EFFECTS OF RECHARGE FROM DRAINAGE WELLS ON QUALITY OF WATER IN THE FLORIDAN AQUIFER IN THE ORLANDO AREA, CENTRAL FLORIDA

By George R. Schiner and Edward R. German

U.S. GEOLOGICAL SURVEY

Water Resources Investigations Report 82-4094

Prepared in cooperation with the

FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Tallahassee, Florida

1983

UNITED STATES DEPARTMENT OF THE INTERIOR

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GEOLOGICAL SURVEY

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ABBREVIATIONS AND CONVERSION FACTORS

Factors for converting inch-pound units to International System (SI) units and abbreviation of units are listed below:

Multiply	By	To obtain
	Length	
inch (in.)	25.40	millimeter (mm)
	2.540	centimeter (cm)
	0.0254	meter (m)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Volume	
gallon (gal)	3.785	liter (L)
million gallons (Mgal)	3785	cubic meter (m^3)
	Flow	
gallon per minute (gal/min)	0.06309	liter per second (L/s)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)
gallon per minute per foot [(gal/min)/ft]	0.01923	liter per second per meter [(L/s)/m]
	Transmissivity	
foot squared per day (ft^2/d)	0.09290	meter squared per day (m^2/d)

Equations for temperature conversion between degrees Celsius (°C) and degrees Fahrenheit (°F):

$$°C = 5/9\ (°F-32)$$
$$°F = (9/5°C) + 32$$

National Geodetic Vertical Datum of 1929 (NGVD of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called mean sea level. NGVD of 1929 is referred to as sea level in this report.

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ABSTRACT

The Floridan aquifer is used almost exclusively as the source of water supply in central Florida. Approximately 400 drainage wells in the Orlando area inject, by gravity, large quantities of storm runoff that may or may not be suitable for most purposes without treatment. This storm runoff is injected into the same freshwater zones of the Floridan tapped for public supply. Some wastewater is also injected. Regulatory and water-management agencies are concerned that the input from drainage wells could adversely affect the Floridan water quality. As many as half a million residents and 6.5 million annual tourists in the Orlando area could be affected by any deterioration of water quality.

Water injected by drainage wells is an important source of recharge to the Floridan aquifer. The wells bypass confining beds and probably allow more recharge to the Floridan than would occur under natural conditions. This recharge compensates for heavy withdrawals from the Floridan and helps maintain aquifer pressures that retard upward salt-water encroachment. At least 90 percent of the drainage wells inject into the upper producing zone (100- to 600-foot depth) of the Floridan. The median depth of 314 drainage wells is about 400 feet--the range is 120 to 1,049 feet. The wells are used mostly to control lake levels and to dispose of urban storm runoff. About 50 percent of the drainage wells are used to dispose of street and other impervious-area runoff, about 35 percent to regulate lake levels, and about 15 percent to dispose of cooling, air-conditioning, and other miscellaneous wastewaters. Water injected by drainage wells moves downgradient towards supply wells. The distance between a drainage and a supply well may be as small as several hundred feet. In addition, head difference allows water from drainage wells in the upper producing zone to move into the lower producing zone (1,100- to 1,500-foot depth) which is used for public-water supply. About 65 percent of all water pumped from the Floridan is from the lower producing zone.

Water samples from the Floridan aquifer were analyzed for selected major constituents, chemical and physical properties, nutrients, metals, and organic compounds to determine if water quality is affected by recharge through drainage wells. Sixty-five supply wells and 21 drainage wells mostly within a 16-mile radius of Orlando, were sampled between September 1977 to June 1979.

Most constituent concentrations were slightly higher in water from drainage wells than in water from supply wells; this indicates at least a localized effect on aquifer water quality due to drainage-well recharge. The most notable differences between the waters from the two types of wells were bacteria count and total nitrogen concentration. For drainage wells, median values for total nitrogen and bacteria count were 1.0 milligram per liter and 39 colonies per 100 milliliters, respectively; for supply wells, median values were 0.27 milligram per liter and 0 colonies per 100 milliliters. However, with the exception of bacteria, water from drainage wells would on the average, without treatment, meet the maximum contaminant standards established by the U.S. Environmental Protection Agency in 1975 and 1977 in the National Interim Primary and Proposed Secondary Drinking Water Regulations, and by the Rules of the Department of Environmental Regulation in the Florida Administrative Code of 1978.

The areal pattern of water-quality variations did not relate statistically to number of drainage wells in the vicinity of sampled supply wells. However, the high bacteria count in some drainage wells indicates a potential for contamination of supply wells by drainage-well recharge if a supply well and a drainage well are hydraulically connected.

INTRODUCTION

Background

The study area covers about 1,200 mi^2 in the city of Orlando and adjacent areas, but most drainage wells are found in a 300 mi^2 area (fig. 1). The study area includes western Orange County and southwestern Seminole County, between latitudes 28°22' and 28°48' north and longitudes 81°03' and 81°38' west.

Much of the topography of the Orlando area is characterized by numerous closed depressions, lakes (fig. 1), and a few natural streams. The area is poorly drained and under natural conditions lowland areas retain runoff water and lake levels rise after heavy rains. Periodic local flooding from rainstorms was a common but acceptable occurrence in the Orlando area as long as the pressures of land development were small. However, the tendency to develop on flood-prone areas increased and large amounts of wastewaters were generated as the Orlando area expanded and became more urbanized. Flooding and disposal of wastewaters thus became a problem. In the early 1900's it was found that drainage wells were a relatively inexpensive and efficient means of augmenting surface drainage. In addition they could be used for disposing of various types of wastewaters. By 1965 hundreds of wells had been installed. Their present (1981) use is mostly to prevent flooding by controlling lake levels and to dispose of storm runoff from urbanized areas. Most of the wells are owned and serviced by Orange County and the City of Orlando.

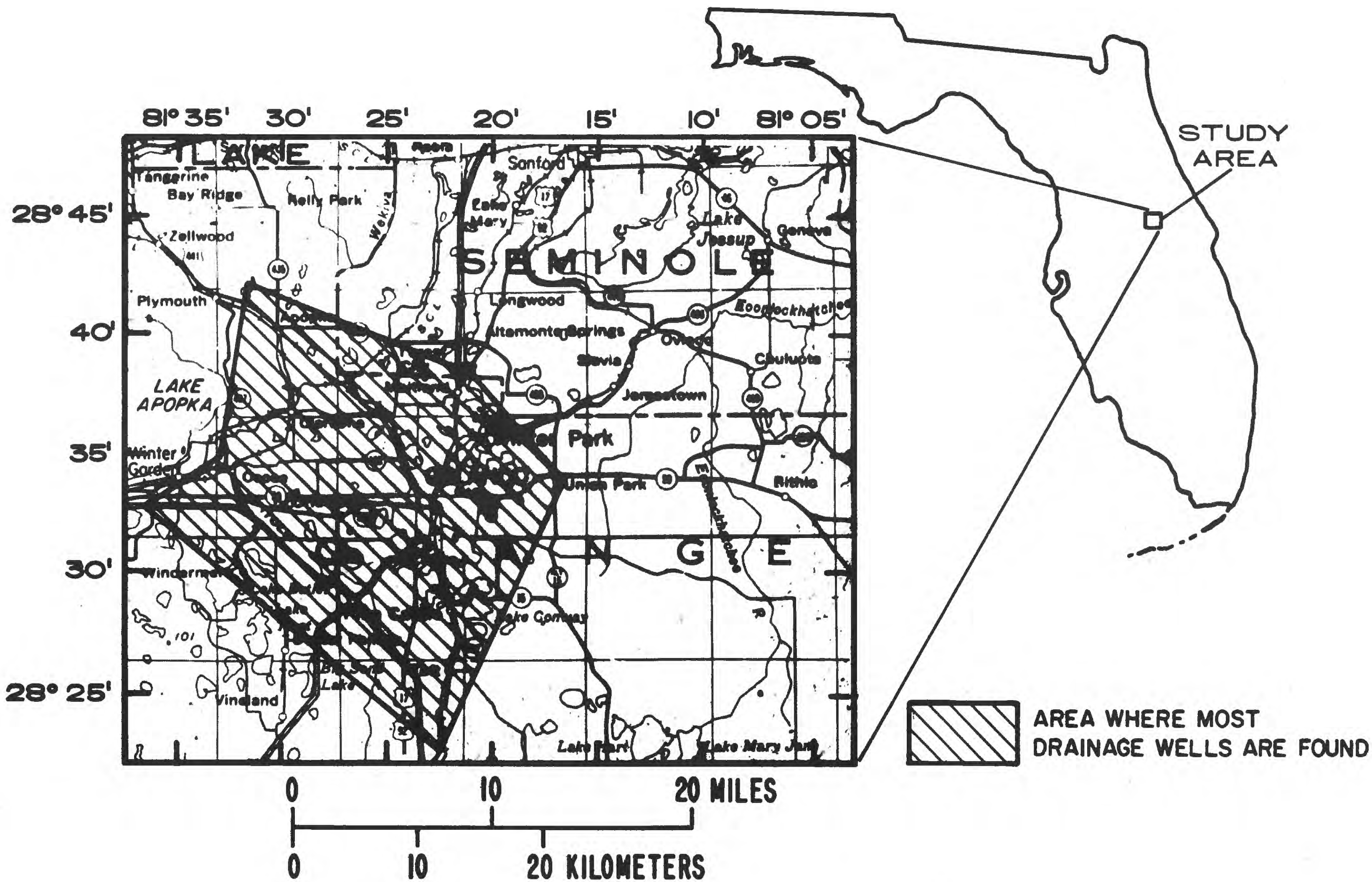


Figure 1.--Location of the study area.

Drainage wells inject surface water, by gravity, into the Floridan aquifer. This aquifer is the source of nearly all water supplies in central Florida. The Floridan readily accepts large quantities of storm runoff and some wastewater from drainage wells into the same water-bearing zones tapped by wells for rural, irrigation, and public supply. The water may or may not be suitable for most purposes without treatment. Drainage wells are in widespread use and many are within several hundred feet of public-supply wells. The drainage wells, therefore, pose a potential threat to the water quality of the Floridan aquifer and could cause serious health and economic problems. As many as half a million residents of the Orlando area and 6.5 million annual tourists could be affected by deterioration of water quality in the Floridan aquifer.

Purpose and Content

Although drainage wells pose a threat to water quality in the Floridan aquifer, little is known of the effects of drainage-well injections on the quality of water of the Floridan aquifer in the Orlando area. This report is the first of a two-part study suggested by Kimrey (1978, p. 21-25) to provide that information. The purpose of this report is to: (1) describe the general quality of ground water found in the injection zones (permeable strata that accept water) of drainage wells; (2) assess the impact of drainage wells on the water quality of supply wells, particularly public-supply; and (3) establish a data base necessary for future studies.

Interpretations in this report should have transfer value to other parts of Florida and other states where drainage wells are used to dispose of storm and wastewater by injection into carbonate aquifers.

Water from 21 drainage wells, 67 public-supply wells, and 4 observation wells was sampled and analyzed for an extensive number of constituents. Tables showing these analyses are accompanied by maps showing well locations. The water quality of drainage wells and supply wells is compared statistically. Tables present selected data on the physical and hydraulic characteristics of sampled drainage wells.

The study was made by the U.S. Geological Survey in cooperation with the Florida Department of Environmental Regulation.

Previous Studies

Only generalized information on drainage wells in the Orlando area is available from previous reports. The possibility of aquifer pollution by drainage wells was first recognized in reports by Sellards (1908) and Sellards and Gunter (1910). In 1933, Stringfield also reported on the pollution aspects of drainage wells in general terms. Reports by Unklesbay (1944), Telfair (1948), Parker and others (1955), Lichtler and others

(1968), Lichtler (1972), and Kimrey (1978), contain some quantitative and qualitative data on the quality of water and hydraulics of drainage wells. The geology and hydrology of the study area is described comprehensively in a report on the hydrology of Orange County by Lichtler and others (1968). The most comprehensive report is by Kimrey (1978), who traced the history of drainage wells in the Orlando area and suggested the general geohydrologic and environmental implications of using drainage wells.

Other sources of information on drainage wells are the annual data reports and computer files of the Geological Survey which contain long-term records of water levels and surface- and ground-water quality. Potentiometric-surface maps that cover large regions or counties have been released periodically since the 1930's. In addition, the Orange County Pollution Control Board, the City of Orlando, and the Florida Department of Environmental Regulation have reports and file data on water quality. The East-Central Florida Regional Planning Council has financed several reports by private consulting firms containing some information pertinent to drainage wells.

Well Numbering Systems

Two numbering systems are used to identify wells in this report. A 1-digit or 2-digit well number is used to identify wells and test holes in illustrations, text, and tables. A 15-digit number is used to identify wells in the U.S. Geological Survey data storage and retrieval systems.

