 20 | MOCN | 20 | 09-83 | 52 | Z | | |
| M013 | 13 | 04N | 04W | ADCO-CURRIE DRLG CO | 1983 | 45. | 96 | 5 | 10 | MRVA | 10 | 09-83 | 60 | Z | | |
| M014 | 32 | 04N | 03W | DAVID NEW DRLG | 1983 | 55. | 120 | 3 | 20 | MRVA | 12 | 09-83 | 50 | Z | | |
| N001 | 13 | 03N | 05W | JOE PARKER | 1971 | | 146 | 4 | 20 | MRVA | 25 | 05-71 | | H | | |
| N004 | 03 | 03N | 0SW | WILCOX DRLG | 1981 | 50. | 90 | 3 | 30 | MRVA | 10 | 09-81 | 52 | Z | | |
| N005 | 02 | 03N | 05W | NEW HUGHES | 1982 | 55. | 140 | 3 | 20 | MOCN | 50 | 07-82 | 52 | Z | | |
| P040 | 35 | 01N | 12E | NICOR DRLNG | 1983 | 390 | 609 | 3 | 42 | CCKF | 180 | 08-83 | 70 | Z | | |
| Q043 | 02 | 13N | 05E | JOHN EASTERLY | 1981 | | 160 | 10 | 60 | SPRT | 32 | 06-81 | 500 | I | - | |

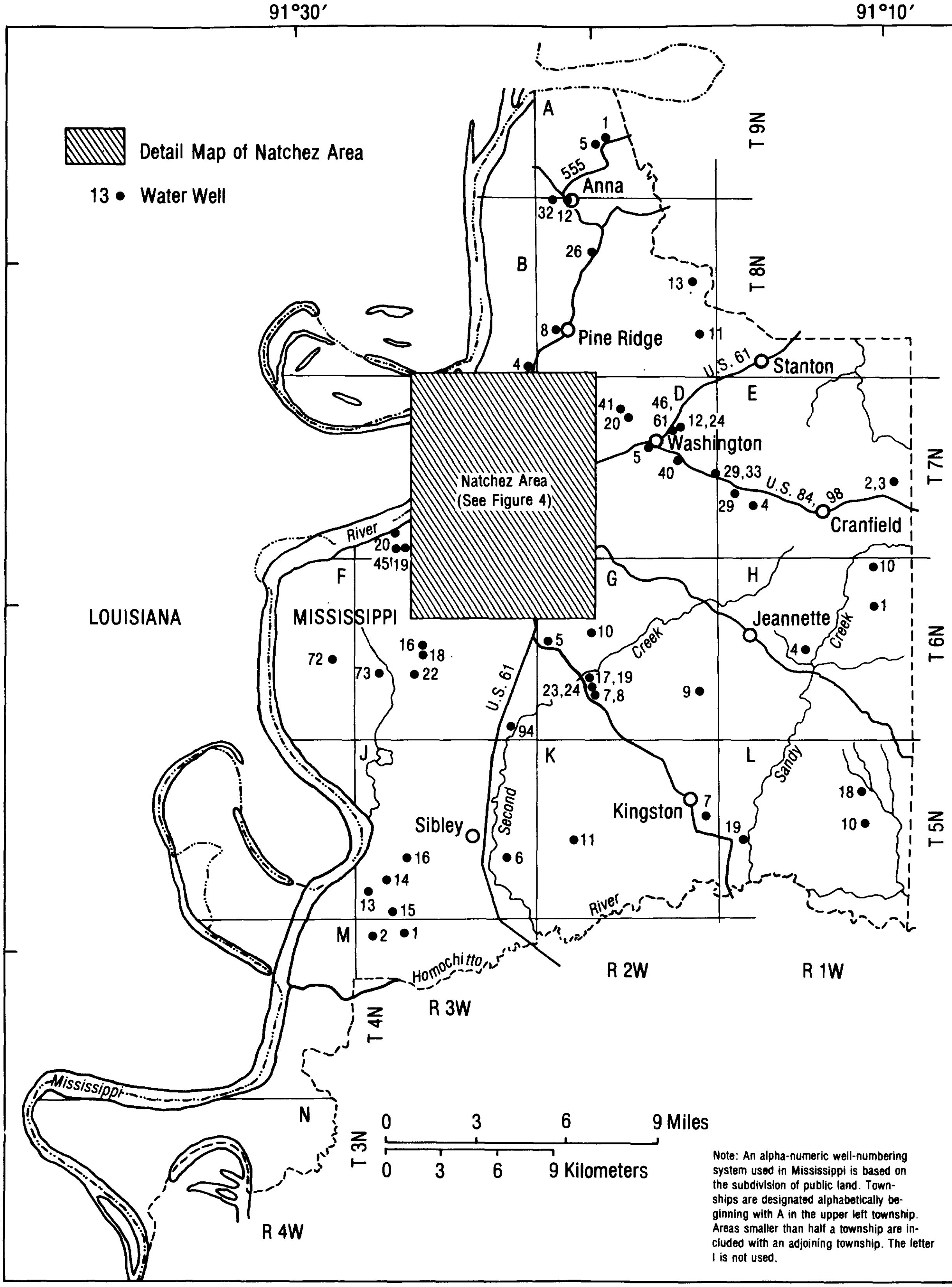



**Figure 3.—Locations of selected wells in Adams County.**

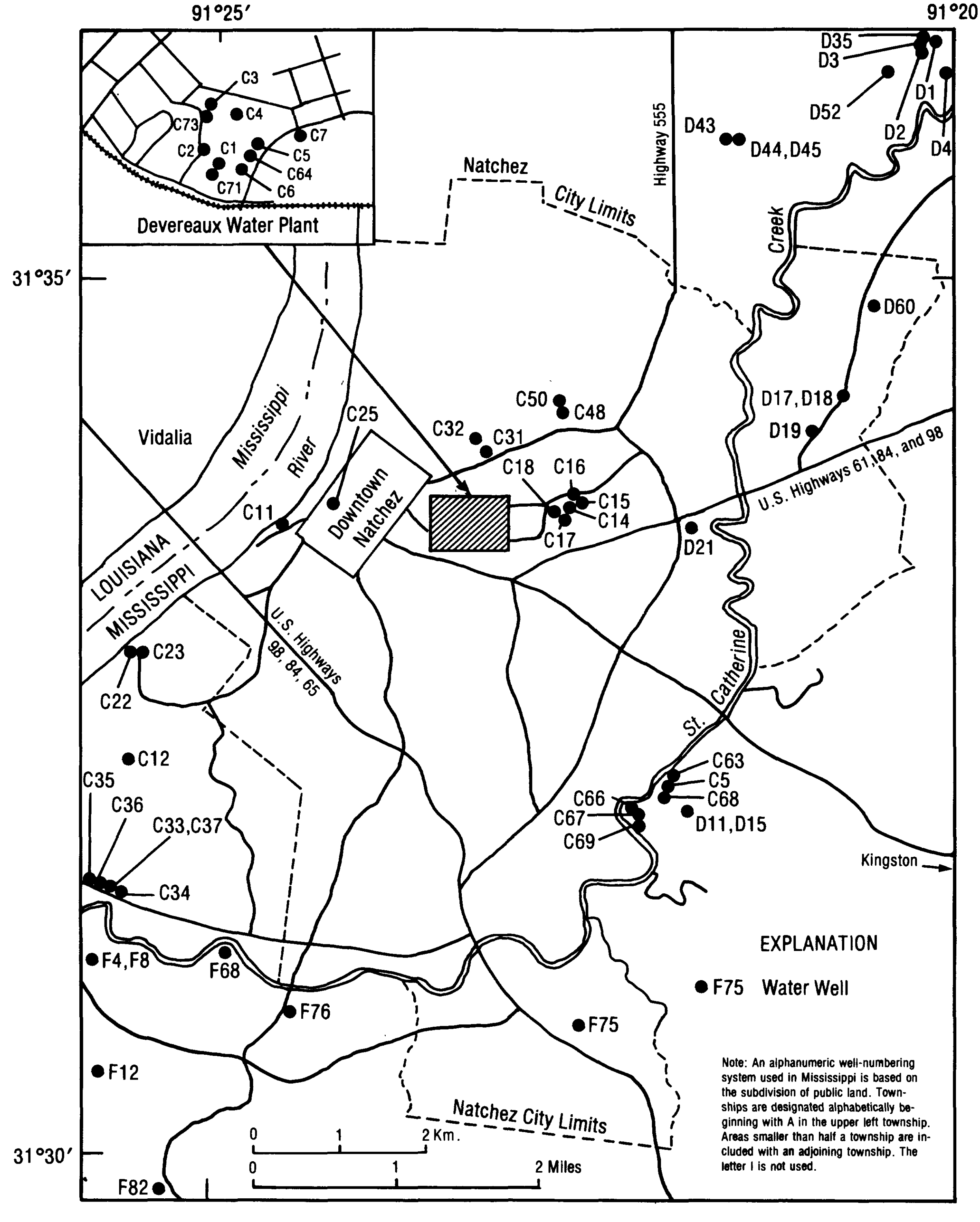



**Figure 4.—Location of wells in the Natchez area.**

Industrial water use was negligible until about 1940 when the first of several large industries located in the area. The largest water users are Armstrong Rubber Company (1938), International Paper Company (1949), Johns-Mansville Company (1953), and Diamond National Corporation (1964). Mississippi Power and Light Company's generating plant, located northeast of Natchez, became operational in 1949. All industrial water used by International Paper Company is pumped from the Mississippi River alluvial aquifer. Most other public and industrial supplies are pumped from Miocene aquifers. Several rural community water systems have been combined into the Adams County Water Association since 1964.

Ground-water withdrawals from the Miocene aquifers amounted to less than 1 Mgal/d, at the old Natchez Water Plant, until 1940 when industrial development began. By 1955, about 6.4 Mgal/d was being produced from the Miocene aquifer (Mississippi Water Resources Policy Commission, 1955). In 1962, about 5.3 Mgal/d was pumped (Callahan and others, 1963, p. 28). Rural water systems produced about 0.7 Mgal/d in 1974 and by 1980 had increased production to 1.0 Mgal/d. Industrial pumpage from the Mississippi River valley alluvial aquifer increased from about 25 Mgal/d in 1950 to about 46 Mgal/d in 1955 (Mississippi Water Resources Policy Commission, 1955) and was reported to be about 44 Mgal/d in 1960 (Callahan and others, 1964, p. 43). Reported production was 40 Mgal/d in 1974 and 38 Mgal/d in 1979. In 1983, average pumpage was 38 Mgal/d (K. G. Perkins, written commun., 1984).

Pumpage from Miocene aquifers increased to about 8.4 Mgal/d in 1980. Since 1980, pumpage from Miocene aquifers for public supplies has increased but industrial withdrawals have decreased owing to conservation measures taken by some users and to operational changes by others. In 1983, the City of Natchez used an average of 3.2 Mgal/d, and industrial pumpage was about the same. Rural community water systems in Adams County, some of which have wells in the Natchez area, used an average of 0.95 Mgal/d. Total pumpage from the Miocene aquifer in Adams County in 1982 was about 7.4 Mgal/d.

Most of the large wells that tap the Miocene aquifers in the Natchez area are concentrated in four areas. Wells owned by the City and one large industry are located in the central part of the City. Other industrial well fields are located about 3 miles northeast of the Devereaux Water Plant (Mississippi Power and Light Company), another about 2 miles to the southeast (Johns-Mansville Corporation), and in St. Catherine Creek valley about 2 miles to the south.

International Paper Company operates two well fields in alluvial aquifers, one in St. Catherine Creek valley near the confluence with the Mississippi River, and the other in the Mississippi alluvial plain south of the plant. Several industrial and community water system wells are located outside the Natchez area (table 2).

## GEOHYDROLOGY

Sediments exposed in the Natchez area are Miocene to Holocene in age. The Loess (Bluff) Hills physiographic district is underlain by Miocene deposits that are blanketed by much younger terrace deposits (including the Natchez Formation) and loess. The Mississippi alluvial plain is underlain by sand, gravel, silt, and clay to depths of more than 200 feet in places. An excellent discussion of the exposed strata is given in "Geology and Man in Adams County, Mississippi" (Childress and others, 1976, p. 35-42). A summary of the geologic units in the area is presented in table 1.

The southward-dipping Miocene sediments contain freshwater to depths ranging from about 300 feet below sea level in northern Adams County to about 1,600 feet below sea level in the southern part (fig. 5). Ground water occurs in shallow water-table aquifers in some places; however, because much of the area is blanketed by loess, a material that does not yield significant quantities of water to wells, the deeper confined (artesian) aquifers are the main source of ground water for public supplies and for some industrial supplies.

Recharge to the confined aquifers in the Natchez area occurs where the permeable sand outcrops are exposed at the surface or are hydraulically connected to overlying younger aquifers. The aquifers that are the principal sources of water at Natchez are probably recharged in areas 10 to 30 miles north of the city. The direction of ground-water movement in the confined aquifer is discharged westward into the deeply incised Mississippi River valley. The Mississippi River alluvial aquifer is recharged by precipitation on the land surface, by infiltration from the Mississippi River and tributary streams when at high stages, and by lateral and vertical flow from hydraulically connected Miocene and younger aquifers.

The principal aquifers in the Natchez area are sand beds in the Miocene deposits and the sand and gravel alluvial deposits of Quaternary age (figs. 6-10). Of less importance is the Natchez aquifer, also at Quaternary age, which overlies the Miocene aquifer system. Water-bearing strata also occur below the Miocene aquifers; however, in Adams County these strata do not contain freshwater. In the southern part of the county, the deeper Miocene strata contain saline water.

The Mississippi River alluvial aquifer is in the sand and gravel deposits that underlie the flood plain of the Mississippi River. The Natchez aquifer, formed by Quaternary sand and gravel in the Natchez Formation and older underlying terrace deposits, lies immediately beneath the loess that caps the uplands. The deposits are exposed in deep valleys and in the bluffs along the Mississippi River.

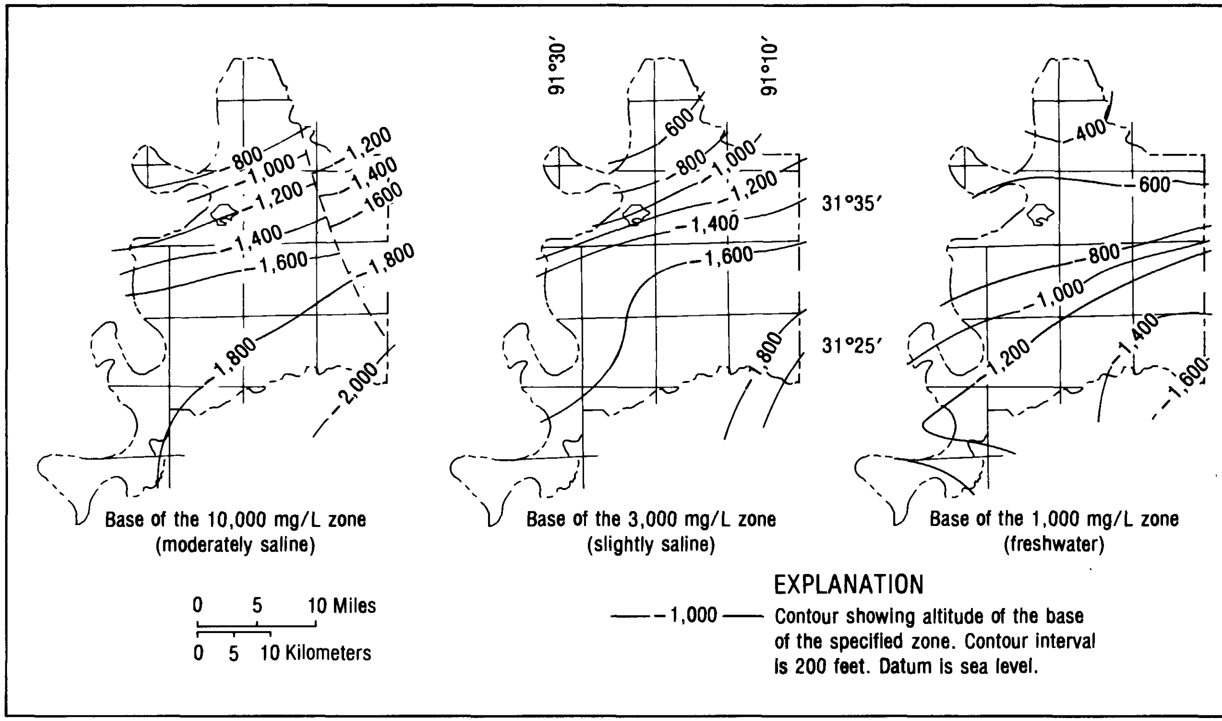



Figure 5.—Configuration of the bases of the moderately-saline, slightly-saline, and freshwater zones in Adams County.

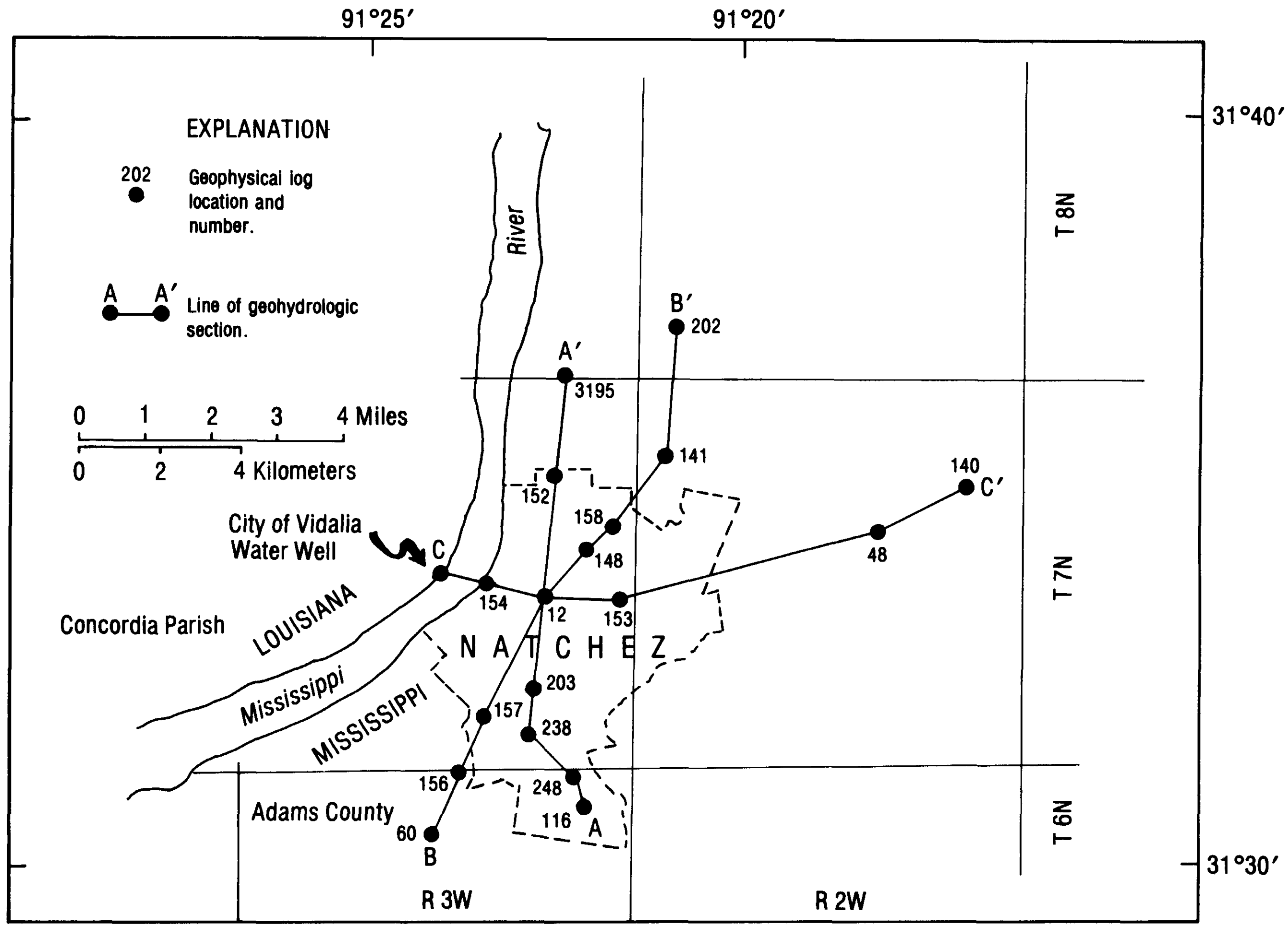



Figure 6.—Locations of geohydrologic sections A-A′, B-B′, and C-C′.

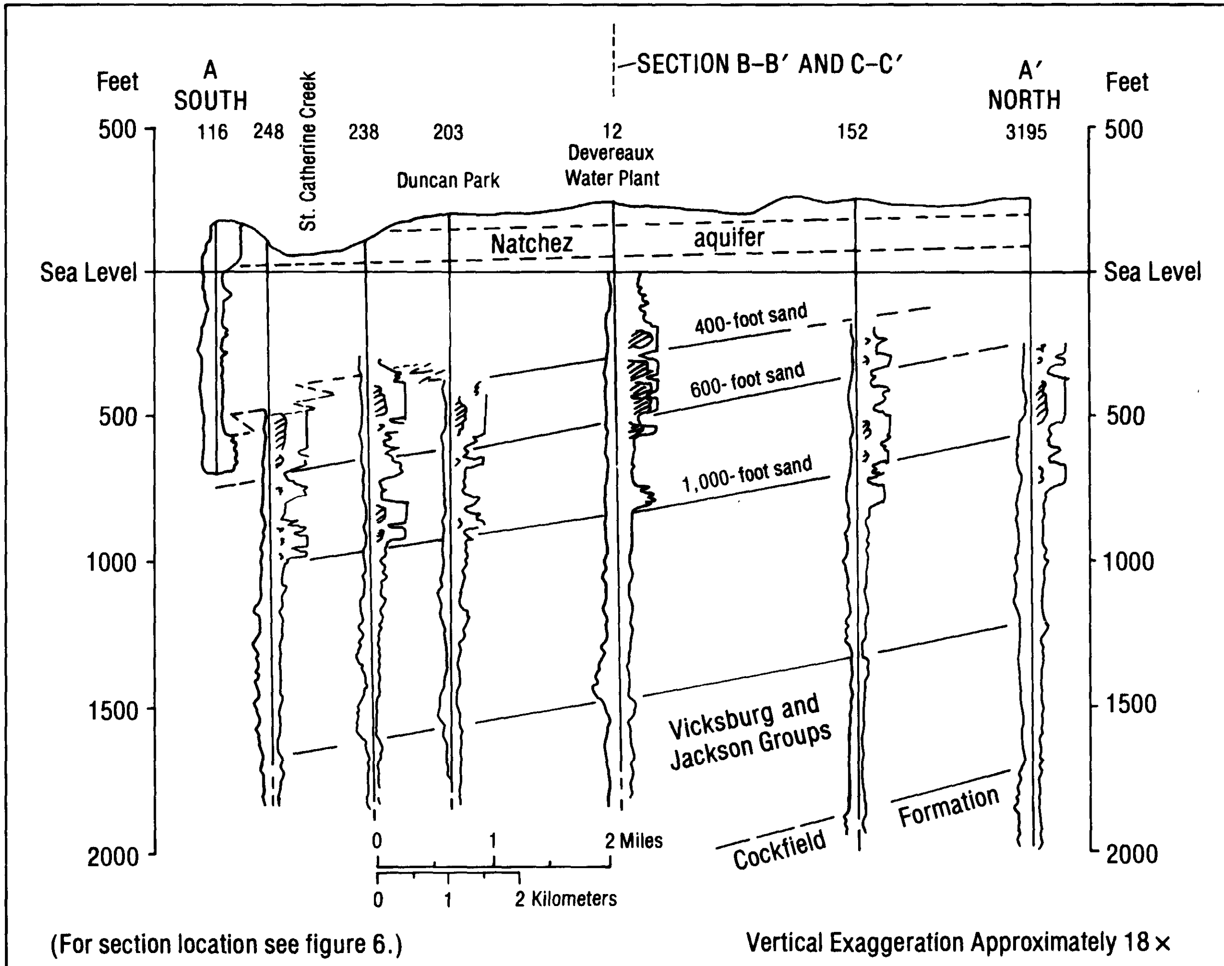



Figure 7.—Geohydrologic section A-A′.

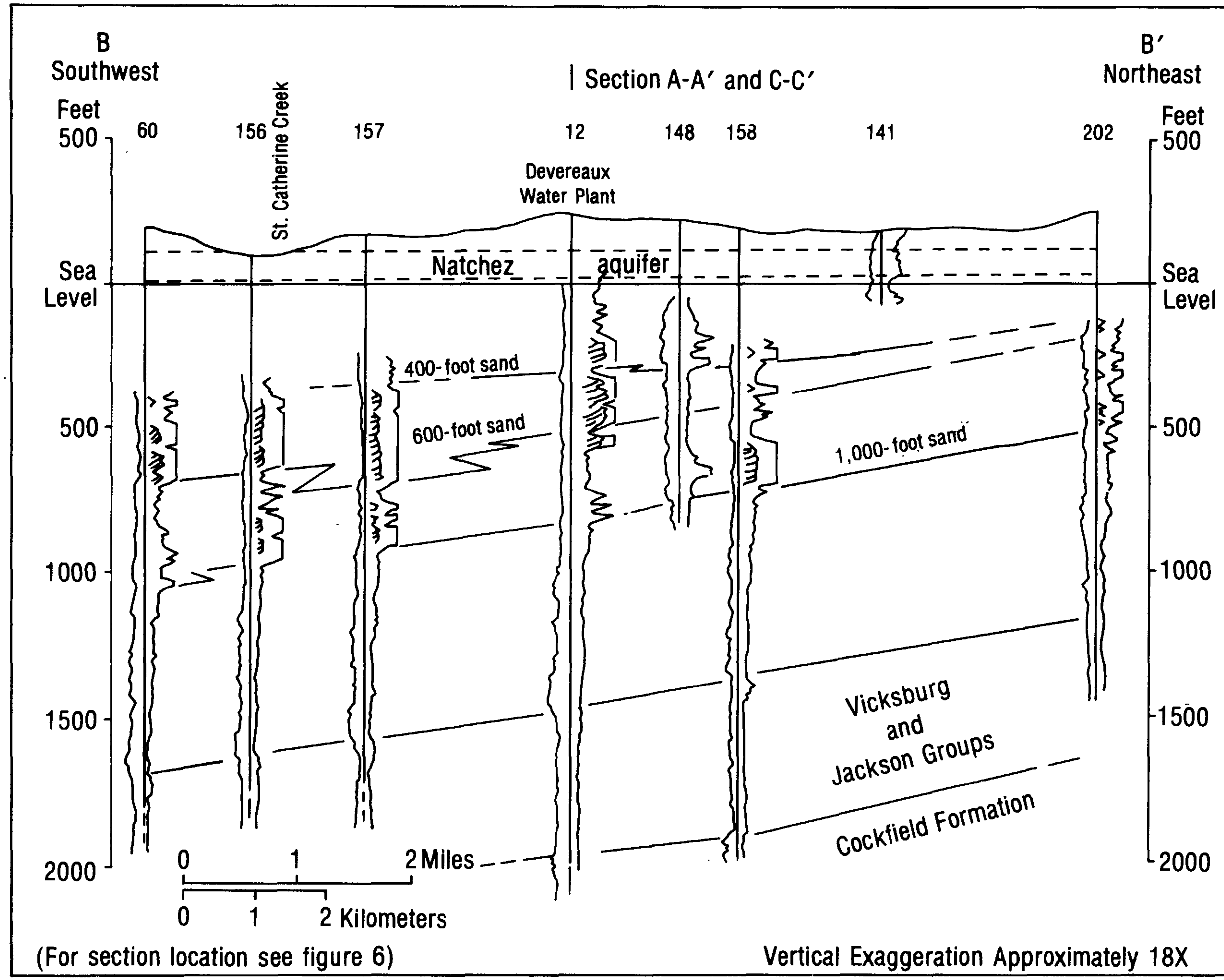



Figure 8.—Geohydrologic section B-B′.