The ground-water site identification (GWSI) system of the U.S. Geological Survey is used to store data on wells (ground-water stations). The system provides a unique number for each station. The number consists of 15 digits, formed from the latitude and longitude of the station location. The first 6 digits denote the degrees, minutes, and seconds of latitude; the next 7 digits denote degrees, minutes, and seconds of longitude; and the last 2 digits denote a sequential number for a station within a 1-second grid. Once assigned, a site identification number does not change even though the latitude and longitude may be revised later. The site identification number is used to identify a hydrologic station, and the data are stored in the National Water Data Storage and Retrieval (WATSTORE) System of the Geological Survey.

Acknowledgments

Information made available by well drillers, well owners, civil officials, and private citizens is greatly appreciated. Special acknowledgment is made to William Masi, Public Works Department of Orange County

and his predecessor William Fogel; Joel Johnson, Property Accounting Department of Orange County; Joseph Compton, Jr., City of Winter Park Director of Public Works; and Walter Lawson, Bureau Chief of Streets and Drainage, City of Orlando.

GEOLOGY

The Orlando area is underlain mostly by marine sedimentary rocks consisting of limestone, dolomite, shale, sand, and evaporite deposits that range in age from Eocene to Cretaceous. These sedimentary rocks are about 6,500 feet thick, and rest on a basement complex of crystalline rock. Unconsolidated post-Eocene deposits (mostly sand, sandy clay, and shell material) that average about 150 feet in thickness overlie the Eocene carbonate rocks that compose the Floridan aquifer. Only about the upper 1,500 to 2,000 feet of sediments contains freshwater. Descriptions and water-bearing properties of the geologic formations penetrated by wells in the Orlando area are given in table 1. An interpretation of the geology indicated by the gamma-ray log of the Lake Davis drainage well (see table 1) is shown in figure 2.

DESCRIPTION OF THE FLORIDAN AQUIFER

Geology and Water Occurrence

The Floridan is the most productive aquifer in central Florida. Presently (1981), in the Orlando area, all public supplies and most water used for domestic, industrial, and irrigation purposes are withdrawn from the Floridan aquifer. As defined by Parker and others (1955, p. 189), the Floridan in the report area includes parts or all of the middle Eocene (Avon Park and Lake City Limestones), upper Eocene (Ocala Limestone), and permeable parts of the Hawthorn Formation that are in hydrologic contact with the rest of the aquifer (table 1). The Floridan is about 2,000 feet thick (Lichtler and others, 1968, p. 91) and consists mostly of interbedded limestone, dolomitic limestone, and dolomite. The top of the Floridan ranges from less than 10 to about 300 feet below land surface.

The aquifer contains two highly transmissive cavernous zones of varying extent and vertical thickness separated by a relatively impermeable zone with few cavities. The upper producing zone extends from about 100 to 600 feet below land surface. The lower producing zone extends from about 1,100 to 1,500 feet or more below land surface. The cavities or caverns may occur throughout the several hundred-foot-thick intervals that comprise each zone, or may be concentrated at only a few locations within the zone. Caliper logs showing borehole diameter indicate that cavities are as much as 10 to 25 feet in depth. The occurrence of

Table 1.--Water-bearing characteristics and descripiton of the geologic units in Orange and Seminole Counties

[Modified from Lichtler and others, 1968]

Series	Formation name	Thickness (feet)	Description	Water-bearing characteristics	Aquifer
Holocene to Pliocene	Undifferentiated, may include Caloosahatchee Marl	0-200	Mostly quartz sand with varying amounts of clay and shell.	Varies widely in quantity and quality of water produced.	Surficial (Nonartesian).[1/]
Miocene	Hawthorn Formation	0-200	Gray-green, clayey, quartz sand and silt; phosphatic sand; and buff, impure, phosphatic limestone, mostly in lower part.	Generally impermeable except for limestone, shell, or gravel beds.	Intermediate (Shallow artesian).[1/] Lower limestone beds may be part of Floridan aquifer.
Eocene	Ocala Limestone	0-125	Cream to tan, fine, soft to medium hard, granular, porous, sometimes dolomitic limestone.	Moderately high transmissivity. Most wells also penetrate underlying formations.	Floridan.
	Avon Park Limestone	400-600	Upper section mostly cream to tan, granular, porous limestone. Lower section mostly dense, hard, brown, crystalline dolomite.	Overall transmissivity very high. Contains many interconnected solution cavities. Many large capacity wells draw water from this formation.	Floridan.
	Lake City Limestone	More than 700. Total unknown.	Dark brown crystalline layers of dolomite alternating with chalky fossiliferous layers of limestone.	Similar to Avon Park Limestone. Municipal supply of cities of Orlando and Winter Park obtained from this formation.	Floridan.

[1/] Terminology of Lichtler and others, 1968.

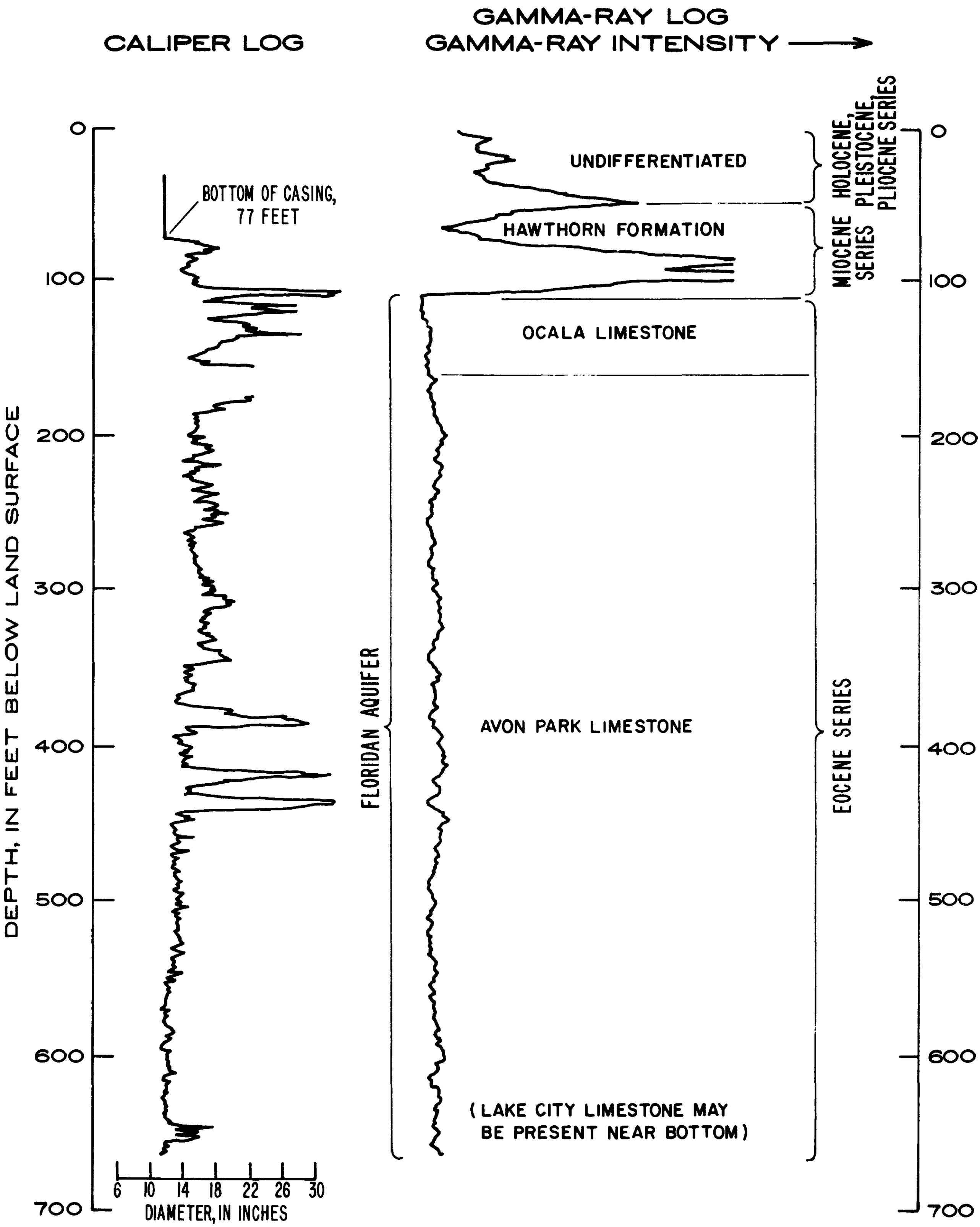


Figure 2.--Caliper and gamma-ray logs of the Lake Davis drainage well.

cavities in the upper producing zone is illustrated by the caliper log shown in figure 2 at depths of about 125 feet and 400 feet. The zone separating the two major producing zones (between 600 to 1,100 feet below the land surface) is generally a low yielding part of the aquifer; few wells are completed in that zone in the Orlando area.

Movement, Recharge, Discharge, and Yield

Ground-water storage and movement in the Floridan aquifer is complex and is related primarily to the interconnection and extent of intergranular openings, cavities, and solution channels. The producing zones, containing interconnected horizontal and vertical solution channels, are probably the major conduits for ground-water movement in the aquifer. Little is known about the distance that connected channels extend, but the range may be tens of feet to several miles. Aquifer tests indicate that interconnected openings may follow circuitous paths.

Head relations indicate a natural downward hydraulic gradient from the upper producing zone, through semiconfining beds, and into the lower producing zone (Lichtler and others, 1968, p. 95-99)--indicating that the upper producing zone may be recharging the lower producing zone in the Orlando area. The regional direction of ground-water flow in the upper producing zone is indicated by the potentiometric-surface map shown in figure 3. The flow, normal to the potentiometric contours, is generally northeast.

Natural recharge to the Floridan is almost entirely from rainfall that percolates through semiconfining beds in western Orange County and adjacent areas of Lake and Polk Counties. A large quantity of recharge is contributed locally by drainage wells. Some inflow to the Floridan in Orange County is by underground flow from southern Lake County and northern Osceola County.

Discharge from the Floridan aquifer is by: (1) subsurface outflow into northern Lake County, southern Seminole County, and western Brevard County; (2) upward leakage where the Floridan potentiometric surface stands higher than the water table; (3) pumpage from wells; and (4) spring discharge.

Fluctuations of the Floridan potentiometric surface occur in response to changes in rates of recharge and discharge both natural and artificial. Most natural fluctuations are the result of variations in rainfall. Artificial recharge from drainage wells can cause local highs on the potentiometric surface and pumping can cause local depressions. The potentiometric surface has fluctuated within a range of 25 feet in the study area since the early 1930's with little or no downward trend during periods of average rainfall.

Yields of wells in the Floridan aquifer may range considerably, but overall yields are high. The average transmissivity of the Floridan is reported to be about 2 million ft^2/d, but the lower producing zone may

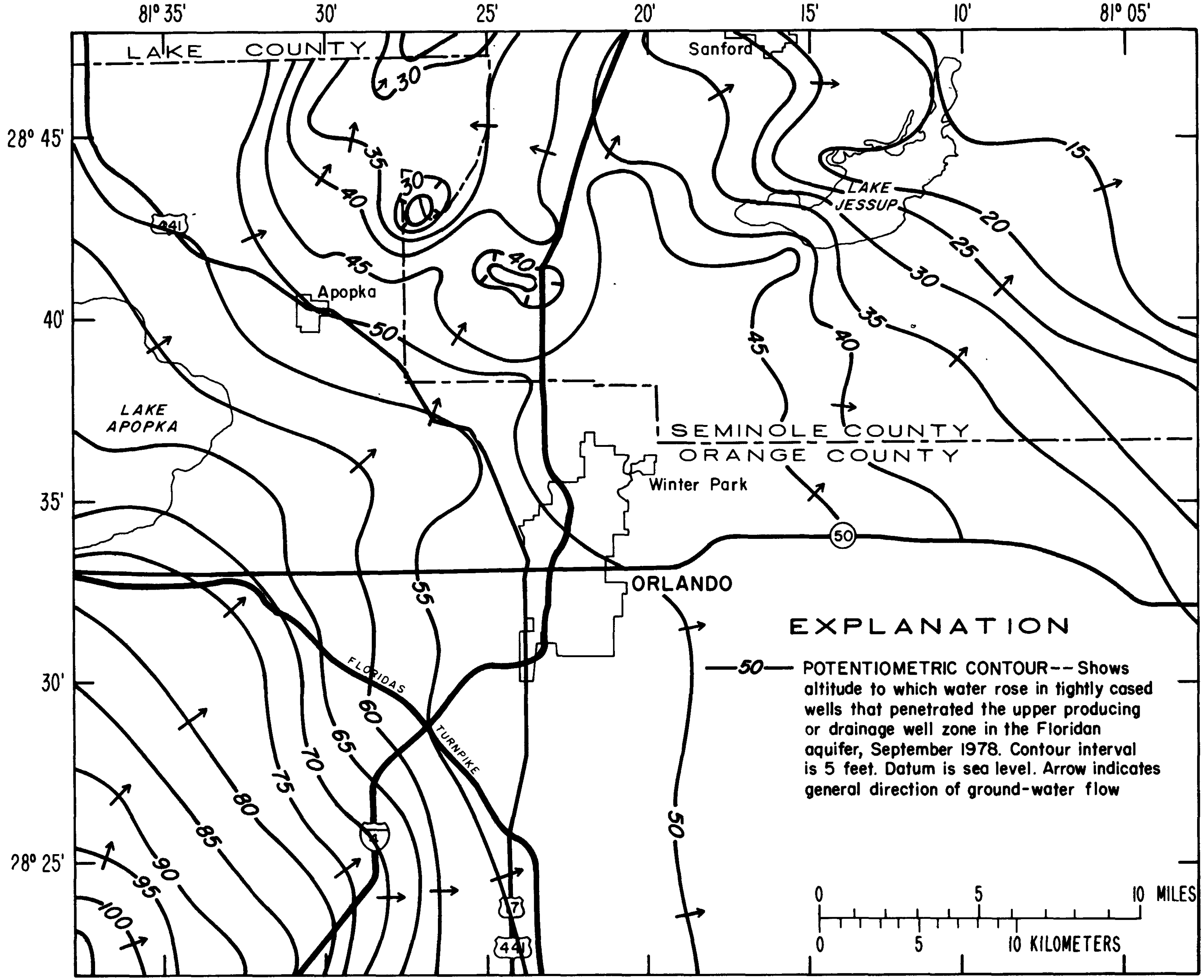


Figure 3.--Potentiometric surface of the upper producing zone of the Floridan aquifer, September 1978 (modified from Watkins and others, 1979).