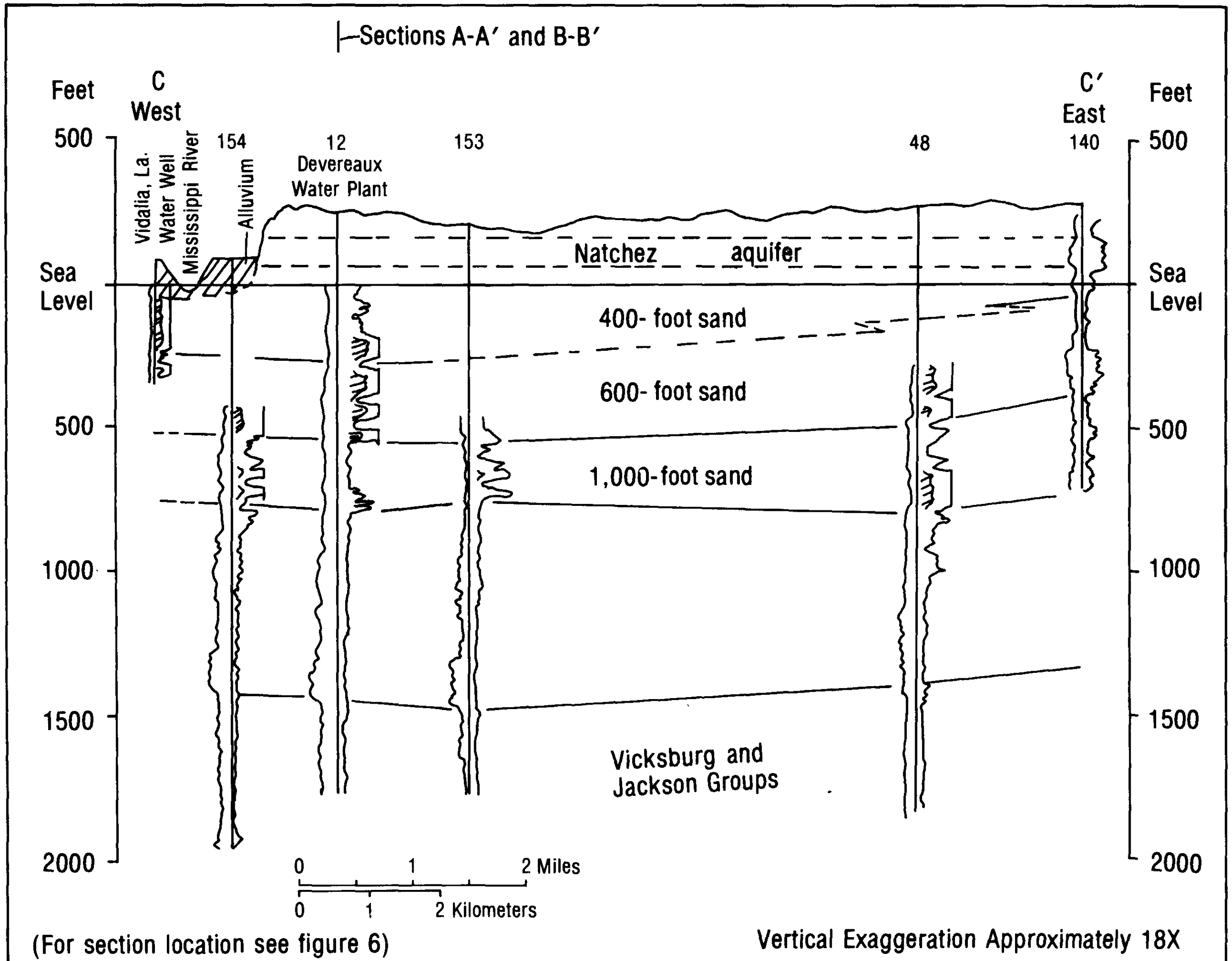



Figure 9.—Geohydrologic section C-C′.

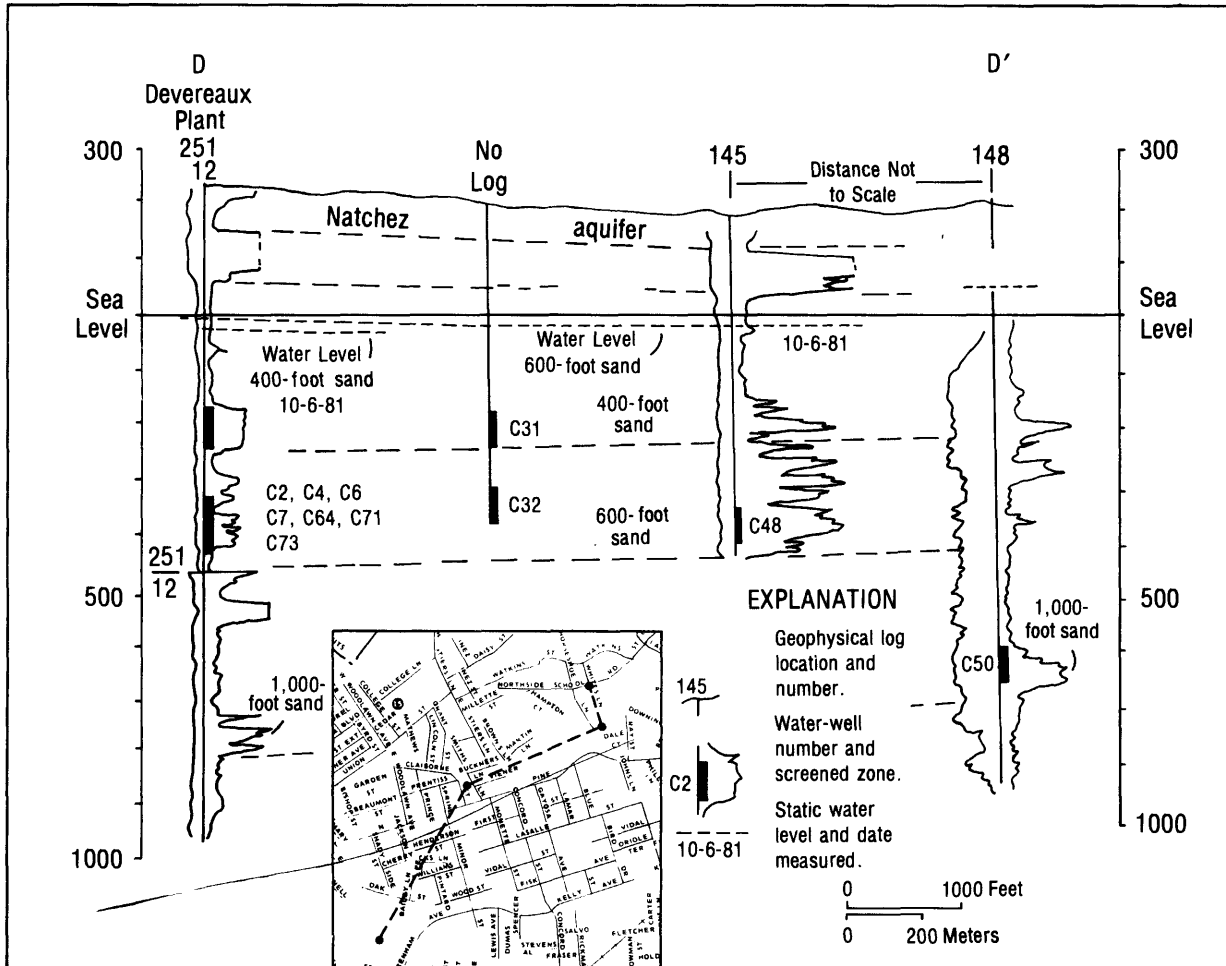



Figure 10.—Geohydrologic section D-D′.

The older strata in Adams County dip generally southward. The rate of dip of a mappable limestone stratum in the Vicksburg Group is about 40 feet per mile (fig. 11); assuming that the Miocene beds have about the same dip, a specific stratum or aquifer will be about 100 feet deeper for each $2\frac{1}{2}$ miles of site displacement southward (assuming that site altitudes are the same).

In southwestern Mississippi on the east side of the Mississippi River below Vicksburg, the Mississippi River alluvial deposits form a series of local aquifers that are bounded on the west side by the river and on the east side by the bluffs. These local aquifers are separated from north south where the river impinges on the bluffs, as at Natchez (fig. 2).

Ground water in the Mississippi River alluvial aquifer occurs under confined and unconfined conditions. Conditions vary with water-level changes and are related to the position of the potentiometric surface relative to the base of surficial confining lay and silt beds. During et periods and in unpumped areas, water levels commonly are above the base of overlying confining beds. As water levels fall below these beds as a result of either natural declines or pumping, the aquifer makes a gradual change to unconfined (water-table) conditions. Recharge to the alluvial aquifer is by percolation of precipitation and floodwater from the surface, infiltration from streams (including the Mississippi River), and movement of water from underlying or adjacent older water-bearing strata.

Data from pumping tests show that the aquifer is highly productive. Pumping tests made using industrial wells in the Natchez area (Callahan and others, 1963, p. 26) indicate transmissivity values ranging from 22,000 $ft^2/d$ (165,000 gpd/ft) to 33,000 $ft^2/d$ (247,000 gpd/ft) and hydraulic conductivities averaging about 250 ft/d (1,900 $gpd/ft^2$). Specific capacities range from 28 to 148 (gal/min)/ft of drawdown, and typical wells produce about 2,000 gal/min. These values are comparable with values reported for the same aquifer in other areas (Turcan and Meyer, 1962; Newcome, 1971). Descriptions for typical industrial water-supply wells that tap alluvial aquifers near Natchez are included in table 2 (wells F16, F18, and F68). Where well interference is not a factor, wells can be designed for much larger yields. Several irrigation wells made in the alluvial aquifer in southwestern Adams County are reported to produce 4,500 gal/min each (table 2, wells J13-J16). Comparable yields can be obtained from the alluvial aquifer in area north of Natchez.

Water levels (potentiometric surfaces) in alluvial aquifers under natural conditions fluctuate seasonally in response to precipitation and stream stages. Along the lower Mississippi River, water levels generally are highest in the late spring and lowest in the fall, reflecting the seasonal variation in precipitation and river stages. Where pumpage also is seasonal, as for irrigation, under average climatic and recharge conditions, water levels recover to about the same level each spring. As a result of hydraulic connection with the river, water levels in the alluvial aquifer near the Mississippi River follow the changing stages of the stream.

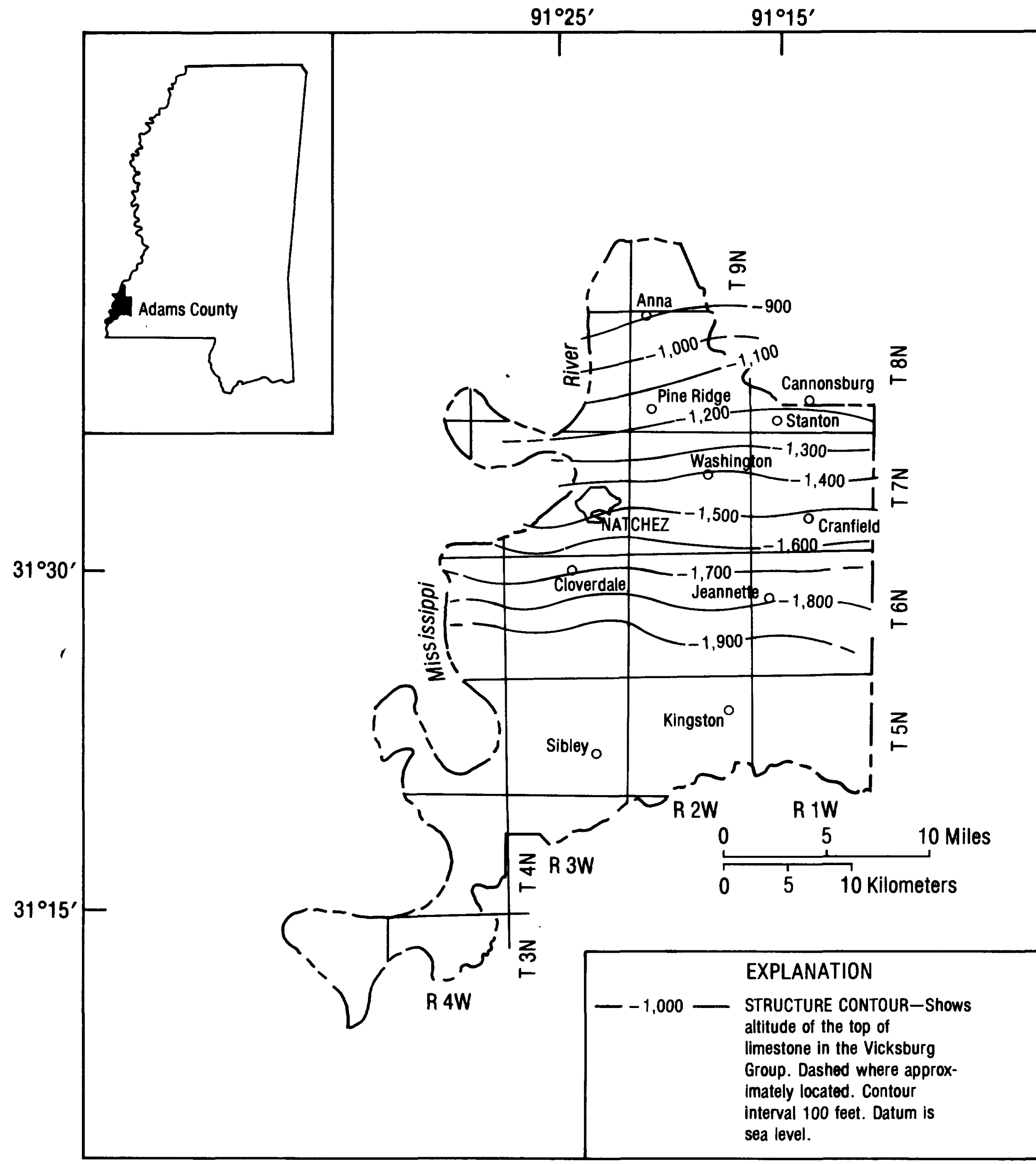



Figure 11.—Configuration of the top of limestone of Vicksburg age in the Natchez area.

Where pumping is continuous as for industry or public water supply, areas of lowered water levels (cones of depression) develop in the potentiometric surface. The size and depth of these areas is related to the hydraulic character of the aquifer, the volume of water pumped, and the availability of water for recharge. Where the aquifer is capable of sustaining a constant withdrawal and where withdrawal does not exceed recharge, the cone of depression eventually reaches a near-stable condition. An example of the withdrawal effect of pumping from the alluvial aquifer by an industry near Natchez is shown in figure 12. A hydrograph for an observation well in the alluvial aquifer indicates that the cone of depression in 1963 was deeper than in 1978, and that some recovery occurred after 1976 (fig. 13). This recovery, probably the result of a reduction in pumping or a change in the distribution of pumping, demonstrates the prompt response of the alluvial aquifer to changes in stress.