Table 2.--Summary of data on depths of drainage wells and public-supply wells

Well type	Number of wells	Range of depth (feet)	Percent of wells in which indicated depth is exceeded				
			90	75	50	25	10
Drainage	314	120- 1,049	196	334	424	484	600
Public supply	1/ 186	94- 1,500	200	324	420	558	1,300

1/ Includes four non-public supply wells used to expand the statistical base for quality of water interpetations.

be as much as eight times more transmissive (4 million ft^2/d) than the upper producing zone (500,000 ft^2/d) (Lichtler and others, 1968, p. 138). Public supply wells that tap the lower zone are reported to generally yield 3,000 to 5,000 gal/min with 10 to 25 feet of drawdown (Lichtler and others, 1968, p. 95). Lichtler and others (1968, p. 95) report that yields of 4,000 gal/min or more can be obtained from wells that tap the upper producing zone. Most domestic wells and small public-supply wells tap the upper producing zone. Table 2 shows that about 75 percent of 182 public-supply wells are finished in the upper producing zone (100- to 600-foot depth). The larger water users, however, (such as the cities of Orlando and Winter Park) prefer to tap the lower producing zone. About 65 percent of all water pumped from the Floridan for all uses is from the lower producing zone.

DESCRIPTION OF DRAINAGE WELLS

General

Records of 392 drainage wells in the Orlando area are stored in the Geological Survey computer files. (See fig. 4 for locations.) The records represent most but not necessarily all the wells drilled since the first well was drilled in 1904. Many of the wells that were drilled are probably still in service (1981). Drainage wells mostly operate during the wet season (June through September), but some wells receive water constantly while others have not received water for a decade or longer. Most wells that dispose of street and impervious area runoff receive water from every rainfall. About 50 percent of the drainage wells are used to dispose of street and other impervious area runoff (usually in urbanized areas), 35 percent to regulate lake levels, and 15 percent to dispose of cooling, air-conditioning, and other miscellaneous wastewaters.

Records indicate that drainage wells have a wide range of completion depths--the median depth of drainage wells is about 400 feet (table 2). Reported depths of wells are often more than measured depths because the waters that enter a drainage well commonly carry debris which collects at the bottom of the well bore and may eventually fill the well. (See table 3.) Some wells are reported to have been completely filled by debris and sand. Many wells must be cleaned out periodically to maintain their effectiveness.

Well casings generally extend only to the first hard limestone formation penetrated, usually less than about 200 feet in depth. Therefore, the bottom part of a drainage well (commonly about 200 feet) is frequently "open-hole" or uncased. Casing diameters range from 4 to 26 inches. Sixty-three percent of the drainage wells that have casing records (376 wells) are 12 inches or larger in diameter. Forty-three percent are 12 inches in diameter. Casings are usually made of steel or black iron.

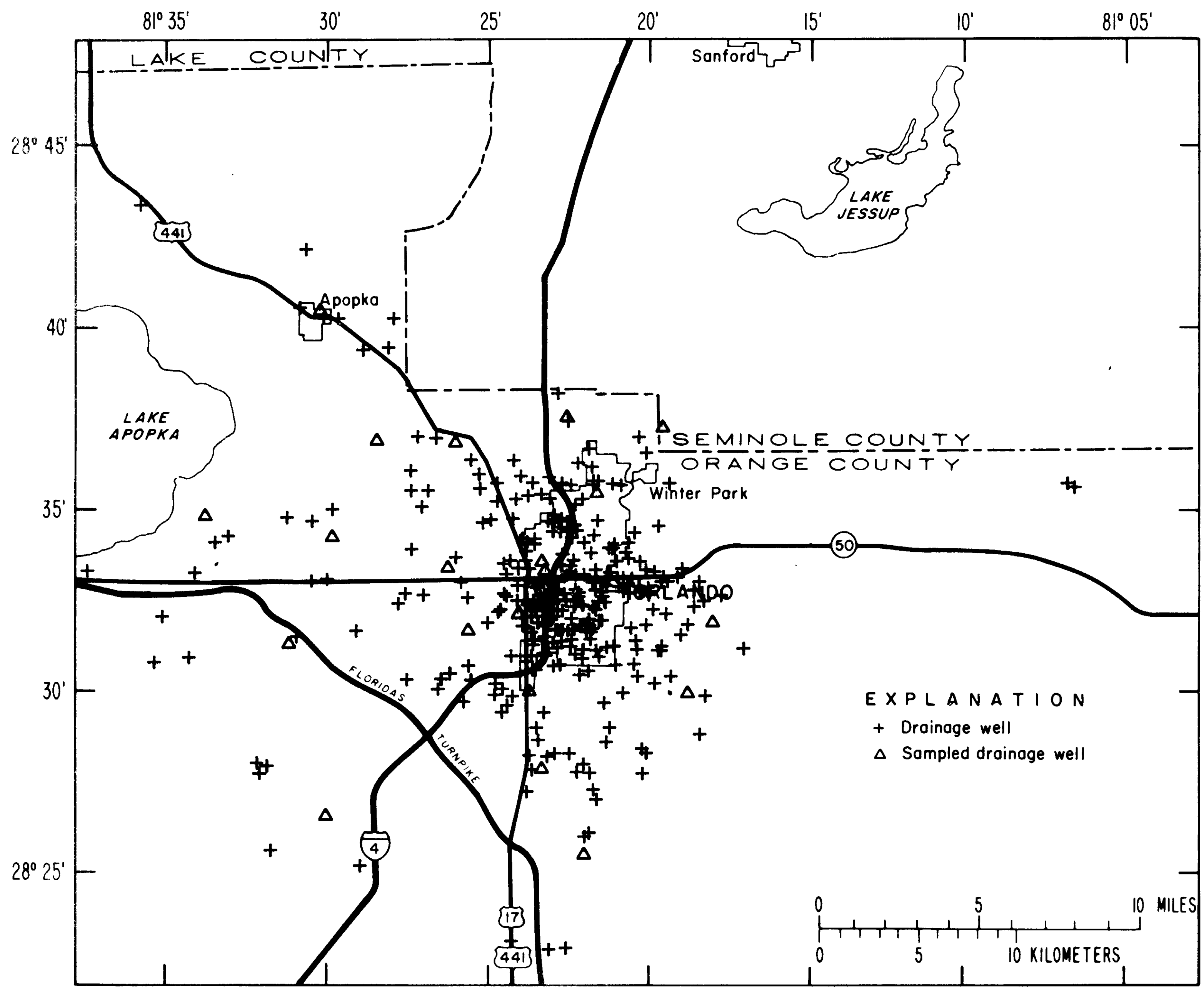


Figure 4.--Location of drainage wells in the Orlando area.

Table 3.--Selected data on drainage wells sampled during 1978-79

Well No.	Site identification No.	Well name	Depth: Reported (feet)	Depth: Measured (feet)	Casing: Depth (feet)	Casing: Diameter (inches)	Base of major yielding zone (feet below land surface)	Pumping rate (gal/min)	Specific capacity [(gal/min)/ft)]
4	282534081220601	Taft	455	455	202	12	450	350	290
7	282636081300801	Dr. Phillips	356	364	116	12	135	380	100
13	282753081232501	Lancaster Rd.	457	143	95	12	140	340	250
16	283001081185301	Lake Barber	422	345	149	12	320	240	510
17	283002081234701	Lake Holden	600	133	110	18	130	[1] 400	330
26	283121081311601	Lake Olivia	402	498	344	12	360	360	100
29	283144081254201	Lake Mann	398	400	137	16	145	370	130
30	283154081220701	Lake Davis	346	668	77	12	110	450	490
31	283157081180401	Englewood Sub.	---	465	128	18	450	[2] 410	[3] 1,900
33	283211081241001	City Yard	351	150	76	12	---	400	910
36	283321081231801	Lake Concord	350	471	288	20	290	360	460
37	283326081262101	Lake Lawne	329	109	84	18	90	[4] 390	1,000
41	283337081232301	Lake Adair	500+	228	142	18	220	410	220
48	283416081295901	Lake Florence	450	454	194	16	360,420	460	210
49	283449081335601	Crown Point Rd.	---	147	94	8	---	310	27
50	283530081214301	Lake Midget	425	372	170	12	370	420	330
56	283654081260801	Lockhart	450	365	[3] 250	18	---	360	170
57	283655081283401	Long Lake	387	301	144	20	150	450	200
64	283717081194202	Lakemont St.	---	290	85	12	170,240	[5] 410	800
66	283735081224001	Lake Sybelia	388	371	105	12	235	430	440
77	284032081302401	Apopka 2nd St.	600	315	94	12	150	[6] 170	---

[1] Inflow during pumping was 1 gal/min.
[2] Inflow during pumping was 2 gal/min.
[3] Reported.
[4] Inflow during pumping was 0.5 gal/min.
[5] Inflow during pumping was 8 gal/min.
[6] Inflow during pumping was 10 gal/min.

Hydraulic Characteristics

Drainage wells have the same hydraulic characteristics as supply wells, except that they inject water by gravity into an aquifer rather than withdraw water by pumping. Acceptance rates (volume of water an aquifer can receive per unit time, usually in gallons per minute) of drainage wells are related to the transmissivity and storage coefficient of the receiving aquifer, the head imposed by the water in the drainage well on the aquifer, and by the pipe hydraulics of the well. Little quantitative data are available on acceptance rates, but the range is reported as a few hundred to several thousand gallons per minute (Kimrey, 1978, p. 13). Stringfield (1933, p. 22) reported an acceptance rate of 9,500 gal/min for a well in west Orlando. The Lake Adair drainage well (table 3) was observed accepting an estimated 3,400 gal/min on July 17, 1979. Prior rainfall from July 6-17 was about 6 inches.

Data suggest that the high transmissivities of the Floridan aquifer will allow as much water to be accepted by gravity injection as the pipe hydraulics of a well will allow. Using the general orifice formula (Brater, 1962, sec. 4, p. 34-35) that discharge is a function of orifice area and the square root of the head differential (or loss), table 4 was developed showing approximate theoretical maximum acceptance rates, in gallons per minute, for wells of various diameters and heads. Actual acceptance rates may differ considerably from the theoretical rates shown because of the many qualifying conditions that may exist at individual wells. But the few field data available suggest a similar observed and theoretical acceptance rate for wells of the same diameter. For example, the estimated inflow of 3,400 gal/min into the Lake Adair drainage well (18-inch diameter) based on field measurements, roughly agreed with the theoretical acceptance rate of 3,300 gal/min for an 18-inch diameter well. A head of 0.75 feet above the orifice is consistent with the field observations.

Drainage wells are an important source of recharge to the Floridan aquifer. The wells hydraulically bypass confining beds and probably allow more recharge to the Floridan than would occur under natural conditions. This additional recharge probably compensates for some of the heavy withdrawals from the Floridan aquifer and helps maintain aquifer pressures that retard upward saltwater encroachment (Kimrey, 1978, p. 21). Kimrey (1978, p. 15) reports that the estimated recharge (50 Mgal/d) by drainage wells was approximately equal to ground-water withdrawals in the Orlando area, because no appreciable cone of depression has formed due to the withdrawals. The balance of recharge and discharge probably still (1981) exists for the most part though withdrawals have increased. It is possible that much of the estimated 1980 withdrawal rate of about 85 Mgal/d in the report area is balanced by recharge from drainage wells. Lichtler and others (1968, p. 113) estimated that recharge was about 210 Mgal/d in Orange County. Therefore, about 40 percent of the total recharge in the county may be from drainage wells. The recharge-discharge relation could become severely unbalanced during a period of drought.