Overlying the confining clay beds that form the uppermost Miocene strata in the Natchez area are beds of gravel, sand, and clay that have been assigned by some workers to the "Citronelle Formation" (Vestal, 1942, p. 17); however, the deposits are not equivalent to those commonly mapped as Citronelle (Bicker, 1969). These beds are in turn overlain by similar deposits that have been named the Natchez Formation. These units, together with the loess deposits that form the surface in the area, have a maximum thickness of about 250 feet. The sand and gravel beds form an aquifer here referred to as the Natchez aquifer (figs. 7-10), which is the source of water for shallow wells in the uplands in the Natchez area.

Aquifer-test data are not available for the Natchez aquifer. As the aquifer is similar in lithology and thickness to the Citronelle aquifer elsewhere in Mississippi and has a similar relation to the underlying Miocene aquifer, it may be assumed that hydraulic characteristics are similar. The average saturated thickness for the Citronelle aquifer in Mississippi is 45 feet; the average hydraulic conductivity, 150 ft/d (1,122 gpd/$ft^2$); and the median specific capacity, 11 (gal/min)/ft of drawdown (Boswell, 1979). Wells made in the aquifer typically have deep static levels and short screens; therefore, pumping rates generally are not large. Ground water in the Natchez aquifer is subject to drainage into the deep valleys and into the upper part of the Mississippi River alluvium, which contributes to low water levels in the aquifer and in wells. Low water levels in thin saturated zones in aquifers result in restricted drawdown space in wells; hence, this aquifer is not commonly a source for large wells in the Natchez area. The largest yield reported is 366 gal/min from well D19 (table 2). Water-level data for the Natchez aquifer are too sparse to ascertain if significant changes have occurred. The available measurements indicate that withdrawals have had little effect and that recharge to the aquifer is ample.

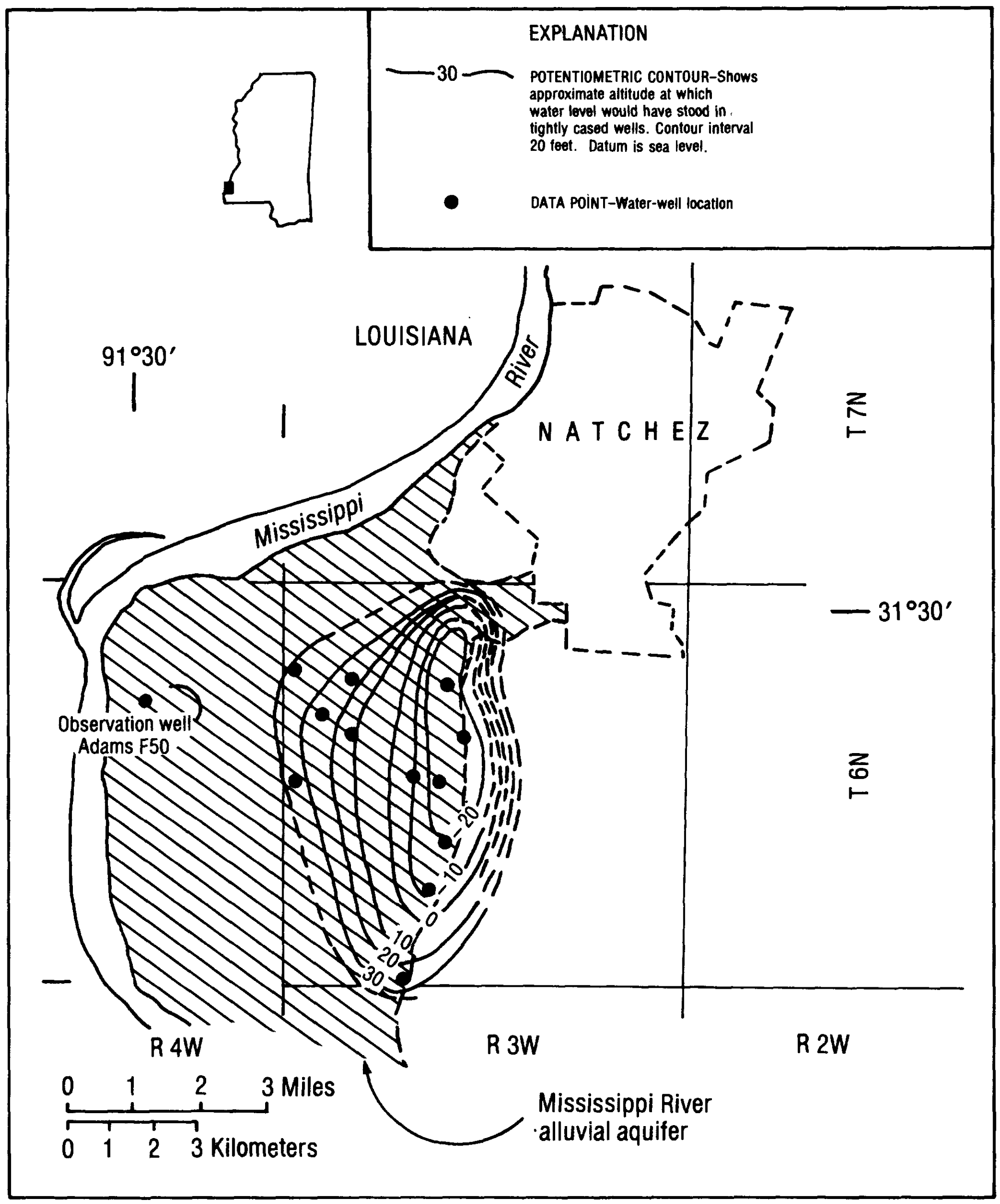



**Figure 12.—Potentiometric surface of the Mississippi River alluvial aquifer, March 1963. (modified from Callahan and others, 1964, figure 19).**

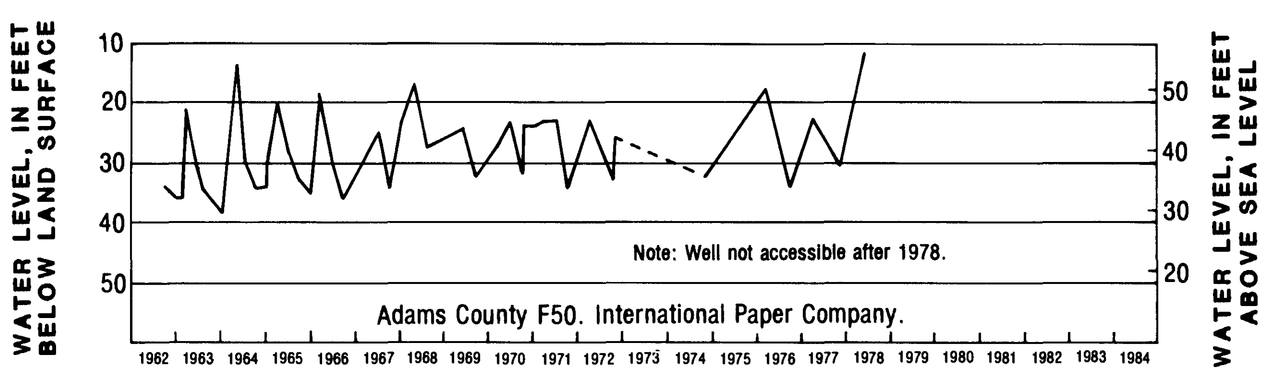



Figure 13.—Hydrograph for well F50 in the Mississippi River alluvial aquifer.

Freshwater in Miocene aquifers at Natchez extends to a depth of about 1,200 feet. In this study, the Miocene strata are considered to include the Catahoula Sandstone; however, some of the uppermost beds may be part of the Hattiesburg Formation. Separation of these units is not essential from a hydrologic standpoint and all wells that tap the Miocene aquifer system in Adams County are assigned to the Catahoula aquifer (CTHL in table 2).

The principal Miocene aquifers tapped by public and industrial water-supply wells in the Natchez area were called the 400-foot sand and the 600-foot sand by Callahan and others (1963, p. 25) on the basis of the depths of the original wells (fig. 4, wells C1-C7) at the Devereaux Water Plant. A geophysical log (Adams County No. 12) made during exploratory drilling in 1939 shows the base of the 400-foot sand at about 500 feet and the base of the 600-foot sand at about 800 feet. The base of a deeper poorly developed sand, herein referred to as the 1,000-foot sand, is at a depth of about 1,050 feet. All three aquifers vary in thickness and lithology throughout the area (figs. 7-10), and the 1,000-foot sand is nearly everywhere better developed than in the Devereaux Water Plant test hole. Recently, water well C50 was completed about 1 mile north of the plant in a strata that is equivalent to a depth of about 1,000 feet at the water plant (fig. 10); however, the potentiometric surface and the character of the water in the new well are indicative of a separate aquifer. The three zones, therefore, constitute thee distinct Miocene aquifers in the Natchez Devereaux Water Plant area. The Natchez aquifer (fig. 10, geophysical log 251), though of limited potential, is a fourth aquifer.

The Miocene sand strata in the Natchez area vary considerably in thickness and hydraulic characteristics; therefore, the probability of making a large-capacity water well in any zone at a specific site cannot be predicted. For example, well C50 was planned to be one of two 600-foot aquifer wells. Test drilling at the C50 site, only about 1,000 feet from 600-foot sand well C48, penetrated a zone of very poor potential at the 600-foot level and the well was made at 864 feet (geophysical log 148, fig. 8). Driller's logs and geophysical logs for borings outside the environs of the city indicate that the 400-foot and 600-foot zones, when considered on a regional basis, are a single aquifer, whereas the 1,000-foot zone persists as a separate water-bearing unit.

Maps depicting the base of the 400- and 600-foot sand zones are impractical owing to the extreme variation in the thickness and position of sand beds in the zones. Complete penetration of the zones during test drilling can be insured by estimating test hole depths based on the altitude of a limestone strata in the Vicksburg Group (fig. 11) at the test site. The base of the 600-foot zone averages about 900 feet above the limestone. The base of the 400-foot zone averages about 1,100 feet and the 1,000-foot zone is about 650 feet above the limestone.

The results of aquifer tests indicate that the Miocene aquifers that underlie the southern part of Mississippi are among the most permeable in the State (Newcome, 1971, p. 6). The average hydraulic conductivity for four aquifer tests made in the early 1960's using wells in the Natchez area was 96 ft/d (720 gpd/$ft^2$) --near the average for Miocene aquifers in Mississippi (Newcome, 1971, p. 17). Transmissivity (T) values, a function of aquifer thickness and permeability, range from 2,000 $ft^2$/d (15,000 gpd/ft) to 10,000 $ft^2$/d (75,000 gpd/ft), averaging about 6,400 $ft^2$/d (48,000 gpd/ft). In the Natchez area, T values generally are lower in the 400-foot zone than in the 600-foot zone.

The highest yielding wells screened in the Miocene aquifers, completed in 1983 by the City of Natchez in the 600-foot sand, produce about 750 gal/min (fig. 4b, wells C64, C71, and C73). Specific capacities for these wells indicate T values within the above range.

Records show a steady water-level decline in the 400 and 600-foot sand from about 70 feet above sea level in 1939 to about sea level by 1955. By 1961, water levels had nearly stabilized, averaging about 10 feet lower in the 400-foot sand than in the 600-foot sand. By 1982, water levels were only a few feet lower than in 1961.

The lowest water levels measured in 1982 were in industrial water-supply wells at the Armstrong Rubber Company. A 600-foot sand well (C15) showed a decline from about 15 feet above sea level in 1952 to about 30 feet below sea level in 1982. A 400-foot sand well (C16) at the same location declined to about 40 or 50 feet below sea level during the same period. The deepest measured water level, 69 feet below sea level in 400-foot sand well C18, shows the pronounced effect of nearby pumping. Water levels in wells C14, C15, and C16 were less affected by other pumping.

Water levels in industrial wells at a site about $2\frac{1}{2}$ miles southeast of the Devereaux Water Plant at Johns Manville Corporation have remained essentially stable since 1961. One 400-foot sand well (C67), measured periodically since 1961 by the Survey, has shown virtually no decline since 1964. A 600-foot sand well (C63) declined slightly between 1961 and 1982. Wells at the Mississippi Power and Light Company generating plant, about 4 miles northeast of the Devereaux Water Plant are in strata equivalent to the 600-foot sand. Water levels have remained fairly stable in this area since 1961 (figs. 14 and 15).

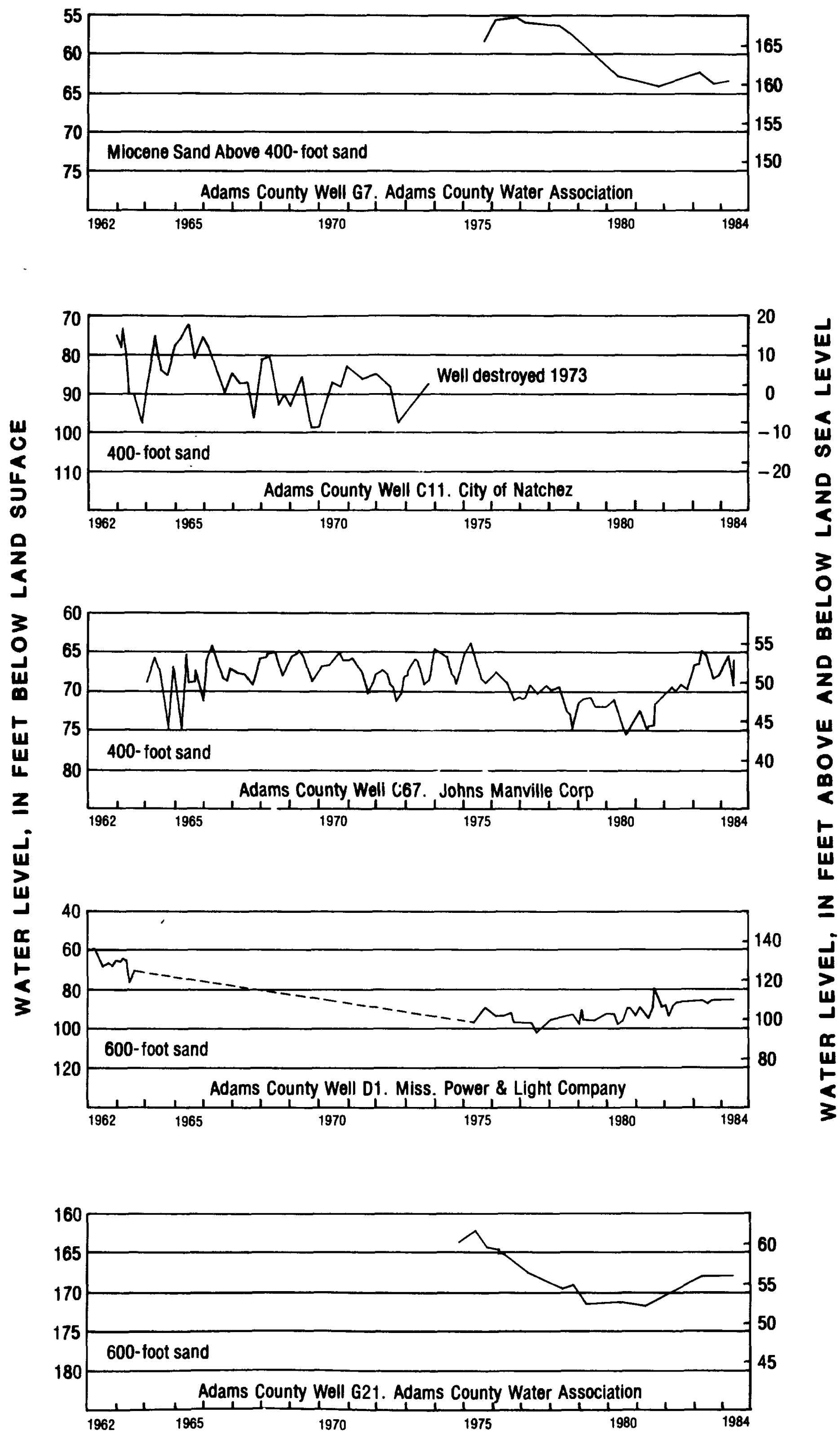



Figure 14.—Hydrographs for water wells in Adams County.