Table 4.--Maximum theoretical acceptance rates of wells

Diameter (inches)	Acceptance Rate (gal/min) Head (feet) 0.10	0.25	0.50	0.75	1.0	1.5	2.0
6	140	210	300	370	420	520	600
8	240	390	540	660	760	940	1,100
10	370	590	830	1,000	1,200	1,400	1,700
12	540	850	1,200	1,500	1,700	2,100	2,400
14	740	1,200	1,600	2,000	2,300	2,900	3,300
16	950	1,500	2,100	2,600	3,000	3,700	4,300
18	1,200	1,900	2,700	3,300	3,800	4,700	5,400
20	1,500	2,300	3,300	4,000	4,700	5,700	6,600
24	2,200	3,400	4,800	5,900	6,800	8,300	9,600
26	2,500	4,000	5,700	7,000	8,000	9,800	11,300

At least 90 percent of the drainage wells inject water into the upper producing zone (table 2). Fluid-velocity logs run during aquifer tests indicate that considerable water injected by drainage wells probably enters the first cavernous zone penetrated by the well below the bottom of the casing (usually about 10 to 50 feet below the casing) though additional cavities occur at greater depths. (See table 3 and figure 2.)

WATER QUALITY OF DRAINAGE WELLS AND SUPPLY WELLS

Scope of Data Collection

Samples of water from the Floridan aquifer in the Orlando area were analyzed for a wide variety of chemical constituents and physical properties. Drainage and supply wells were selected for sampling to provide areal coverage in the study area and to test proximity relations between wells. Some supply wells were sampled because they were relatively close (within several thousand feet) to one or a cluster of drainage wells that were hydraulically upgradient. Also, drainage wells that had not received water for several years or more were sampled to obtain data on possible residual effects of injections. The accessibility of wells for geophysical logging and for pumping was an important selection criteria.

Nearly all the water-quality data were obtained since September 1977, when a reconnaissance of public supply-water quality was made to provide background water-quality data for the drainage-well study. Analyses from a continuing program of water quality sampling of public supplies were also used. Data from four observation wells in the upper producing zone sampled during other investigations are included in statistical summaries of supply wells. Ninety-two Floridan aquifer wells (86 in the study area) were sampled for water quality. Their locations are listed in tables 5 and 11 and most are shown in figure 5. Selected physical information on the wells are given in tables 5 and 11 and selected data on quality of water for these are listed in the supplementary data section of this report.

Sampling Methods

Water-quality sampling techniques should be used that provide data representative of aquifer water. An important consideration in sampling wells is to insure that only native aquifer water is sampled. For this reason, drainage wells were pumped for at least 2 hours at rates between 170 and 450 gal/min prior to sampling to evacuate all water in the casing and to clear the well of sediment. Supply wells were equipped with pumps that ran at least 2 hours prior to sampling. During the 2-hour pumping period, the specific conductance of the discharge water stabilized to a constant value. It was sometimes necessary to dam surface inflow to a well prior to pumping. In five wells inflows ranging from less than 1 to 10 gal/min continued during the pumping period. (Inflow rates and well identifications are given in table 3.) The procedure used to sample drainage wells was:

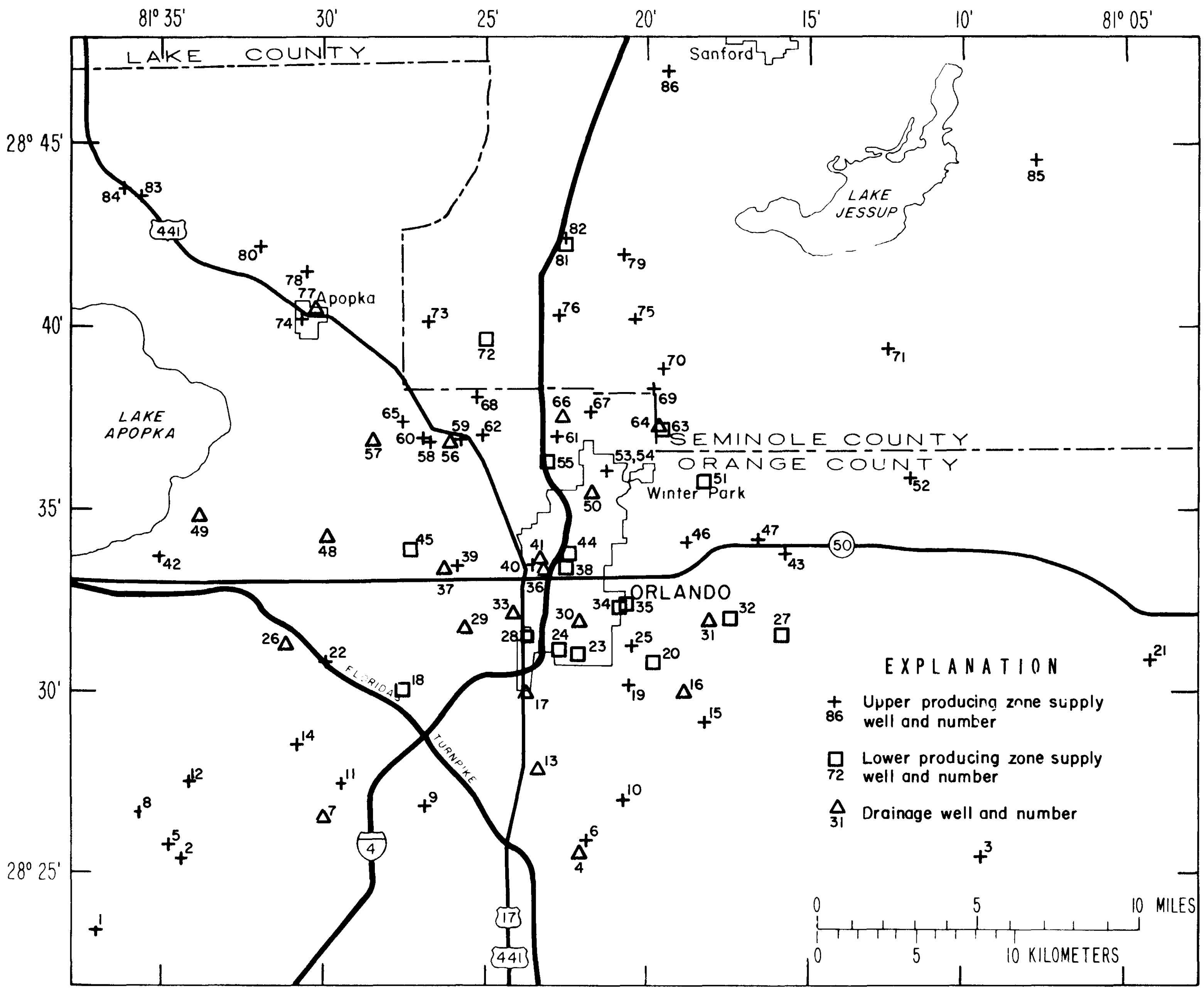


Figure 5.--Locations of drainage wells and supply wells sampled for water quality.

TABLE 5.--SELECTED INFORMATION ON SAMPLED WELLS

MAP NO.	STATION NO.	LAT-ITUDE	LONG-ITUDE	DEPTH OF WELL (FT)	DEPTH OF CASING (FT)	CASING DIAM-ETER (IN)	NAME OF OWNER
1	282331081370801	282331	0813708	166	68	4	U S GEOLOGICAL SURVEY
2	282529081343001	282529	0813430	700	181	24	REEDY CREEK IMPROVEMENT DISTRICT
3	282530081094001	282530	0810940	600	252	12	CITY OF COCOA
4	282534081220601	282534	0812206	455	202	12	ORANGE COUNTY
5	282552081345301	282552	0813453	---	---	--	REEDY CREEK IMPROVEMENT DISTRICT
6	282558081215401	282558	0812154	572	455	8	TAFT WATER ASSOCIATION
7	282636081300801	282636	0813008	364	116	12	MINUTE MAID CO
8	282647081354801	282647	0813648	135	90	4	U S GEOLOGICAL SURVEY
9	282654081265701	282654	0812657	409	227	28	ORLANDO UTILITIES COMM
10	282705081204601	282705	0812046	404	198	8	SOUTHERN STATES UTILITIES
11	282732081293001	282732	0812930	420	201	20	DR PHILLIPS INC
12	282738081341401	282738	0813414	178	103	4	U S GEOLOGICAL SURVEY
13	282753081232501	282753	0812325	143	95	12	ORANGE COUNTY
14	282835081305201	282839	0813026	235	161	4	U S GEOLOGICAL SURVEY
15	282912081181501	282912	0811815	427	149	12	ORANGE COUNTY
16	283001081185301	283001	0811853	345	149	12	ORANGE COUNTY
17	283002081234701	283002	0812347	133	110	18	ORANGE COUNTY
18	283006081273701	283006	0812737	1346	1045	16	ORLANDO UTILITIES COMM
19	283013081203401	283013	0812034	345	148	8	ORANGE COUNTY
20	283051081195101	283051	0811951	1338	1060	16	ORLANDO UTILITIES COMM
21	283054081042601	283054	0810426	365	254	6	ECON UTILITIES CORP
22	283054081295901	283054	0812959	458	206	8	FLORIDA TURNPIKE COMM
23	283103081221101	283103	0812211	1215	1058	36	ORLANDO UTILITIES COMM
24	283111081224201	283111	0812242	1330	1135	30	ORLANDO UTILITIES COMM
25	283121081202901	283121	0812029	260	---	6	ORANGE COUNTY
26	283121081311601	283121	0813116	498	344	12	ORANGE COUNTY
27	283135081155201	283135	0811552	1300	1000	20	ORANGE COUNTY
28	283135081234301	283135	0812321	1232	1170	10	LAYNE-ATLANTIC
29	283144081254201	283144	0812542	400	137	16	ORANGE COUNTY
30	283154081220701	283154	0812207	668	77	12	CITY OF ORLANDO
31	283157081180401	283154	0811849	465	128	18	CITY OF ORLANDO
32	283202081172501	283202	0811725	1250	1100	10	ORANGE COUNTY
33	283211081241001	283211	0812410	150	76	12	CITY OF ORLANDO
34	283225081205101	283225	0812051	1247	1063	26	ORLANDO UTILITIES COMM
35	283228081204201	283228	0812042	1240	1053	30	ORLANDO UTILITIES COMM
36	283321081231801	283321	0812318	471	288	20	CITY OF ORLANDO
37	283326081262101	283326	0812621	109	84	18	CITY OF ORLANDO
38	283327081223201	283327	0812232	1415	943	28	ORLANDO UTILITIES COMM
39	283331081255701	283331	0812557	525	447	10	SOUTHERN STATES UTILITIES
40	283333081233502	283333	0812335	400	105	4	U S GEOLOGICAL SURVEY
41	283337081232301	283337	0812323	228	142	18	CITY OF ORLANDO
42	283348081351201	283348	0813512	770	225	16	CITY OF WINTER GARDEN
43	283350081154301	283350	0811543	370	196	6	ORANGE COUNTY
44	283353081222401	283353	0812224	1445	945	28	ORLANDO UTILITIES COMM
45	283357081272201	283357	0812722	1414	1000	16	ORLANDO UTILITIES COMM

TABLE 5.--SELECTED INFORMATION ON SAMPLED WELLS--CONTINUED

MAP NO.	STATION NO.	LAT-ITUDE	LONG-ITUDE	DEPTH OF WELL (FT)	DEPTH OF CASING (FT)	CASING DIAM-ETER (IN)	NAME OF OWNER
46	283408081184801	283408	0811848	475	225	10	SOUTHERN STATES UTILITIES
47	283412081163401	283412	0811634	292	210	6	ORANGE COUNTY
48	283416081295901	283416	0812959	454	194	16	ORANGE COUNTY
49	283449081335601	283449	0813356	147	94	8	ORANGE COUNTY
50	283530081214301	283530	0812153	372	170	12	CITY OF WINTER PARK
51	283548081181401	283548	0811814	1354	700	20	GENERAL WATERWORKS CORP
52	283555081115201	283555	0811152	400	134	12	UNIVERSITY OF CENTRAL FLORIDA
53	283607081211301	283607	0812113	451	81	12	GENERAL WATERWORKS CORP
54	283608081211601	283608	0812116	460	271	16	GENERAL WATERWORKS CORP
55	283623081230501	283623	0812305	1275	1163	16	GENERAL WATERWORKS CORP
56	283654081260801	283654	0812608	365	250	18	ORANGE COUNTY
57	283655081283401	283655	0812834	301	144	20	ORANGE COUNTY
58	283656081264501	283656	0812645	200	---	6	SOUTHERN STATES UTILITIES
59	283658081254801	283658	0812548	302	97	--	SOUTHERN STATES UTILITIES
60	283702081265801	283702	0812658	232	123	12	SOUTHERN STATES UTILITIES
61	283703081225001	283703	0812250	371	---	--	CITY OF EATONVILLE
62	283707081250901	283707	0812509	363	128	8	SOUTHERN STATES UTILITIES
63	283717081193101	283717	0811931	1315	1148	20	CITY OF CASSELBERRY
64	283717081194202	283717	0811942	290	85	12	SEMINOLE COUNTY
65	283729081273701	283729	0812737	400	126	6	SOUTHERN STATES UTILITIES
66	283735081224001	283735	0812240	371	105	12	ORANGE COUNTY
67	283743081214501	283743	0812145	390	157	8	CITY OF MAITLAND
68	283809081251802	283809	0812518	571	233	8	ORANGE COUNTY
69	283823081195001	283823	0811950	380	---	8	SEMINOLE COUNTY
70	283855081192801	283855	0811928	439	295	12	CITY OF CASSELBERRY
71	283925081123301	283925	0811233	263	148	12	CITY OF OVIEDO
72	283943081250201	283943	0812502	1122	508	20	HI-ACRES CONCENTRATE INC
73	284014081264901	284014	0812649	453	130	8	FLORIDA LIVING NURSING CENTER INC
74	284014081304601	284014	0813046	463	201	6	CITY OF APOPKA
75	284017081202401	284017	0812024	265	---	8	CITY OF CASSELBERRY
76	284020081224501	284020	0812245	382	154	12	ALTAMONTE SPRINGS
77	284032081302401	284032	0813024	315	94	12	CITY OF APOPKA
78	284134081303801	284134	0813038	705	178	12	CITY OF APOPKA
79	284202081204401	284202	0812044	390	68	10	CITY OF LONGWOOD
80	284217081320201	284217	0813202	435	106	12	CITY OF APOPKA
81	284221081223401	284221	0812234	925	466	10	SANLANDO UTILITIES CORP
82	284227081223501	284227	0812235	625	100	12	SANLANDO UTILITIES CORP
83	284337081354601	284337	0813546	384	312	6	GARDNER MC GRAW
84	284352081361701	284352	0813617	170	93	8	ZELLWOOD WATER USERS
85	284437081075601	284437	0810756	202	100	8	MULLET LAKE WATER ASSOC
86	284705081192001	284705	0811920	350	115	12	CITY OF SANFORD