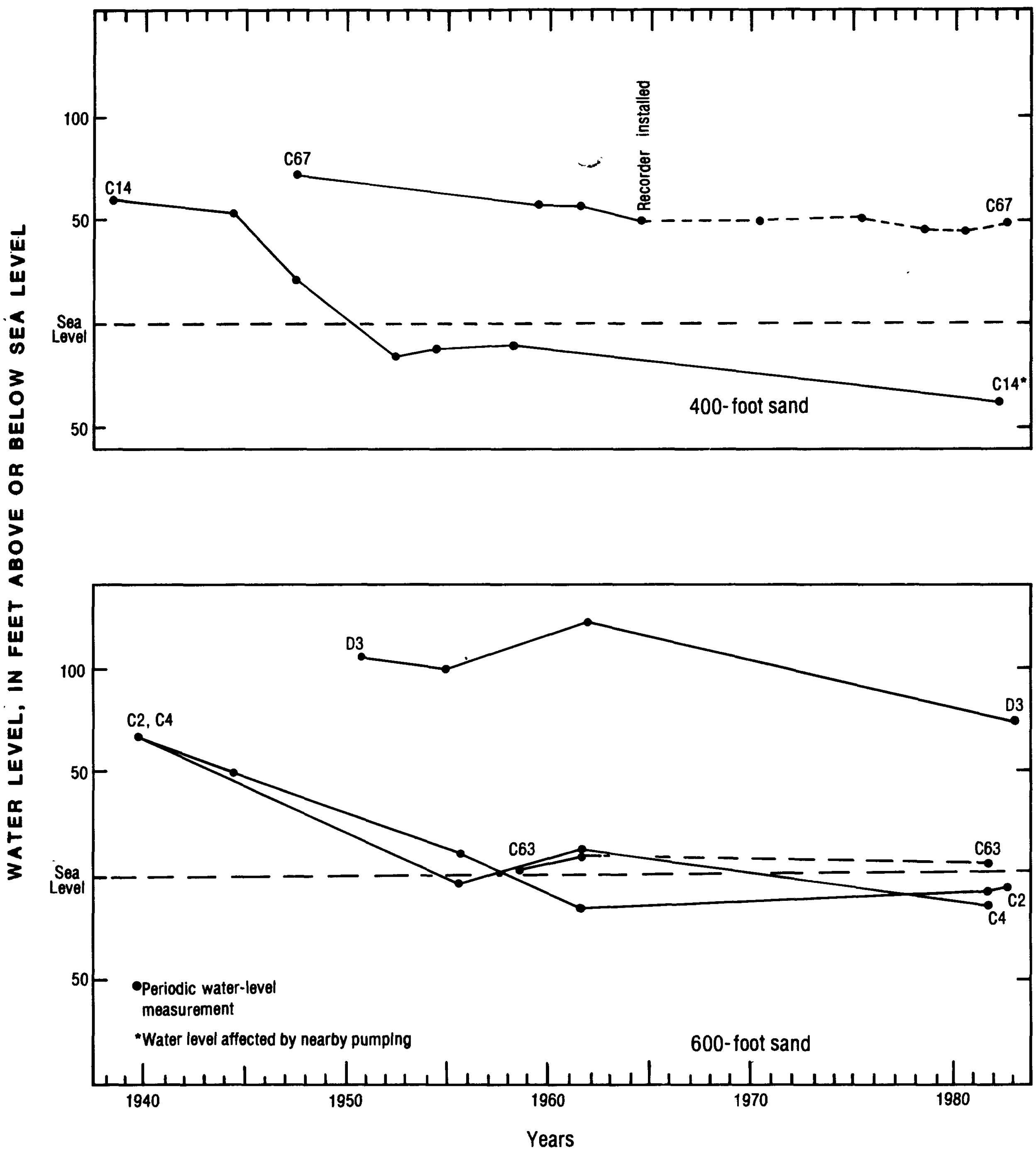



Figure 15.—Water-level trends in the Natchez area, 1939-83.

Although water levels have not declined excessively in the Natchez area since 1961, the cones of depression in the Miocene aquifers have expanded areally (figs. 16 and 17). The expansion is attributed mostly to a broader distribution of withdrawals and to a continuing adjustment of the potentiometric surfaces in both aquifers. If withdrawals continue at about the same rate, the cone of depression will expand only at a very slow rate. The principal expansion of the cone has been to the southwest because (1) the source of recharge is to the north, and the aquifers merge in that direction; (2) the water-bearing sand beds are thicker to the east and southeast; (3) the 400-foot sand thins southward, therefore, it has less capability to store and transmit water; and (4) movement from the 400-foot sand into the cone of depression in the alluvial aquifer may occur southwest of the city.

## WATER QUALITY

### Freshwater Aquifers

Water in the major freshwater aquifers in the Natchez area is usable for most purposes. Concentrations of most common constituents and properties of water do not exceed criteria for potable water supplies established by the Environmental Protection Agency (1976). The water is moderately high in dissolved-solids concentrations, ranging from 281 to 482 mg/L (million gallons per liter) and hardness ranges from soft to very hard. Recommended criteria for concentrations of iron and manganese (0.30 and 0.05 mg/L, respectively) are exceeded in water from several wells. Color is visibly high (20-50 units) in water from several wells that tap the deeper Miocene sands and exceeds the recommended limit (75 units) in a few wells. Results of chemical analyses of water from wells that represent natural water-quality conditions in the Natchez area are given in table 3.

The Mississippi River alluvial and Natchez aquifers contain a hard, calcium-magnesium bicarbonate type water. The dissolved-solids concentrations range from 281 to 482 mg/L. Hardness ranges from 260 to 425 mg/L. The dissolved-solids concentrations in shallow confined Miocene sands are similar to concentrations in the shallow Quaternary aquifers (fig. 19), but the water from some wells that tap the deeper sands is of a different chemical-quality type. The hardness of water in Miocene sand units decreases with depth (fig. 18) ranging from 64 to 238 mg/L in the 400-foot sand, 3 to 290 mg/L in the 600-foot sand, and 0 to 3 mg/L in the 1,000-foot sand.

The change of variation with depth from a calcium-magnesium bicarbonate type water in the shallow Miocene sands to a sodium bicarbonate type water in the deeper Miocene sands is the result of natural ion-exchange processes. The water in the 1,000-foot sand in the study area is a sodium bicarbonate type whereas the water in the 400 and 600-foot sands is in calcium-magnesium-sodium bicarbonate transition stages as it moves downgradient from recharge areas in a north to south-southwest

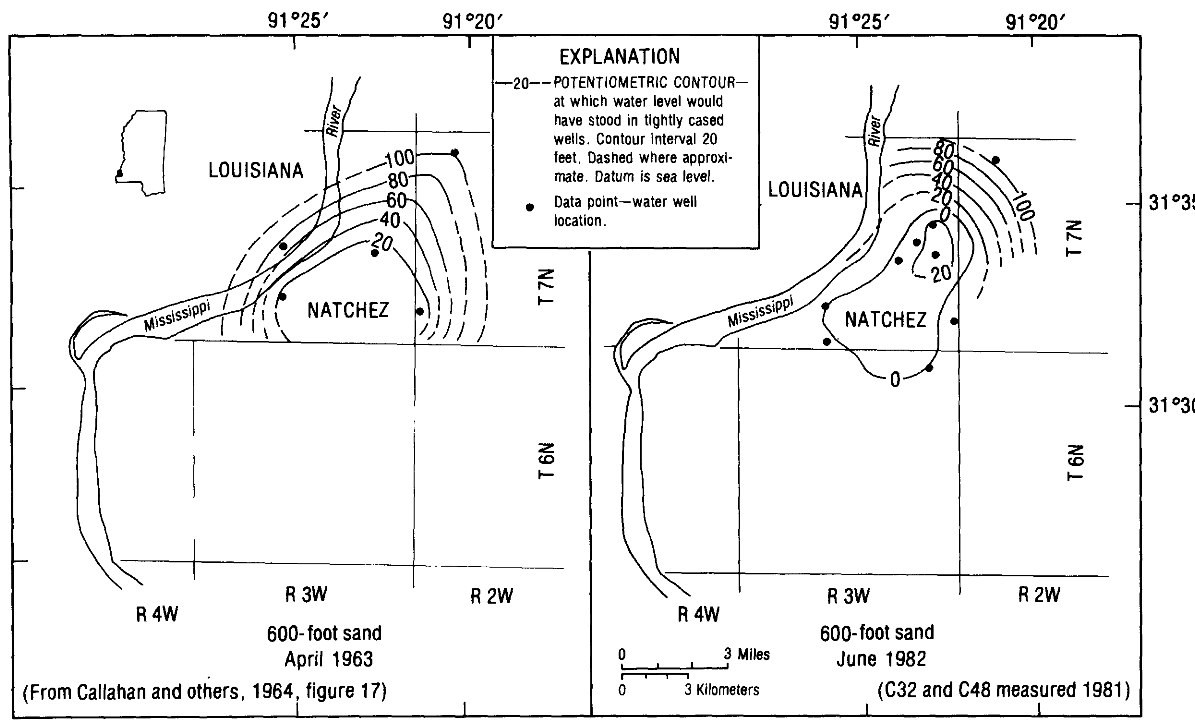
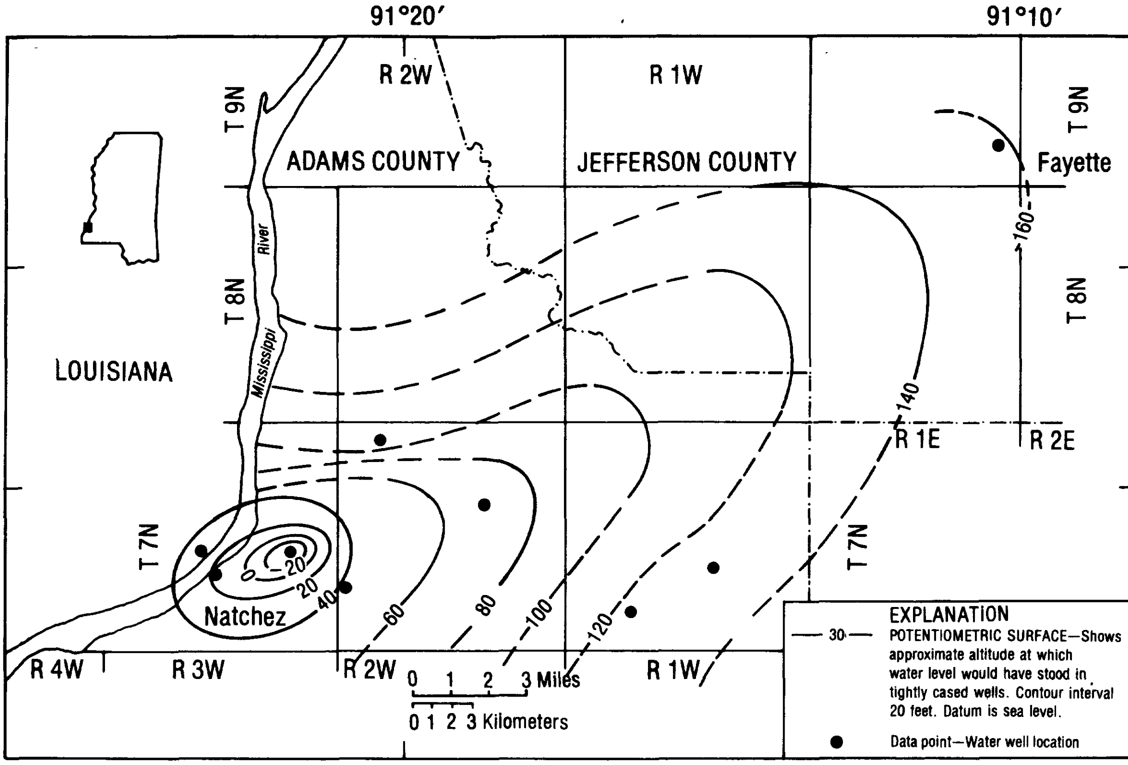
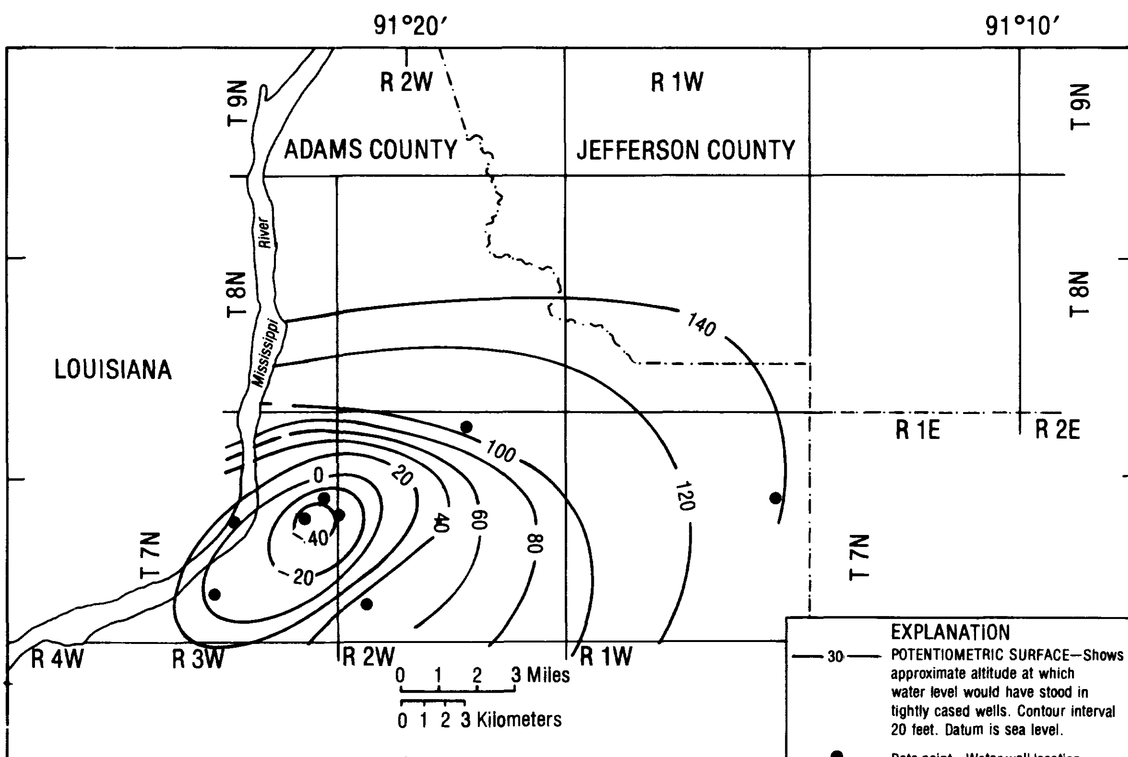



Figure 16.—Potentiometric surface in the 600-foot sand, April 1963 and June 1982.