1. Geophysical logs were run prior to sampling, primarily to identify water-yielding zones for point sampling.

2. Sample bottles were filled from the pump discharge and treated to preserve sample integrity. Concurrently, field measurements of specific conductance, pH, and temperature were made.

3. After pumping, a second set of samples from five drainage wells were taken opposite a large cavity with a point sampler.

The sample taken from the pump discharge is assumed to represent a composite of water from all producing zones penetrated by the well. The purpose of the second set of samples (procedure 3) was to determine the water quality of a particular zone.

Sample Preservation and Analytical Methods

Water samples were processed at the time of collection using standard Geological Survey procedures. Samples for dissolved constituents were filtered through a 0.45-micron membrane filter, samples for metals were acidified with nitric acid, and samples for nutrients and organic compounds were packed in ice. Bacteria samples were transported to the Orlando office of the Geological Survey within 6 hours after collection and prepared for counts using membrane-filter techniques (Greeson and others, 1977). Samples for nutrient analyses were shipped on ice and analyzed by the Survey Water-Quality Service Unit in Ocala, Fla. All other samples were analyzed by the Geological Survey Water Quality Laboratory in Doraville, Ga. The analytical procedures used are described in Goerlitz and Brown (1972), Fishman and Brown (1976), and Skougstad and others (1979).

Description of the Water Quality

Most of the data interpretation is based on comparisons of well types, drainage or supply. For purposes of interpretation, the well types were categorized into five groups, as follows:

1. Drainage wells that receive lake overflow.

2. Drainage wells that receive street runoff.

3. Supply wells that tap the upper producing zone and are located near drainage wells.

4. Supply wells that tap the lower producing zone and are located near drainage wells.

5. Supply wells that tap the upper producing zone near the study area that probably are not affected by drainage wells.

Some supply wells were sampled more than once. Data from these wells were averaged. The samples from drainage wells taken from the pump discharge are used to characterize the drainage well groups and subgroups; the additional point samples taken at five wells are used only to compare pumped and point sampling.

Major Dissolved Constituents and Properties

A statistical summary of data on the major dissolved constituents and physical properties found in samples from drainage wells and supply wells is given in table 6. The cations are calcium, magnesium, sodium, and potassium, and the major anions are chloride, sulfate, and bicarbonate, typical of a limestone aquifer. Dissolved solids concentrations in the samples from a total of 82 drainage wells and supply wells ranged from 95 mg/L (milligrams per liter) to 476 mg/L. Ninety percent of water samples from these wells had dissolved solids concentrations that ranged from 112 to 255 mg/L.

Figure 6 shows the general chemical type of water from drainage wells and supply wells in the upper and lower producing zones. Water from drainage wells and supply wells in the upper producing zone are very similar in both their chemical type and variations. Though the water is basically a calcium and magnesium bicarbonate type, several wells have more than 25 percent of the anionic composition as sulfate + chloride and more than 15 percent of the cationic composition as sodium + potassium.

In contrast, water from supply wells in the lower producing zone (also a calcium and magnesium bicarbonate type) varies little within its chemical type. The small variation in water quality of the deep wells may be because of the more isolated position of the lower producing zone from local influences. Or, this small variation may be due, at least in part, to the relatively small area covered for deep well sampling. Most of the wells in the lower producing zone that were sampled are within 6 miles of the intersection of I-4 (Interstate Highway 4) and State Highway 50, whereas the sampled drainage wells and supply wells in the upper producing zone are scattered within a 16-mile radius of the I-4 intersection.

Temperature, pH, color, turbidity, and COD (chemical oxygen demand of water) from drainage wells and supply wells are listed in table 6. The data show that with the possible exception of color and COD, there is little difference between water from drainage wells and water from supply wells. Color was virtually absent in most supply wells (a median value of 0 platinum cobalt units for the group). In contrast, color was found in most of the drainage-well samples (a median value of 8 units for the group). Corresponding to the pattern of higher color in drainage wells was a higher median COD (9 mg/L for drainage wells, and 4 mg/L for supply wells). The higher color and COD of drainage-well samples are probably due to the presence of organic materials.

Table 6.--Statistical summary of data on major dissolved constituents and physical properties for drainage wells and supply wells

[Dissolved concentrations in milligrams per liter, except as indicated. Multiple analyses for a well are averaged. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter	Group[1/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Specific conductance (µmho/cm at 25°C)	DR	21	323	330	400	395	241	235
	SP	64	287	266	694	565	176	171
Dissolved solids, residue	DR	21	184	190	241	234	130	109
	SP	61	170	160	476	386	100	95
Temperature (°C)	DR	21	23.8	23.5	25.5	25.0	23.0	23.0
	SP	62	24.0	24.0	26.0	25.0	22.5	20.0
Silica (Si)	DR	21	7.4	6.6	17	13	1.3	1.1
	SP	61	11	10	33	22	5.7	5.2
Calcium (Ca)	DR	21	41	45	59	52	29	23
	SP	65	39	36	100	86	25	25
Magnesium (Mg)	DR	26	7.8	7.6	14	13	4.4	4.0
	SP	65	8.3	8.0	15	15	4.7	2.8
Sodium (Na)	DR	21	8.8	8.5	16	15	5.0	4.0
	SP	65	7.6	6.4	34	33	2.9	2.8
Potassium (K)	DR	21	2.1	1.8	6.2	5.1	.9	.7
	SP	65	1.1	1.0	5.4	3.7	.4	.1
Bicarbonate (HCO_3)	DR	21	188	172	460	435	93	71
	SP	59	145	138	301	260	100	91

1/ Group: DR, drainage well; SP, supply well.

Table 6.--Statistical summary of data on major dissolved constituents and physical properties for drainage wells and supply wells--Continued

[Dissolved concentrations in milligrams per liter, except as indicated. Multiple analyses for a well are averaged. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter	Group[1]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Carbonate (CO_3)	DR	21	0	0	0	0	0	0
	SP	63	0	0	0	0	0	0
Sulfate (SO_4)	DR	21	18	13	47	39	2.2	1.7
	SP	65	10	5.4	109	41	.6	.5
Chloride (Cl)	DR	21	14	15	22	19	7.4	4.9
	SP	65	12	9.6	60	42	4.3	4.0
Fluoride (F)	DR	21	.2	.1	.4	.2	.1	.0
	SP	61	.2	.2	.5	.4	.1	.1
pH (units)	DR	21	7.2	7.3	7.5	7.5	7.0	6.9
	SP	63	7.6	7.6	8.2	8.1	7.0	6.6
Color (Platinum-cobalt units)	DR	20	11	8	80	20	5	0
	SP	61	2	0	20	15	2	0
Turbidity (Nephelometric units)	DR	21	3	2	16	7	1	0
	SP	6	7	1	36	2	1	1
Chemical oxygen demand	DR	20	14	9	60	50	1	0
	SP	52	6	4	40	40	1	0

[1]Group: DR, drainage well; SP, supply well.

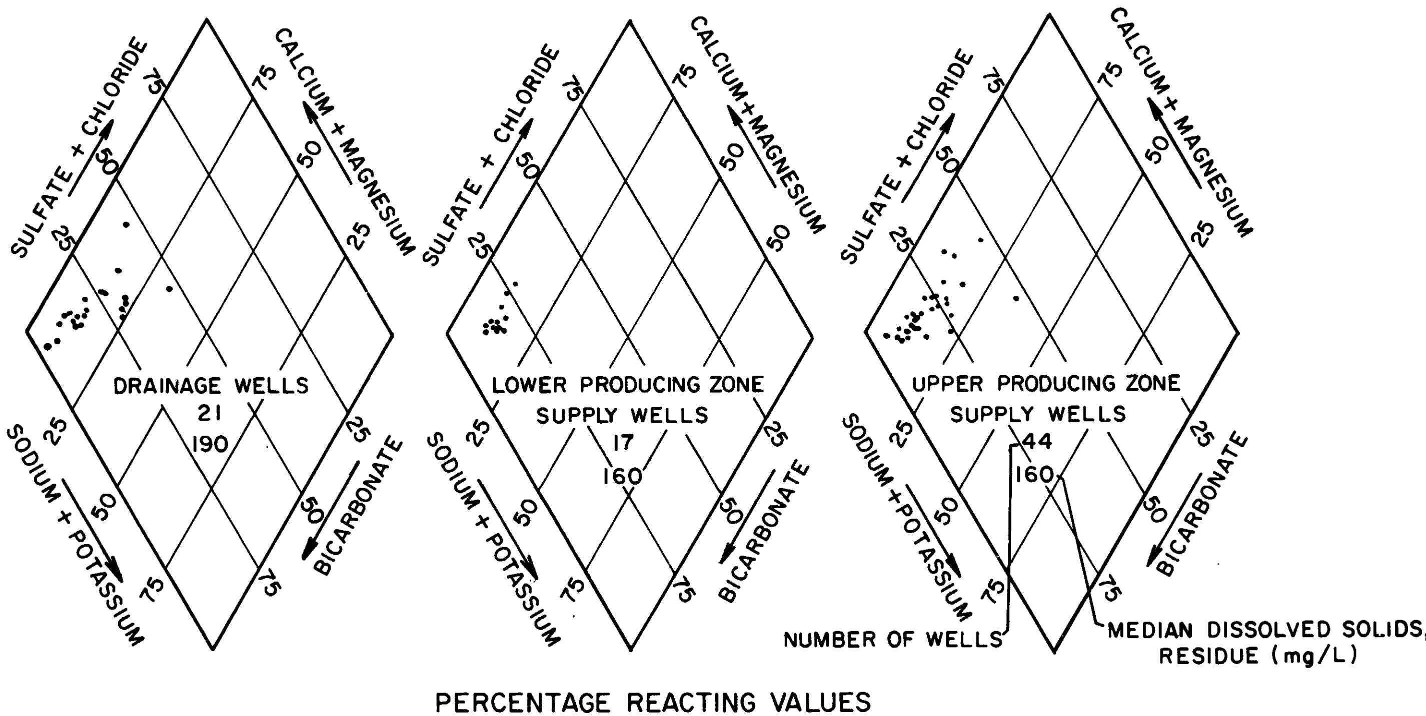


Figure 6.--Major dissolved constituent ratios in water from drainage wells and supply wells.

Several of the major constituents and physical properties summarized in table 6 are specified in the suggested National Secondary Drinking Water Regulations, herein referred to as "secondary regulations" (U.S. Environmental Protection Agency, 1977). The secondary regulations are not mandatory, but are intended as guidelines for desirable esthetic properties (appearance and taste) of water. The frequency distribution of these major constituents and physical properties is shown in figure 7.

Of the five major constituents and physical properties covered by the suggested limits and shown in figure 7 (chloride, color, pH, sulfate, and dissolved solids), only color exceeded the limit, 15 platinum-cobalt units. The color limit was exceeded in two supply wells (3 percent of the 61 supply wells sampled) and in 2 drainage wells (10 percent of the 20 drainage wells sampled). Hydrogen sulfide, also covered by the suggested secondary drinking water regulations, was sampled only in drainage wells and is not plotted in figure 7. The hydrogen sulfide limit of 0.05 mg/L was exceeded in 17 drainage wells (94 percent of the 18 drainage wells sampled). Figure 7 also shows that chloride, color, sulfate, and dissolved solids are generally higher in drainage wells than in supply wells. The maximum values for constituents (other than color) occurred in supply wells, possibly because many more supply wells were sampled.

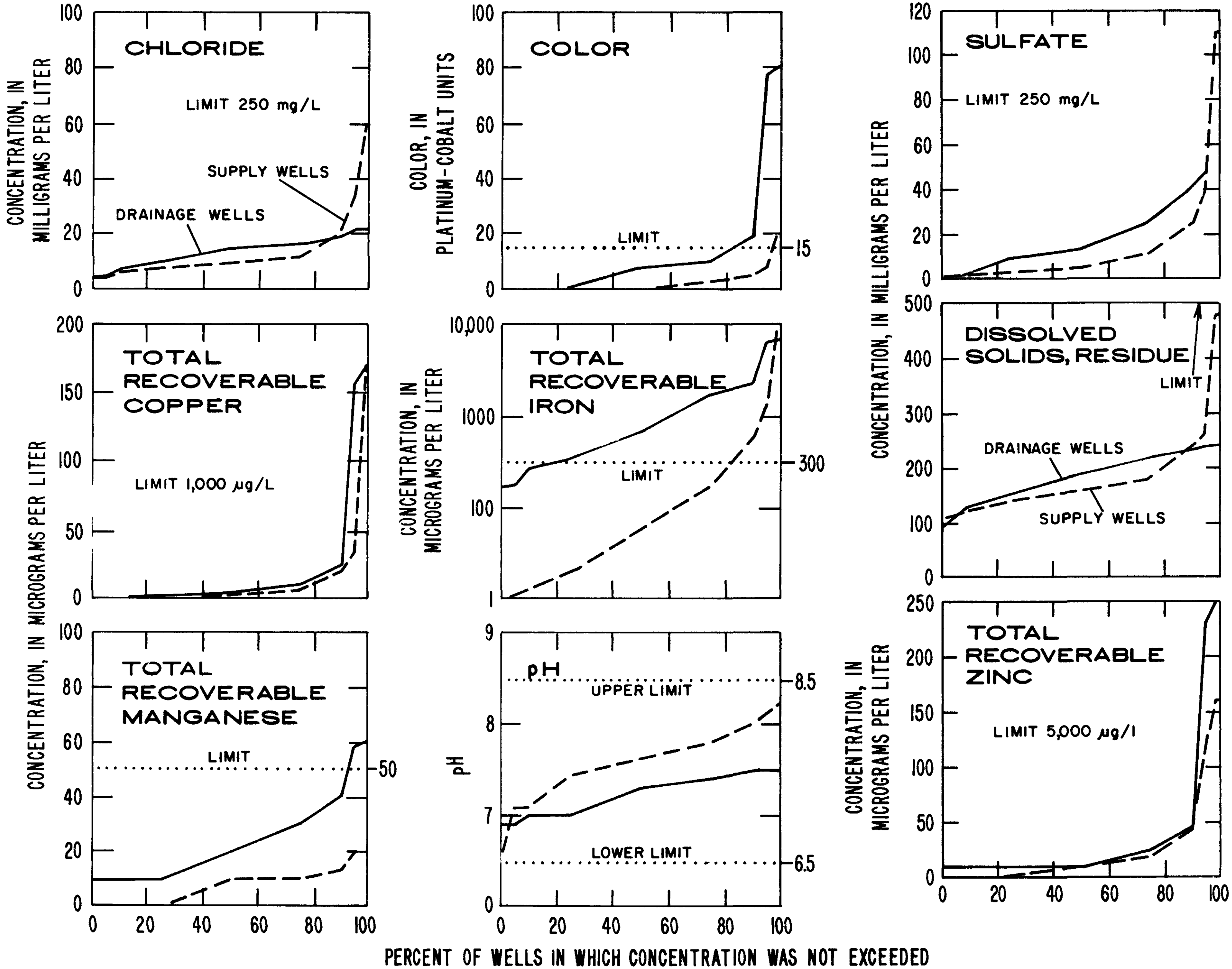
Nutrients

Nutrients include the group of nitrogen, phosphorus, and carbon compounds which are of concern in surface waters because of their effect on productivity and eutrophication of water bodies. Nutrients are generally not a concern in aquifers, but nutrient data were collected because nutrients may have been transported into the ground-water system by surface waters, and could serve as a tracer of drainage well recharge.

Nitrogen species in samples from drainage wells were determined in the dissolved phase and as the total concentrations from a water-suspended sediment mixture. Data for these species are summarized in table 7.

Median total nitrogen (sum of all species) was noticeably higher for samples from drainage wells than for samples from supply wells (1.0 and 0.29 mg/L, respectively). Figure 8 shows the pattern of occurrence of total nitrogen. For more than 95 percent of the wells, drainage wells have a definite pattern of higher total nitrogen concentrations. However, the maximum total nitrogen concentrations occurred in supply wells.

Total organic nitrogen (shown in table 7) was also highest in samples from drainage wells--median concentration of 0.24 mg/L compared to 0.02 mg/L for samples from supply wells.



NOTE: LIMITS ARE INTENDED FOR GUIDELINES AND ARE NOT FEDERALLY ENFORCEABLE (U.S. ENVIRONMENTAL PROTECTION AGENCY, 1977).

Figure 7.--Frequency distribution of constituents specified in suggested National Secondary Drinking Water Regulations.

Table 7.--Statistical summary of nutrient and bacteria data for drainage wells and supply wells

[Dissolved concentrations in milligrams per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Organic nitrogen (N), D	DR	20	0.30	0.19	1.3	0.62	0.06	0.06
	SP	--	---	---	--	---	---	---
Organic nitrogen (N), T	DR	21	.40	.24	1.5	1.3	.14	.07
	SP	54	.04	.02	.22	.20	.01	.00
Ammonia nitrogen (N), D	DR	20	.39	.27	2.0	.89	.02	.01
	SP	--	---	---	--	---	---	---
Ammonia nitrogen (N), T	DR	21	.42	.30	2.0	.90	.05	.03
	SP	54	.27	.25	1.1	.84	.01	.00
Nitrite (N), D	DR	20	.01	.01	.13	.02	.00	.00
	SP	10	.00	.00	.00	.00	.00	.00
Nitrite (N), T	DR	21	.01	.00	.14	.04	.00	.00
	SP	57	.00	.00	.06	.01	.00	.00
Nitrate (N), D	DR	20	.29	.01	2.4	1.7	.01	.00
	SP	8	.10	.08	.29	.21	.02	.01
Nitrate (N), T	DR	21	.28	.01	2.4	1.5	.00	.00
	SP	57	.18	.00	3.6	.93	.00	.00
Nitrogen (N), D	DR	21	1.0	.83	2.7	2.2	.33	.07
	SP	--	---	---	--	---	---	---

[1/] Parameters: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture.

[2/] Group: DR, drainage well; SP, supply well.

Table 7.--Statistical summary of nutrient and bacteria data for drainage wells and supply wells--Continued

[Dissolved concentrations in milligrams per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Nitrogen (N), T	DR	21	1.1	1.0	2.7	2.2	0.39	0.37
	SP	54	.48	.29	3.7	3.6	.08	.05
Orthophosphate (P), D	DR	20	.15	.11	.55	.33	.01	.00
	SP	--	---	---	---	---	---	---
Orthophosphate (P), T	DR	21	.17	.11	.55	.34	.03	.02
	SP	54	.09	.07	.29	.24	.02	.01
Phosphorus (P), D	DR	20	.19	.14	.64	.34	.04	.02
	SP	--	---	---	---	---	---	---
Phosphorus (P), T	DR	21	.25	.23	.66	.64	.11	.04
	SP	54	.09	.07	.30	.24	.02	.01
Total coliform (colonies/ 100 mL)[3/]	DR	21	1,200	150	>10,000	5,600	1	0
	SP	51	6	0	80	60	1	0
Fecal coliform (colonies/ 100 mL)	DR	21	440	10	4,400	1,460	1	0
	SP	51	1	0	5	4	2	0
Fecal streptococci (colonies/ 100 mL)	DR	21	680	16	>10,000	1,650	1	0
	SP	--	---	---	---	---	---	---
Total organic carbon	DR	21	7.3	6	28	18	2	0
	SP	53	4.5	4	18	16	1	0

1/ Parameters: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture.

2/ Group: DR, drainage well; SP, supply well.

3/ Immediate M-Endo medium.

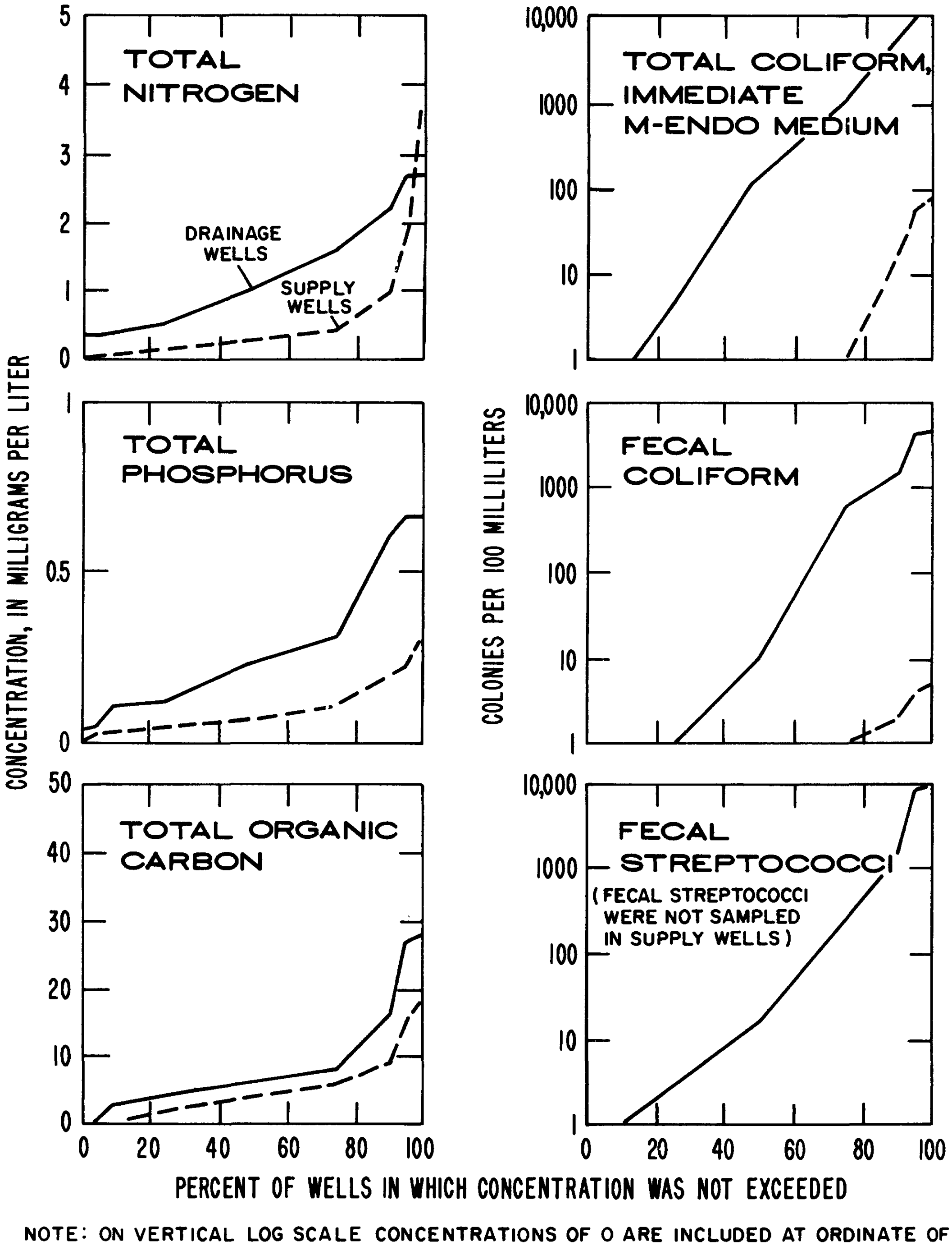


Figure 8.--Frequency distribution of nitrogen, phosphorus, organic carbon, and bacteria in water from drainage wells and supply wells.

Total ammonia nitrogen concentrations were about the same magnitude for drainage as for supply wells. Other nitrogen species are generally present only in very low concentrations. Median total nitrite nitrogen was 0.00 mg/L for drainage and supply wells, and except for one supply well and one drainage well, did not exceed 0.04 mg/L. Median total nitrate nitrogen was less than 0.1 mg/L for both groups of wells; however, two drainage wells and two supply wells had nitrate concentrations in excess of 1.0 mg/L. The maximum nitrate nitrogen concentration of 3.6 mg/L occurred in two supply wells.

A comparison of dissolved nitrogen species with total nitrogen species in samples from drainage wells shows that the range of concentrations and median concentrations (table 7) were only slightly higher for total nitrogen species than for dissolved nitrogen species. The median dissolved organic nitrogen concentration (0.19 mg/L) was about 79 percent of the median total organic nitrogen; and for ammonia and total nitrogen, the median dissolved concentrations were 90 and 83 percent, respectively, of the median total concentrations.