Potentiometric surface of the 400- foot sand, April-August 1961; (Callahan and others, 1964, figure 16).




Potentiometric surface of the 400-foot sand, June 1982.

**Figure 17.—Potentiometric surface in the 400-foot sand, 1961 and 1982.**

Table 3.--Chemical analyses of water from selected wells in Adams County
(Results in milligrams per liter except as indicated)

| WELL No. | DATE | WELL DEPTH (ft) | SPECIFIC CONDUCTANCE (micromhos at 25°C) | pH (units) | CALCIUM (Ca) | MAGNESIUM (Mg) | SODIUM (Na) | POTASSIUM (K) | ALKALINITY[a] as $CaCO_3$ | SULFATE (SO4) | CHLORIDE (Cl) | FLOURIDE (F) | SILICA (SiO2) | DISSOLVED SOLIDS (ROE) | HARDNESS as CaCO3 | SODIUM (percent) | COLOR (units) | IRON[b] (Fe) | MANGANESE[b] (Mn) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B4 | 7/61 | 760 | 391 | 7.5 | 0.0 | 0.0 | 92 | 1.6 | 159 | 1.2 | 25 | 1.4 | 52 | 293 | 0 | 98 | 50 | 0.18 | - |
| B32 | 4/83 | 120 | 675 | 6.9 | 80 | 37 | 10 | 1.5 | 349 | 5.1 | 4.9 | .2 | 27 | 416 | 360 | 6 | 15 | .02 | .01 |
| C1 | 3/61 | 457 | 538 | 6.7 | 51 | 17 | 44 | 3.8 | 279 | 12 | 5.6 | .2 | 42 | 348 | 196 | 32 | 10 | .91 | - |
| C2 | 3/61 | 612 | 557 | 6.7 | 64 | 20 | 29 | 3.5 | 292 | 12 | 5.0 | .3 | 42 | 352 | 240 | 20 | 10 | 1.10 | - |
| C3[c] | 1/61 | 449 | - | 6.6 | 53 | 21 | 31 | 7.5 | 274 | 11 | 5.0 | .0 | - | 307 | 217 | 22 | - | .70 | - |
| C4 | 3/61 | 612 | 560 | 6.8 | 50 | 17 | 51 | 3.5 | 292 | 12 | 5.6 | .1 | 42 | 358 | 195 | 35 | 20 | 1.20 | - |
| C5 | 10/56 | 425 | 520 | 8.0 | 60 | 19 | 30 | .7 | 274 | 15 | 4.0 | .0 | - | 320 | 228 | 22 | - | .00 | - |
| C6[c] | 1/61 | 660 | - | 6.3 | 44 | 17 | 52 | 6.5 | 278 | 16 | 5.0 | .0 | - | 324 | 180 | 37 | 5 | .80 | - |
| C7 | 10/56 | 619 | 551 | 7.0 | 57 | 18 | 43 | 6.6 | 292 | 10 | 4.8 | .3 | 27 | 314 | 216 | 29 | - | .00 | - |
| C12 | 4/61 | 600 | 585 | 6.9 | 4.2 | .9 | 136 | 4.7 | 300 | 12 | 3.9 | .2 | 41 | 402 | 14 | 92 | 100 | .23 | - |
| C16 | 3/61 | 455 | 532 | 7.1 | 53 | 19 | 35 | 3.5 | 272 | 12 | 5.1 | .2 | 42 | 340 | 210 | 26 | 10 | .96 | - |
| C18 | 3/61 | 473 | 543 | 6.8 | 62 | 20 | 28 | 3.8 | 284 | 12 | 4.4 | .2 | 41 | 342 | 238 | 20 | 20 | 1.00 | - |
| C19 | 6/61 | 507 | 588 | 7.6 | 4.9 | .4 | 138 | 3.9 | 297 | 12 | 5.0 | .2 | 48 | 411 | 14 | 93 | 10 | .85 | - |
| C20 | 6/61 | 142 | 794 | 7.8 | 94 | 46 | 12 | 1.6 | 442 | .8 | 7.1 | .3 | 32 | 482 | 425 | 6 | 5 | 12.00 | - |
| C22 | 9/61 | 280 | 426 | 7.4 | 18 | 4.7 | 72 | 5.9 | 188 | 19 | 16 | .1 | 34 | 300 | 64 | 66 | 10 | .57 | - |
| C33 | 6/82 | 655 | 600 | 7.1 | 1.3 | .6 | 150 | 3.9 | 300 | 15 | 4.2 | .1 | 44 | 398 | 6 | 95 | 1 | .15 | .03 |
| C35 | 6/82 | 679 | 600 | 6.5 | .9 | .3 | 150 | 2.7 | 307 | 14 | 4.9 | .1 | 46 | 403 | 3 | 97 | 1 | .07 | .02 |
| C48 | 5/80 | 578 | 550 | 6.6 | 39 | 13 | 60 | 7.9 | 262 | 12 | 5.5 | .1 | 45 | 352 | 150 | 43 | 1 | .95 | .46 |
| C50 | 4/83 | 864 | 750 | 8.4 | .7 | .1 | 170 | 1.8 | 197 | 7.6 | 120 | 1.8 | 51 | 479 | 2 | 99 | 110 | .02 | .01 |
| C64 | 7/83 | 650 | 560 | 6.8 | 42 | 15 | 59 | 5.6 | 293 | 14 | 5.3 | .2 | 46 | 359 | 170 | 43 | 15 | 1.00 | .28 |
| C65 | 12/61 | 406 | 496 | 7.5 | 42 | 12 | 54 | 6.3 | 266 | 12 | 4.6 | .2 | 37 | 330 | 155 | 41 | 10 | .05 | - |
| C71 | 10/83 | 655 | 574 | 6.8 | 41 | 14 | 60 | 5.5 | 284 | 15 | 6.0 | .2 | 44 | 357 | 160 | 44 | 2 | .82 | .23 |
| C73 | 10/83 | 615 | 580 | 6.7 | 50 | 16 | 48 | 6.7 | 271 | 14 | 6.4 | .2 | 44 | 360 | 190 | 34 | 1 | .62 | .29 |
| D13 | 4/61 | 600 | 548 | 6.9 | 42 | 14 | 60 | 4.7 | 277 | 16 | 5.0 | .2 | 40 | 357 | 162 | 43 | 20 | .01 | - |
| D19 | 6/82 | 135 | 600 | - | 67 | 30 | 9.1 | 1.1 | 313 | 4.0 | 6.0 | .3 | 29 | 340 | 290 | 6 | 1 | .00 | .00 |
| D24 | 3/74 | 558 | 568 | 7.1 | 67 | 29 | 11 | 2.2 | 303 | 11 | 3.4 | .2 | 43 | 347 | 290 | 8 | 20 | .72 | - |
| D40 | 6/82 | 1053 | 515 | 7.8 | .4 | .2 | 130 | 1.6 | 262 | 2.0 | 8.4 | .5 | 47 | 352 | 2 | 98 | 6 | .13 | .01 |
| D45 | 6/79 | 150 | 514 | 6.7 | 62 | 26 | 8.4 | 1.2 | 240 | 27 | 14 | .2 | 30 | 354 | 260 | 6 | 0 | .01 | .08 |
| D46 | 4/83 | 958 | 580 | 8.4 | .8 | .2 | 150 | 2.4 | 313 | 2.5 | 11 | .4 | 50 | 389 | 3 | 98 | 15 | .01 | .02 |
| D52 | 6/82 | 483 | 556 | - | 63 | 24 | 13 | 2.4 | 270[d] | 11 | 4.1 | .2 | 39 | 332 | 260 | 10 | 1 | 1.10 | .10 |
| D60 | 5/82 | 150 | 660 | 6.9 | 78 | 35 | 12 | - | 323[d] | 8.0 | 17 | - | - | - | 340 | 7 | - | - | - |
| E29 | 5/84 | 1220 | 520 | 7.8 | .5 | .2 | 130 | 1.7 | 280 | 1.8 | 8.8 | .1 | 49 | 389 | 2 | 98 | 20 | .23 | .02 |
| F4 | 9/61 | 245 | 565 | 7.6 | 62 | 30 | 17 | 2.5 | 269 | 10 | 29 | .3 | 18 | 322 | 278 | 12 | 3 | .00 | - |
| F8 | 9/61 | 246 | 477 | 7.2 | 56 | 30 | 11 | 2.1 | 270 | 4.2 | 6.8 | .2 | 18 | 281 | 263 | 8 | - | .02 | - |
| F12 | 9/61 | 215 | 682 | 8.0 | 82 | 46 | 11 | 2.3 | 400 | 8.8 | 6.5 | .3 | 18 | 380 | 394 | 6 | 3 | .00 | - |
| F16 | 9/61 | 180 | 618 | 7.7 | 73 | 35 | 11 | 1.9 | 328 | 8.2 | 12 | .2 | 16 | 389 | 326 | 7 | 5 | .69 | - |
| F18 | 9/61 | 235 | 537 | 7.3 | 71 | 32 | 9.3 | 1.8 | 302 | 10 | 8.0 | .2 | 14 | 329 | 308 | 6 | 3 | .02 | - |
| F22 | 4/82 | 262 | 580 | 7.0 | 65 | 30 | 16 | - | 285[d] | 22 | 9.0 | - | 1 | - | 290 | 11 | - | - | - |
| F75 | 4/83 | 800 | 590 | 7.0 | 10 | 3.5 | 130 | 5.2 | 300 | 15 | 4.6 | .1 | 48 | 398 | 39 | 86 | 35 | 1.2 | .12 |

a Alkalinity as $CaCO_3$ x 1.22 equals bicarbonate concentrations below pH 8.3. Calculation includes carbonate radical above pH 8.3.
b Samples filtered and acidified on-site after 1979
c Analysis by Mississippi State Board of Health
d Estimated (calculated) value

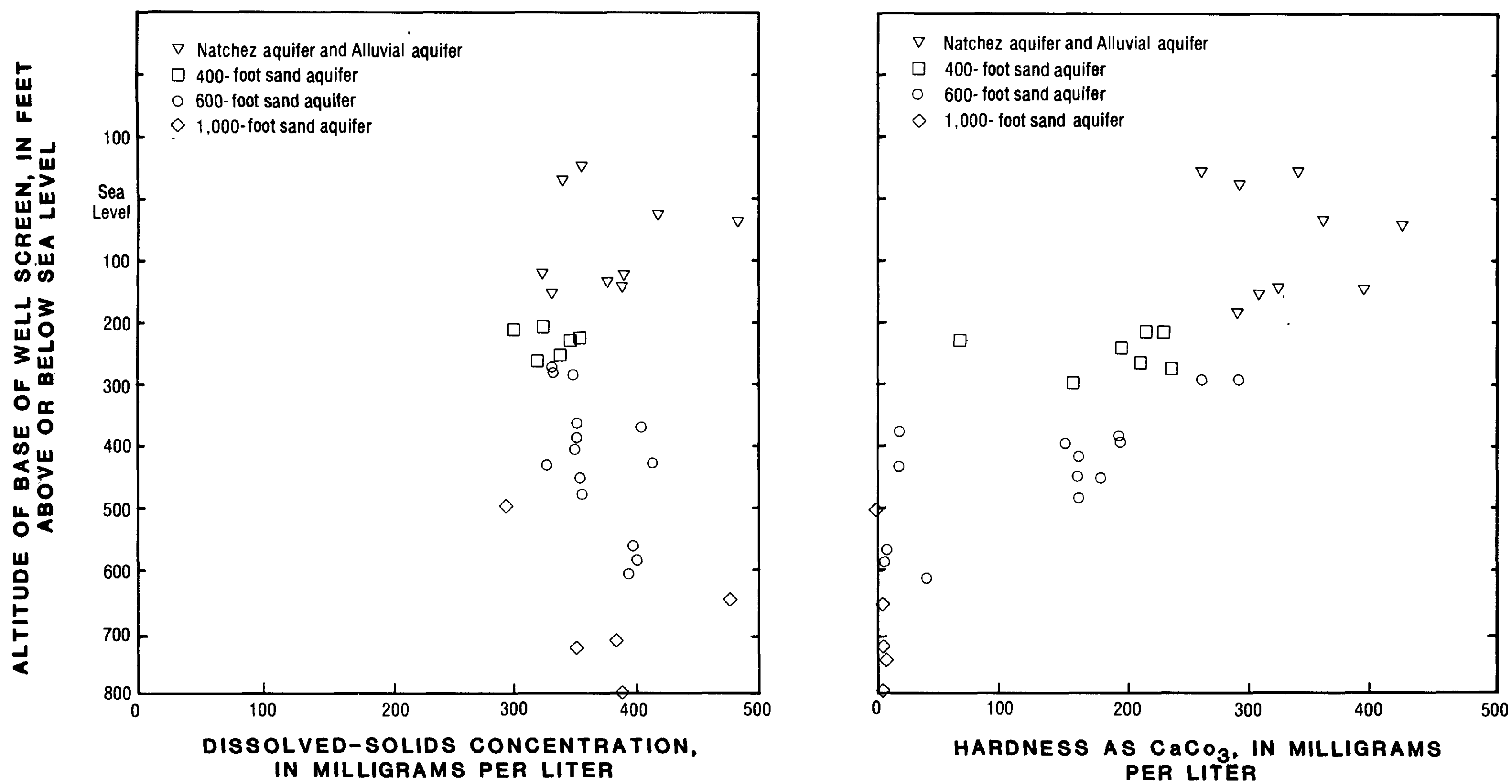



Figure 18.—Dissolved-solids concentrations and hardness of water in aquifers in the Natchez area.