Distributions of total nitrogen among the organic, ammonia, and nitrate-nitrite forms for the upper producing zone, lower producing zone and drainage wells are shown in figure 9. The most noticeable difference in the distributions of nitrogen species in the three groups of wells is the consistent small percentage of nitrogen in the nitrite + nitrate form for the lower producing zone wells. Only 2 of the 17 lower producing-zone wells sampled had detectable concentrations of nitrite or nitrate, and in these wells nitrate + nitrite was less than 3 percent of the total nitrogen. Most (67 to 100 percent) of the nitrogen was in the ammonia form, which is the most highly reduced of the nitrogen species. This predominance of ammonia nitrogen in water from the lower producing zone is indicative of a reducing environment. In the upper producing zone, distribution among the nitrogen species is more varied for both drainage wells and supply wells. Nitrite + nitrate is the least dominant form of nitrogen in most wells (generally less than 25 percent of total nitrogen concentrations).

A few wells (four supply wells and one drainage well) had more than 90 percent of nitrogen in the nitrite or nitrate form. Nitrite and nitrate are oxidized forms of nitrogen, and the presence of appreciable quantities of these species may indicate that the water is relatively young in terms of residence time within the aquifer or that a source of local recharge is high in nitrite or nitrate concentrations.

Organic nitrogen appears to be more characteristic of drainage wells than supply wells. Of the 21 drainage wells sampled, 6 wells (29 percent) had organic nitrogen in excess of 50 percent of the total nitrogen concentrations. In contrast, only 2 of 37 supply wells in the upper producing zone (5 percent), and none of the wells in the lower producing zone had organic nitrogen in excess of 50 percent of the total nitrogen.

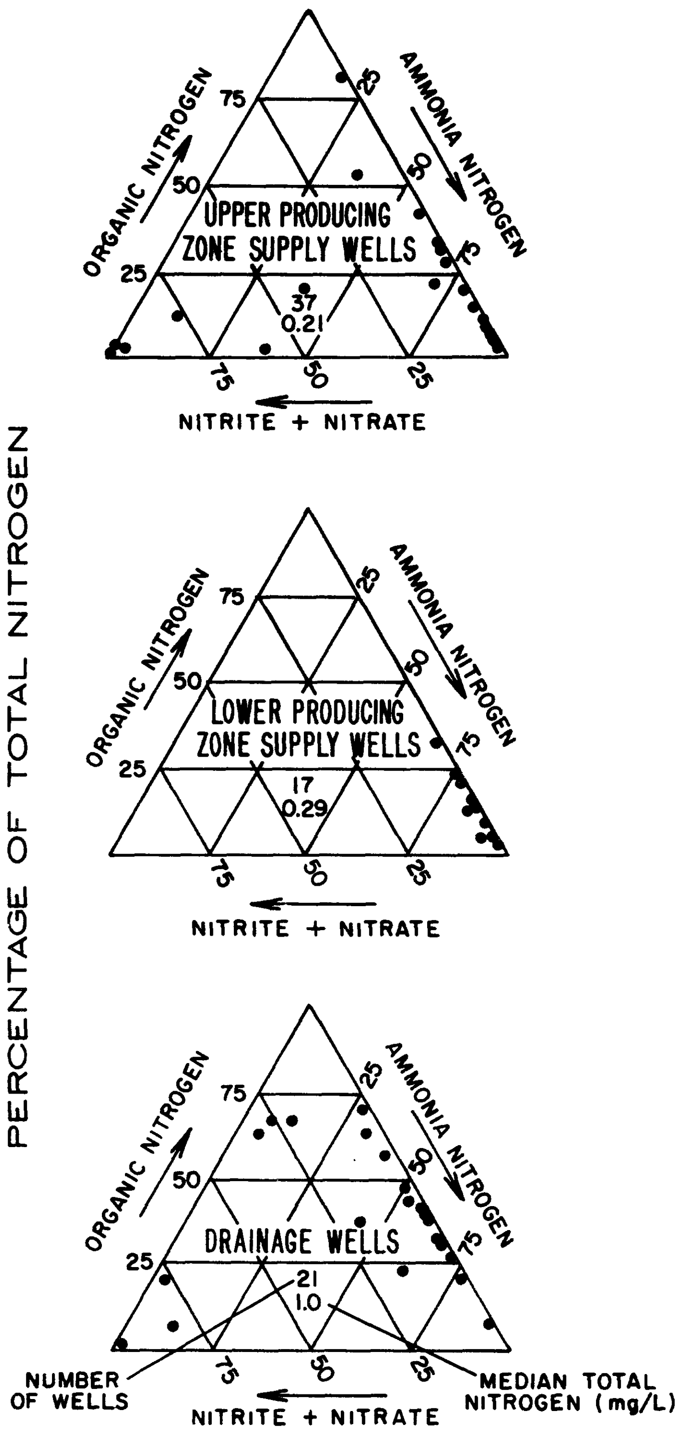


Figure 9.--Nitrogen species distributions in water from drainage wells and supply wells.

Total phosphorus concentrations were generally higher in samples from drainage wells than in supply wells (see table 7 and fig. 8). The median total phosphorus was 0.23 mg/L for drainage well samples compared to 0.07 for supply wells. Total orthophosphate concentrations also tended to be slightly higher in drainage well samples than for supply wells (median concentrations of 0.11 and 0.07 mg/L, respectively).

A comparison of dissolved phosphorus with total concentrations of phosphorus in samples from drainage wells (table 7) shows that the range of concentrations and median concentrations are only slightly higher for total phosphorus than for dissolved phosphorus. For orthophosphate, there is even less difference.

Total organic carbon was generally slightly higher for drainage wells than for supply wells (see table 7 and fig. 8). Median concentration was 6 mg/L for drainage wells and 4 mg/L for supply wells. The ranges of concentrations, excluding the two wells with the highest and lowest concentrations, were nearly identical (2 to 18 mg/L for drainage wells and 1 to 16 mg/L for supply wells).

Bacteria

Total and fecal coliform samples from drainage and supply wells indicate that the aquifer is more contaminated with these bacteria at the drainage well sites. Also, fecal streptococci colony counts were high in many samples from drainage wells. Data on bacterial population are summarized in table 7 and plotted in figure 8.

Median total coliform colony count for samples from drainage wells was 150 col/100 mL (colonies per 100 milliliters), and in two wells counts exceeded 5,000 col/100 mL. Only 3 of the 21 drainage wells sampled had less than 1 col/100 mL of total coliform. Supply wells were generally free of total coliform. In about 73 percent of the 52 supply wells sampled, less than 1 col/100 mL was present. Two supply wells had total coliform counts greater than 50 col/100 mL.

Fecal coliforms were present in fewer wells and in lesser numbers than were total coliform. Six of the 21 drainage well samples had less than 1 col/100 mL (median density was 10 col/100 mL) and two samples had fecal coliform colony counts greater than 1,000 col/100 mL. Only 5 of 51 supply wells sampled had detectable densities of fecal coliform. The highest observed fecal coliform count at a supply well was 5 col/100 mL.

Drainage wells were sampled for fecal-streptococci bacteria but supply wells were not. The distribution of fecal streptococci among drainage wells was similar to that of fecal coliform; the organism was detected in all but three wells. The median colony count was 16 col/100 mL. Counts of greater than 1,000 col/100 mL were detected in samples from three wells.

The bacterial data imply that the upper producing zone of the Floridan aquifer may be contaminated with bacteria in places because of drainage well recharge. However, interpretation of the bacterial data should be approached with extreme caution. Information concerning movement of bacteria through an aquifer is scarce. Bacteria are not dissolved in water as are chemical constituents, but consist of small-sized particles that can be removed by filtration. Bacteria, introduced into an aquifer through a well, may become attached to the well casing or travel only a short distance from the well before becoming immobile by attaching to the aquifer. Pumping the well could resuspend the bacteria and result in high sample densities not representative of the aquifer.

In places, rock openings such as solution cavities may extend a considerable distance and provide an avenue of movement for bacteria to travel from a drainage well to a supply well. Historically, bacterial contamination of supply wells finished in the upper producing (drainage well) zone has been documented (Telfair, 1948). To avoid the threat of pollution the large public water supply companies tend to use wells finished in the lower producing zone (Kimrey, 1978).

Trace Elements

Drainage and supply wells were sampled for a large suite of trace elements, both as dissolved concentration (filterable through a 0.45 micron membrane filter) and total recoverable concentration in an unfiltered water-suspended sediment mixture. The data are summarized in table 8. The seven most prevalent trace elements found, listed in order of descending median concentrations, were: iron, strontium, aluminum, boron, manganese, chromium, and zinc. Median total recoverable concentrations of these metals ranged from 660 μg/L (micrograms per liter) for iron samples from drainage wells to 10 μg/L for chromium and zinc for drainage and supply wells. The other metals listed in table 8 have median concentrations of 6 μg/L or less.

Four trace metals (copper, iron, manganese, and zinc) are not considered toxic but are specified in the National Secondary Drinking Water Regulations (U.S. Environmental Protection Agency, 1977) because they may have objectionable taste or stain household plumbing fixtures. The frequency distributions of these metals are shown in figure 7 with other constituents listed in the secondary regulations. Figure 7 shows that copper and zinc were slightly higher in samples from drainage wells than for supply wells but did not exceed the suggested concentration limit in any samples. However, the concentrations of manganese and especially iron were generally considerably higher for drainage wells than for supply wells. Iron exceeded the suggested limit of 300 μg/L in about 80 percent of the samples from drainage wells and in about 13 percent of the samples from supply wells. Manganese exceeded the suggested limit of 50 μg/L in about 5 percent of the samples from drainage wells but was not excessive in any supply well.

Table 8.--Statistical summary of data on trace elements for drainage wells and supply wells

[Dissolved concentrations in micrograms per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Aluminum (Al), D	DR	21	37	30	110	100	20	10
	SP	53	9	10	40	30	10	0
Aluminum (Al), TR	DR	21	3,600	80	7,400	500	45	40
	SP	53	24	20	460	70	10	0
Arsenic (As), D	DR	21	2	1	6	5	1	0
	SP	52	0	0	2	1	1	0
Arsenic (As), T	DR	21	2	2	7	6	1	0
	SP	56	0	0	8	1	1	0
Barium (Ba), D	DR	21	3	0	30	10	7	0
	SP	53	0	0	0	0	0	0
Barium (Ba), TR	DR	21	10	0	100	0	100	0
	SP	56	2	0	100	0	100	0
Boron (B), D	DR	21	38	30	110	90	20	10
	SP	--	---	--	---	---	---	--
Boron (B), TR	DR	21	74	30	760	100	25	20
	SP	--	---	--	---	---	---	--

[1/] Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

[2/] Group: DR, drainage well; SP, supply well.

Table 8.--Statistical summary of data on trace elements for drainage wells and supply wells--Continued

[Dissolved concentrations in micrograms per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Cadmium (Cd), D	DR	21	1	0	3	2	0	0
	SP	53	0	0	3	0	3	0
Cadmium (Cd), TR	DR	21	1	0	2	1	1	0
	SP	56	0	0	2	1	0	0
Chromium (Cr), D	DR	21	5	1	20	10	1	0
	SP	53	0	0	7	3	1	0
Chromium (Cr), TR	DR	21	<15	10	40	30	10	<10
	SP	55	<11	<10	30	20	10	<10
Cobalt (Co), D	DR	21	1	0	3	2	1	0
	SP	53	0	0	2	1	1	0
Cobalt (Co), TR	DR	21	1	0	3	2	1	0
	SP	53	0	0	2	1	1	0
Copper (Cu), D	DR	21	4	2	23	20	1	0
	SP	53	2	0	31	8	1	0
Copper (Cu), TR	DR	21	14	4	170	26	1	0
	SP	56	9	3	170	45	2	0

1/ Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

2/ Group: DR, drainage well; SP, supply well.

Table 8.--Statistical summary of data on trace elements for drainage wells and supply wells--Continued

[Dissolved concentrations in micrograms per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Iron (Fe), D	DR	21	480	230	1,500	1,300	25	20
	SP	57	50	20	930	270	10	0
Iron (Fe), TR	DR	21	1,230	660	6,600	2,300	260	170
	SP	56	320	60	8,820	2,000	10	0
Lead (Pb), D	DR	21	3	1	38	7	1	0
	SP	53	2	0	10	8	2	0
Lead (Pb), TR	DR	21	6	3	29	23	0	0
	SP	56	6	5	25	23	1	0
Lithium (Li), D	DR	21	<1	0	3	2	0	0
	SP	--	---	---	---	---	---	---
Lithium (Li), TR	DR	21	0	0	0	0	0	0
	SP	--	---	---	---	---	---	---
Manganese (Mn), D	DR	21	17	10	70	50	5	0
	SP	53	2	0	10	10	10	0
Manganese (Mn), TR	DR	21	20	20	60	40	20	10
	SP	56	10	10	20	10	10	0

1/ Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

2/ Group: DR, drainage well; SP, supply well.