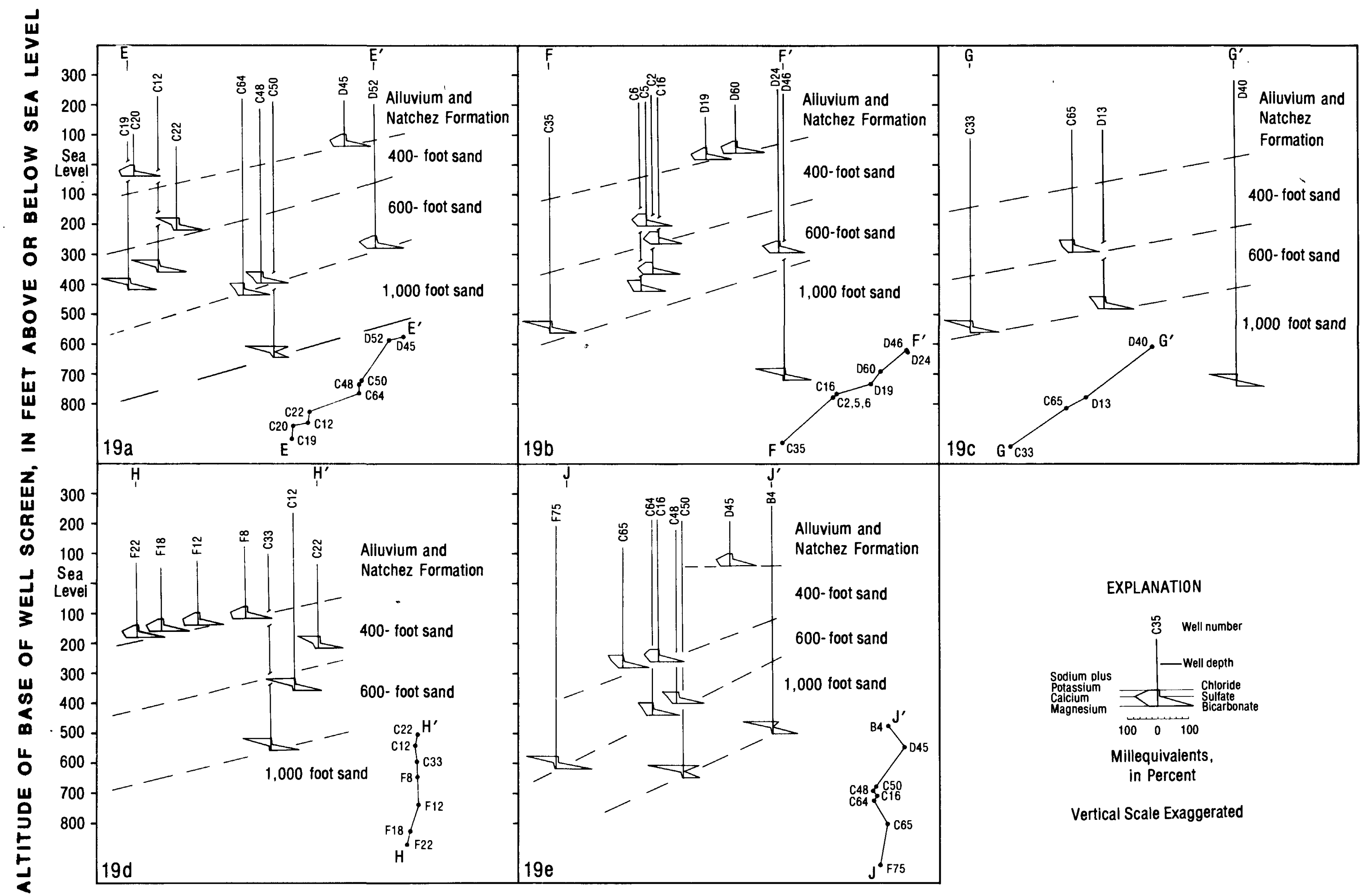



Figure 19.—Variations in the chemical characteristics of water in the Natchez area.

direction. It is probable that water in Miocene sands at shallow depths near recharge areas north and northeast of Natchez is a calcium-magnesium bicarbonate water similar to water in Quaternary aquifers in the Natchez area. Chemical-quality types of water in major aquifers along several hydrologic sections are shown in figure 19. Modification of Stiff diagrams (1951) are used to represent major chemical constituents, in percent millequivalents per liter, for the individual chemical analysis given in table 3. The diagrams shown in the hydrologic sections indicate that the water undergoes changes or alterations in its chemical quality as it moves downgradient.

Figure 19 illustrates the changes or alterations in chemical quality that occur as water moves downgradient in the confined 400- and 600-foot sand aquifers (figs. 19a, 19b, and 19c). The consistent nature of the calcium-magnesium bicarbonate type water in the shallow unconfined alluvial and Natchez aquifers are shown in figures 19a, 19b, 19d, and 19e. Figure 19d also depicts the chemical quality of water in wells adjacent to the Mississippi River in the 400- and 600-foot sand aquifers at Natchez and the alluvial aquifer southwest of Natchez.

Water in the 1,000-foot sand in the Natchez area is a sodium bicarbonate type. However, chemical quality changes in the 1,000-foot sand similar to changes in the 400- and 600-foot sands, are believed to occur in water at shallower aquifer depths approaching the Natchez area. Salinity increases in the lower part of the 1,000-foot sand downgradient of well B4 (fig. 19e). The percentage of chloride increases from well B4 (18 percent) to well C50 (45 percent). The percentage of chloride from analyses of water from wells D46 and D40 northeast and east of Natchez is 5 and 4 percent, respectively (figs. 19b, 19c, and 19e).

The transition in water types with depth is accompanied by a change in pH. The pH of the water in four wells developed in the 1,000-foot sand ranges from 7.5 to 8.4 units. The median pH of water from wells in the 400- and 600-foot sands is 7.1 and 6.8 units, respectively. Water from wells in the Quaternary aquifers have a median pH of 7.2 units.

Concentrations of iron and manganese ranged from 0 to 12 mg/L and 0 to 9.46 mg/L, respectively, in ground waters in the Natchez area (table 3). Iron concentrations are lower in water from the 1,000-foot sand than in water from the 400- and 600-foot sands. The highest concentration of iron (12 mg/L) occurred in water from well C20 in the Natchez aquifer.

The highest color value observed was in water from wells C50 (110 units) and 84 (50 units) in the 1,000-foot sand and well C12 (100 units) in the 600-foot sand (table 3). The data in table 3 suggests that water in shallow wells is lower in color than water from deeper wells. A comparison of color values for water from wells D40 and D46 with those of water from wells C50 and B4 suggests that water in the 1,000-foot sand to the east and northeast of Natchez is lower in color than elsewhere.

The mean silica concentration was highest in water from wells in the 1,000-foot sand (50 mg/L) and lowest in water from the alluvial aquifer (18 mg/L). The mean silica concentration was higher in water from wells in the Natchez aquifer (30 mg/L) than in water from wells in the alluvial aquifer, which indicates a difference in silicate mineralogy in these aquifers. The mean silica concentration was slightly higher in water from the 600-foot sand (44 mg/L) than in water from the 400-foot sand (39 mg/L). Silica concentrations generally were highest in the deeper aquifers (fig. 20).

Fluoride concentrations ranged from 0.4 to 1.8 mg/L in water from the four wells in the 1,000-foot sand and were 0.3 mg/L or less in water from the shallower aquifers (table 3). Water from wells B4 and C50 contained concentrations of both fluoride (1.4 and 1/8 mg/L, respectively) and chloride (25 and 120 mg/L, respectively) that are anomously high, which suggests a common source of these constituents.

At depths greater than 60 feet ground-water temperatures reflect geothermal gradient and temperatures generally increase about 1°F per 100 feet of depth (Stevens and others, 1975, p. 14). Temperatures of ground water in the study area ranged from about 67.0°F in shallow wells to 74.5°F in a well (D40) screened at a depth of 1,043 feet--about 0.8°F per 100 feet of depth.

## Saline Water

Freshwater is defined by the Geological Survey as water that contains less than 1,000 mg/L of dissolved solids. In Adams County, the base of freshwater ranges from about 300 feet below sea level to about 1,600 feet below sea level. The base of the 3,000 mg/L (slightly saline) zone ranges from about 600 feet to about 1,900 feet below sea level, and the base of the moderately saline zone (3,000 - 10,000 mg/L) ranges from about 700 to about 2,000 feet below sea level. The maps shown in figure 5 are generalized from a state-wide study by Gandl (1982). A more detailed map that depicts the base of the 1,000 mg/L zone in Adams County was published in a report by Childress and others (1976).

## Aquifer Contamination

Although the injection of wastes (including oil field brines and other drilling wastes) into freshwater aquifers is now prohibited by State and Federal law, the past use of earthen pits and improper waste injection methods have resulted in local contamination of freshwater aquifers in the Natchez area. Several instances of water-well contamination by saltwater in the Natchez area have been reported. The use of some shallow industrial and rural water association supply wells was discontinued because of brine contamination. Future instances can be expected where new wells are drilled into contaminated strata or where saltwater migrates into existing wells. "Slugs" of saltwater from long-abandoned pits or wells may appear unexpectedly almost anywhere in the subsurface of Adams County.

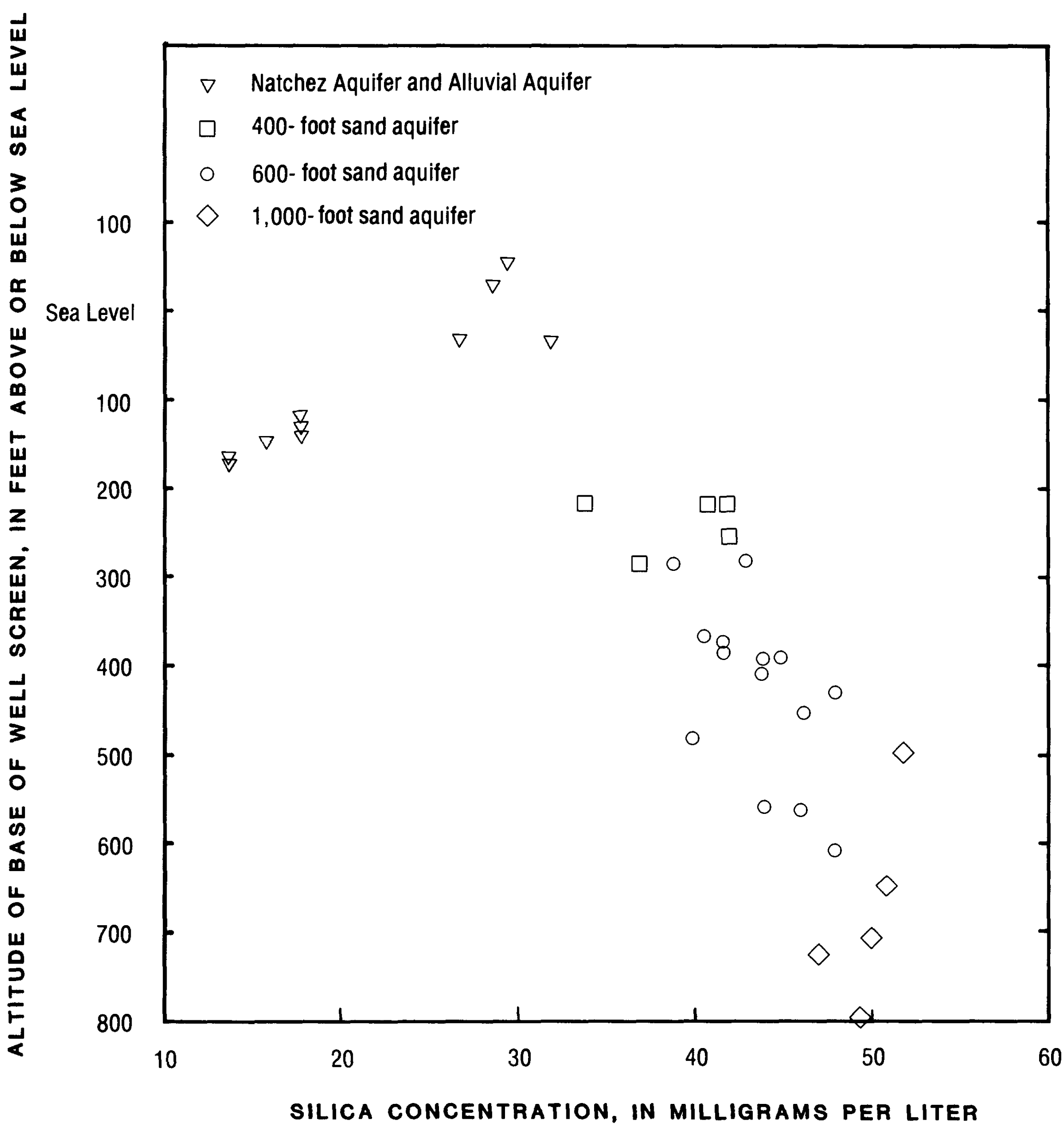



Figure 20.—Silica concentrations in water from major aquifers in the Natchez area.

Investigations of ground-water contamination are beyond the scope of this study; however, the U.S. Geological Survey has concluded a reconnaissance study to determine the extent of oil-field brine contamination in south Mississippi. The report (in preparation) describes specific instances of contamination in Adams County.

## POTENTIAL FOR GROUND-WATER DEVELOPMENT

Ground-water development in the Natchez area can proceed by continued development of the 600-foot sand and, to the north and east, by utilization of the 1,000-foot sand. The 400-foot sand, available in most areas, is capable of large yields to wells at some places south and east of the present cone of depression. The Natchez aquifer is not a major factor for future planning, but it too can be used in some places as a supplemental source of water or as a source for small yields to wells. The Mississippi River alluvial aquifer, the source for extremely large supplies of industrial water south of Natchez, is capable of similar yields in the alluvial plain north of Natchez.

The 400-foot sand is tapped by four city-owned wells, three at Devereaux Water Plant (C1, C3, and C5), and one (C31) is north of the plant. The aquifer is the source for several other industrial and public water-supply wells. The potential for development of the 400-foot sand is not large in the city, because (1) the sand is extremely variable in thickness and it is not capable of large yields to wells in the southern part of the city and elsewhere to the south and (2) low static levels result in a limitation on pumping drawdown space in wells. New wells would need to be designed for small yields; however, the aquifer is a supplemental source of water.

The 600-foot sand, the source for about 75 percent of the present public water supply at Natchez, can sustain moderate increases in withdrawals. An analysis of water-level declines, static levels, and projected static and pumping levels indicated that a continuation of production at the present level is feasible, and that wells of somewhat higher yield than the older wells (fig. 4, wells C2, C4, C6, and C7) could be installed. Three 750 gal/min wells (fig. 4, wells C64, C71, and C73) were installed in 1983 by the city and about 30 other public and industrial water-supply wells are screened in the 600-foot sand in the Natchez area.

Geophysical logs for oil tests indicate that the 600-foot sand is probably as well or better developed at places in the southern part of the city as at the Devereaux Water Plant; however, aquifer pumping tests and comparatively high water levels indicate that the most favorable area for future development is east of St. Catherine Creek in the vicinity of State Highway 551. The 400-foot sand is not included in the logged interval on most of the geophysical logs available and the water-bearing potential for the zone is indeterminate; however, pumping drawdown space would be limited as a result of low static levels. Static levels in all aquifers in the southern part of the city would be about the same as at the present plant.

The 600-foot sand is available for future development throughout the study area and is generally capable of high yields to wells; however, concentrated development and large increases in withdrawals in the immediate Natchez area, particularly in the southern part of the city, will result in a significant lowering of the potentiometric surface after a few years.

A well drilled by the city in 1980 to the 1,000-foot sand (C50, 864 feet deep) produces water that is highly colored and relatively high in dissolved solids. The 1,000-foot aquifer has little potential in the southern and western parts of Natchez owing to the chemical character of the water; however, water from well C50 can be used in emergencies. Municipal or industrial water supplies obtained from the 1,000-foot aquifer would not directly affect the 600-foot aquifer through well interference. The quality of water in the 1,000-foot sand improves substantially to the north, northeast, and east of Natchez and in some areas may be suitable for most uses without treatment. Also, in the same area the aquifer is capable of large yields to wells.

The Mississippi River alluvial aquifer is presently pumped heavily in the area south of Natchez; however, additional withdrawals could be made by well fields located south of the existing well fields. An area of several square miles north of Natchez that is underlain by the alluvial aquifer (fig. 2) is available for developing very large public or industrial water supplies. Factors favoring the alluvial aquifer are (1) it is replenished annually by recharge from the Mississippi River and from precipitation, (2) the alluvial aquifer north of Natchez is separated from the alluvial aquifer south of the city and is not, therefore, subject to interference from the present industrial pumping, (3) total pumping lifts from the alluvial aquifer will in the future be less than from the Miocene aquifer, and (4) the quality of water from well B32 indicates that the water would be hard but with treatment suitable for most uses.

The Natchez aquifer is capable of sustaining moderate yields of up to several hundred gallons per minute to wells in some places. Two community water system wells, D19 and D45, were reported to pump 366 and 250 gal/min, respectively, and similar production could be expected at some other sites.

Pumping tests show that aquifers in the Natchez area exhibit a wide range in hydraulic characteristics; however, in preliminary planning average values can be used to make reasonable estimates of yields to wells and to approximate the effects of well interference. A graphical solution can be made by using figure 20 in conjunction with well spacing, pumping rate, and pumping duration.

The average hydraulic conductivity for the Miocene sand in the Natchez area is near the average of 94 ft/d (700 gpd/ft$^2$) as determined by Newcome (1971, p. 6 and 17). An aquifer that is 60 feet thick can have an estimated transmissivity of about 5,600 ft$^2$/d or 42,000 gpd/ft (hydraulic conductivity multiplied by aquifer thickness). The specific capacity of a 100 percent efficient well in the area can be estimated by dividing the transmissivity by a factor of 270 -- a modification of a method described by Newcome (1965).

A typical well in a 60-foot thick aquifer in the Natchez area could be expected, assuming about 80 percent efficiency, to have a specific capacity of about 17 (gal/min)/ft of pumping drawdown (94 (gal/d/ft$^2$ x 60 - 270 x .80 = 16.7). The pumping drawdown for 759 gal/min would be about 44 feet; however, a fully efficient well would have a drawdown of about 37 feet. The interference at 1,000 feet after 1 year would be about 21 feet (from figure 20 and using transmissivity of 5,300 ft$^2$/d for convenience, drawdown of 28 feet for 1,000 gal/min, corrected for 750 gal/min. After 20 years, the interference will increase to about 28 feet (fig. 21, drawdown of 37 feet, corrected for 750 gal/min).

Estimates for future pumping levels for a specific well can be made by adding the interference effects of other wells to the pumping drawdown in the subject well and including the additional effects of regional water-level declines. For example, three 750 gal/min wells spaced in a triangle that is 1,000 feet on each side will have a pumping level about 93 feet lower than the static level after 20 years continuous pumping (see fig. 20; 28 ft x 2 = 56 ft + 37 ft of pumping drawdown), assuming 100 percent efficiency.

Accurate projections for future pumping levels, interference effects, and water-level declines would require computer modeling.

## SUMMARY

Ground-water withdrawals from the Miocene aquifers in the Natchez area increased from about 6.4 Mgal/d in 1955 to about 8.4 Mgal/d in 1980 and declined slightly to 7.4 Mgal/d in 1982. Ground-water use from the Mississippi River alluvial aquifer reached a maximum of about 46 Mgal/d in 1955 and declined to about 38 Mgal/d in 1983.

Most of the water used from the Miocene aquifers in the Natchez area is produced from the 600-foot sand. One well in the 1,000-foot sand near the Devereaux Water Plant produced water that is colored and high in dissolved solids; however, the quality improves substantially to the north and east. The potential is excellent for increasing the production of ground water from the 600- and 1,000-foot sands to the north, east, and southeast of Natchez and from the Mississippi River alluvial aquifer north of the city. In addition to being capable of very large yields to wells, pumping lifts in the alluvial aquifer in the future will be significantly smaller than from the Miocene aquifers.

Although water levels in the 400- and 600-foot sands have declined nearly 100 feet since 1939, most of the declines had occurred by 1960. In the last 20 years only small declines have been observed.

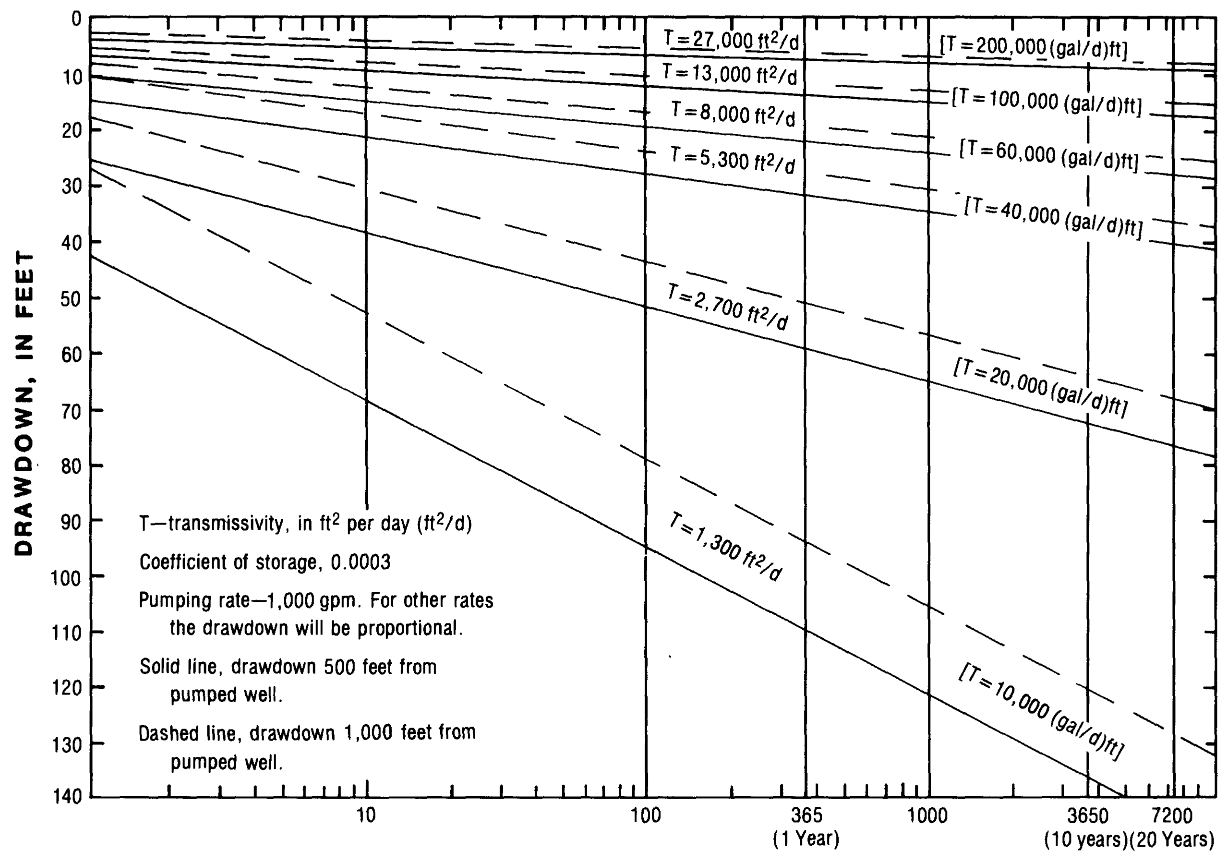



**Figure 21.—Theoretical time-distance relations for pumping from Miocene aquifers.**

Available data indicate that some increases in pumping withdrawals from the 600-foot sand in the city can be made and still maintain pumping levels within acceptable limits; however, large increases in pumping within the present cone of depression may result in excessive declines.

The water in the major aquifers is usable for most purposes. In freshwater aquifers the dissolved-solids concentration is less than 500 mg/L and hardness ranges from soft to very hard. The hardness of water in the shallow Natchez aquifer and in alluvial aquifers is consistently high, generally higher than in water from deeper Miocene aquifers. Iron and manganese concentrations are present in objectionable concentrations in several wells in all aquifers. Iron and manganese concentrations are generally lowest in the 1,000-foot sand. Visible color is lowest in water from shallow wells in the Mississippi River alluvial aquifer and the Natchez aquifer, and from wells in the Miocene aquifers east and northeast of Natchez. Mean silica concentrations are slightly lower in the Natchez aquifer than in the 400- and 600-foot sand aquifers.

## SELECTED REFERENCES


Bicker, A. R., Jr., 1969, Geologic map of Mississippi: Mississippi Geological Survey, map, 1 sheet.

Boswell, E. H., 1979, The Citronelle aquifers in Mississippi: U.S. Geological Survey Water Resources Investigations 78-131, map.

Callahan, J. A., Skelton, John, Everett, D. E., and Harvey, E. J., 1963, Water resources of Adams Claiborne, Jefferson, and Warren Counties, Mississippi: Mississippi Industrial and Technological Research Commission Bulletin 63-1, 48 p.

______1964, Available water for industry - Adams, Claiborne, Jefferson, and Warren Counties, Mississippi: Mississippi Industrial and Technological Research Commission 64-1, 45 p.

Childress, S. C., Bograd, Michael, and Marble, J. C., 1976, Geology and man in Adams County, Mississippi: Mississippi Geological, Economic, and Topographical Survey Environmental Geology Series No. 4, 188 p.

Gandl, L. A., 1982, Characterization of aquifers designated as potential drinking water sources in Mississippi: U.S. Geological Survey Water-Resources Investigations Open-File Report 81-550, 90 p.

Hem, John D., 1960, Restraints on dissolved ferrous iron imposed by bicarbonate redox potential, and pH: U.S. Geological Survey Water-Supply Paper 1459-B, 55 p.

______1963, Chemical equilibra and rates of manganese oxidation: U.S. Geological Survey Water-Supply Paper 1667-A, 64 p.

______1970, Study and interpretation of the chemical characteristics of natural water, second edition: U.S. Geological Survey Water-Supply Paper 1473, 393 p.

Lohman, S. W., 1972, Ground-water hydraulics: U.S. Geological Survey Professional Paper 708, 70 p.

Mississippi Water Resources Policy Commission, 1955, Water for the future in Mississippi: A report to the 1956 Mississippi Legislature, 55 p.

Newcome, Roy, Jr., 1965, Pumping tests, <u>in</u> Water-well symposium for professional engineers: Mississippi Society of Professional Engineers Proceedings (1969).

Newcome, Roy, Jr., 1971, Results of aquifer tests in Mississippi: Mississippi Board of Water Commissioners Bulletin 71-2, 44 p.

______1975, Results of aquifer tests in Mississippi: U.S. Geological Survey Water-Resources Investigations 46-75, map.

Stephenson, L. W., and others, 1928, Geologic map of Mississippi: U.S. Geological Survey

Stevens, Herbert H., Ficke, John F., and Smoot, George F., 1975, Water temperatures - influential factors, field measurements, and data presentation: Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 1, Chap. D1, 65p.

Stiff, H. A., Jr., 1951, Technical Note 84 - The interpretation of chemical analysis by means of patterns: Journal of Petroleum Technology, v. 3, no. 10, p. 15-16.

Swanson, Vernon E., and Palacas, James G., 1965, Humate in coastal sands of northwest Florida: U.S. Geological Survey Water-Supply Paper 1214-B, 29 p.

Taylor, R. E., Humphreys, C. P., Jr., and Shattles, D. E., 1968, Water for industrial development in Covington, Jefferson Davis, Lamar, Lawrence, Marion, and Walthall Counties, Mississippi: Mississippi Research and Development Center Bulletin, 114 p.

Turcan, A. N., Jr., and Meyer, R. R., 1962, Alluvial aquifer in northeastern Louisiana - a large source of water: U.S. Geological Survey Water-Supply Paper 1619-V, 28 p.

U.S. Department of Housing and Urban Development, 1977, Flood Insurance study, City of Natchez, Mississippi, Adams County: Federal Insurance Administration Flood Study, 14 p.

U.S. Environmental Protection Agency, 1976, Quality criteria for water: U.S. Environmental Protection Agency Report, 256 p.

Vestal, F. E., 1942, Adams County mineral resources: Mississippi State Geological Survey Bulletin 47, 200 p.