Table 8.--Statistical summary of data on trace elements for drainage wells and supply wells--Continued

[Dissolved concentrations in micrograms per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1/]	Group[2/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Mercury (Hg), D	DR	21	<.5	<.5	0.5	<.5	.5	<.5
	SP	53	<.5	<.5	0.5	<.5	.5	<.5
Mercury (Hg), TR	DR	21	<.5	<.5	0.5	<.5	.5	<.5
	SP	57	<.5	<.5	0.5	<.5	.5	<.5
Molybdenum (Mo), TR	DR	21	9	4	78	28	1	0
	SP	--	--	---	---	---	--	--
Nickel (Ni), TR	DR	21	10	6	35	34	1	0
	SP	53	5	4	32	20	2	0
Selenium (Se), D	DR	21	<1	0	3	0	3	0
	SP	53	0	0	0	0	0	0
Selenium (Se), T	DR	21	<1	0	3	1	1	0
	SP	56	0	0	0	0	0	0
Strontium (SR), D	DR	21	90	80	190	140	70	60
	SP	65	190	120	900	810	20	10
Strontium (Sr), TR	DR	21	110	90	250	190	60	40
	SP	--	---	---	---	---	--	--

1/ Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

2/ Group: DR, drainage well; SP, supply well.

Table 8.--Statistical summary of data on trace elements for drainage wells and supply wells--Continued

[Dissolved concentrations in micrograms per liter, except as indicated. Identical values may be reported for highest and second highest, or for lowest and second lowest, because of rounding of numbers]

Parameter[1]	Group[2]	Number of wells	Mean	Median	Highest two different values		Lowest two different values	
Zinc (Zn), D	DR	21	10	10	30	20	10	0
	SP	53	6	0	90	40	10	0
Zinc (Zn), TR	DR	21	30	10	250	50	20	10
	SP	56	20	10	160	130	10	0

1/ Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentrations. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

2/ Group: DR, drainage well; SP, supply well.

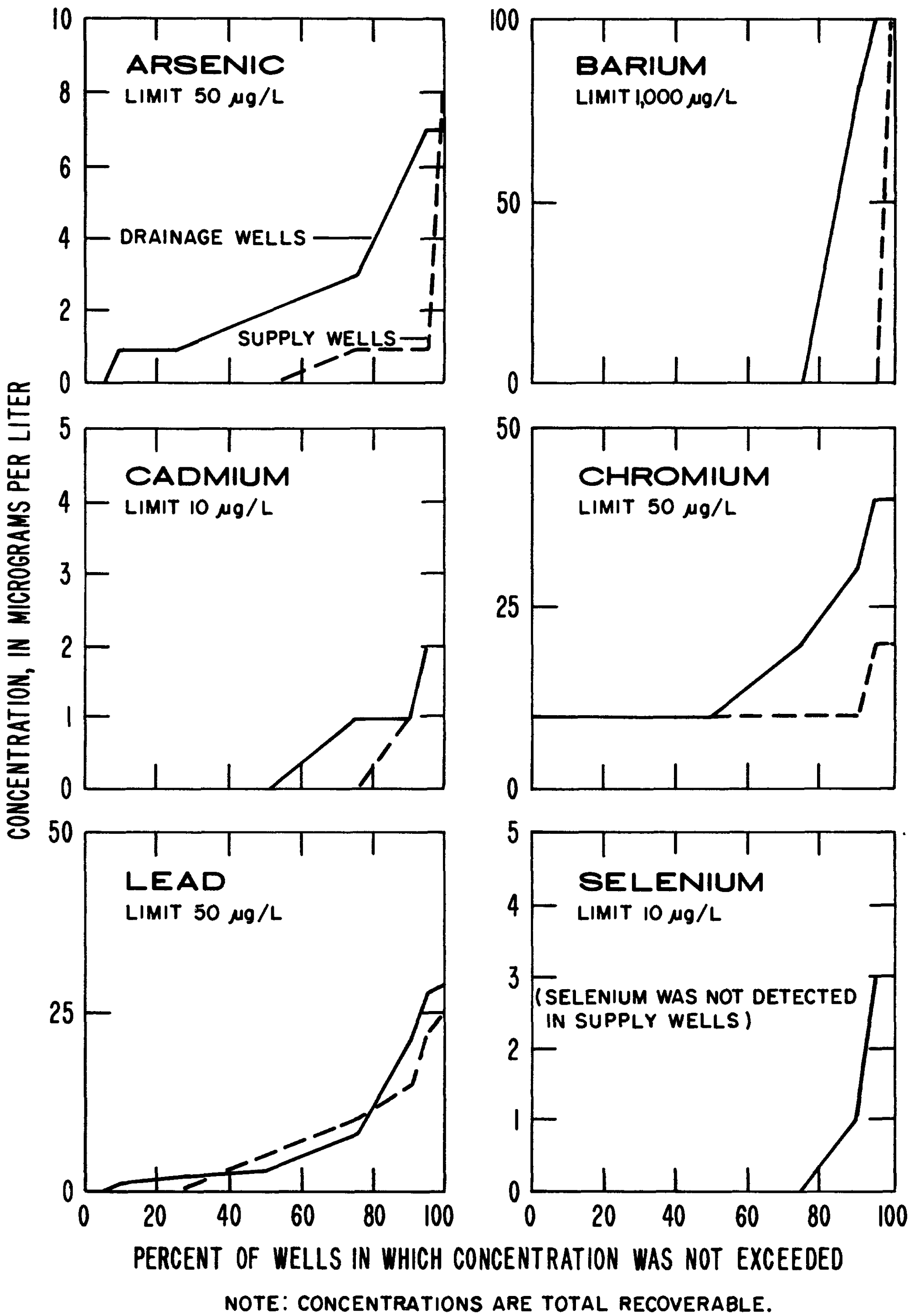


Figure 10--Frequency distribution of selected toxic elements specified in Florida Department of Environmental Regulation water-quality standards for potable ground water.

Seven trace elements (arsenic, barium, cadmium, chromium, lead, mercury, and selenium) among those sampled (see table 8) are specified in the Florida DER (Department of Environmental Regulation) water quality standards for potable ground water (Florida Department of State, 1978) because they are toxic to humans. Six of these toxic elements (shown in fig. 10) did not exceed the criteria concentrations. Most of the toxic elements were present in higher concentrations in samples from drainage wells than in samples from supply wells, but most samples of all of the elements were well below the criteria concentrations. Mercury is the most toxic of all of the elements covered by the water quality standards and should not exceed 2 μg/L in potable ground water. It is not included in figure 10 because mercury was not found in any of the pumped samples in concentrations exceeding the then applicable analytical detection limit of 0.5 μg/L.

Organic Constituents

Samples from drainage and supply wells were analyzed for organic compounds, including oil and grease, methylene blue-active substances (detergent ingredients), PCBs (polychlorinated biphenyls), and selected pesticides. A statistical data summary is given in table 9.

Oil and grease was detected in 58 percent of the supply wells and in only 12 percent of the drainage wells. Median concentration was 1 mg/L in samples from supply wells and 0 in drainage wells. The more frequent occurrence and higher concentrations of oil and grease in supply wells may be because oil and grease is used in the maintenance of the pumps installed on most of the wells.

Methylene blue-active substances, components of many detergents, were detected in 47 percent of the drainage wells and in only 15 percent of the supply wells.

PCBs were detected in three drainage wells (14 percent of the samples), but were not detected in any supply wells.

Of the 25 pesticide compounds analyzed, only 6 were detected in drainage-well samples, and 2 were detected in supply wells. These were, in order of decreasing frequency of occurrence:

1. 2,4-D, a chlorinated phenoxy acid herbicide, was detected in six (29 percent) drainage wells.

2. 2,4,5-TP (Silvex), a chlorinated phenoxy acid herbicide, was detected in three (14 percent) drainage wells and two (4 percent) supply wells.

3. Diazinon, an organophosphorus insecticide, was detected in three (14 percent) drainage wells.

4. Dieldrin, an organochlorine insecticide, was detected in two (10 percent) drainage wells and one (2 percent) supply well.

Table 9.--Statistical summary of data on organic constituents for drainage wells and supply wells

[Concentrations in micrograms per liter, except as indicated]

Parameter	Group[1/]	Number of wells	Mean	Median	Highest two different values		Lowest two different values		Percent of wells in which detected
Oil and grease (mg/L)	DR	17	0.09	0	1.0	0.5	0.5	0	12
	SP	43	2.2	1	10	7.0	.5	0	58
Methylene blue active substances (mg/L)	DR	19	.05	0	.10	0	.10	0	47
	SP	52	.02	0	.10	0	.10	0	15
Chlordane	DR	21	0	0	.10	0	.10	0	5
	SP	55	0	0	0	0	0	0	0
Dieldrin	DR	21	0	0	.02	.01	.01	.00	10
	SP	55	0	0	.01	.00	.01	.00	2
Polychlorinated biphenyls (PCB)	DR	21	.02	0	.20	.10	.10	0	14
	SP	55	0	0	0	0	0	0	0
Diazinon	DR	21	0	0	.02	.01	.01	0	14
	SP	--	---	-	---	---	---	-	--
2,4-D	DR	21	0	0	.02	.01	.01	0	29
	SP	55	0	0	0	0	0	0	0
2,4,5-T	DR	21	.34	0	7.1	0	7.1	0	5
	SP	55	0	0	0	0	0	0	0
2,4,5-TP (Silvex)	DR	21	.02	0	.36	.02	.01	0	14
	SP	55	0	0	.04	.02	.02	0	4

1/ Group: DR, drainage well; SP, supply well.

5. Chlordane, an organochlorine insecticide, was detected in one (5 percent) drainage well.

6. 2,4,5-T, a chlorinated phenoxy acid herbicide, was detected in one (5 percent) drainage well.

The herbicides 2,4-D and 2,4,5-TP are specified in the Florida DER criteria for potable ground water. Concentrations of 2,4-D in samples from drainage wells were far below the drinking water limit of 100 μg/L. Moreover, maximum concentrations were only slightly above the analytical detection limit of 0.01 μg/L. Concentrations of 2,4,5-TP were higher than 2,4-D concentrations (maximum of 0.36 and 0.04 μg/L in drainage wells and supply wells, respectively), but also were far below the regulatory limit of 10 μg/L.

Two other pesticides detected in drainage or supply wells (chlordane and dieldrin) are of special significance because they have been included in a list of toxic compounds complied by the U.S. Environmental Protection Agency. These compounds, often referred to as the 129 priority pollutants, are presently (1981) undergoing a study and review that will eventually result in establishment of drinking water limits for these compounds.

Interpretation of Results by Subgroups of Wells

The description of water quality given in previous sections of this report compared the quality of waters in the supply and drainage wells, generally without reference to the producing zone tapped by the supply wells or source of runoff to the drainage wells. There are differences in water type between upper and lower producing zone wells. For example, supply wells that tap the lower producing zone had less variation of major dissolved constituents and nutrient species than drainage or supply wells that tap the upper producing zone. (See figs. 6 and 9.)

Water quality in the lower producing zone could differ from that in the upper producing zone because the lower zone is further removed from sources of surface contamination. Furthermore, adsorption, precipitation, and other processes probably had more time to remove many of the contaminants contributed from the land surface (especially metals, organic compounds, and bacteria) from the water. In the upper producing zone, water injected by drainage wells that receive direct street runoff could be considerably different in quality than water injected by drainage wells used to control lake levels. Street runoff is injected directly into the receiving aquifer with little or no time available for the removal of street-wash residues prior to the injection. However, concentrations of some contaminants in the surface runoff that reach lakes may be reduced by natural processes of photolysis, oxidation, biodegradation, sorption, settling, and precipitation before reaching a drainage well intake.

Data on quality of stormwater runoff into lakes or drainage wells were not collected as part of this study; however, numerous other studies have been done on stormwater runoff. Selected data from two studies in Florida by the U.S. Geological Survey are summarized in table 10 to provide general information on the quality of stormwater runoff. Also included in table 10 for comparison are summarized data for drainage wells. These data show that stormwater runoff generally contains higher concentrations of bacteria, most nutrients, and metals than water from drainage wells, and that the concentrations of bacteria and some metals (aluminum, lead, and zinc) are often much higher. The higher concentrations in storm runoff imply that physical and chemical processes could attenuate constituent concentrations, either in lakes before the runoff enters the well or after the water has entered the aquifer, or both.

Figures 11 and 12 show median values and interquartile ranges (the range between the 25th percentile and 75th percentile) of selected aggregate measures of water quality, bacteria, and metals for the following four subgroups of wells: (1) upper producing zone supply wells (48 wells), (2) lower producing zone supply wells (17 wells), (3) drainage wells that receive street runoff (12 wells), and (4) drainage wells that receive lake overflow (7 wells). Interquartile ranges were selected to display the distribution of the data because these measures are less influenced by the extreme values than are some other measures of statistical dispersion such as standard deviation or range. In addition, the interquartile range is nonparametric and thus is unaffected by the departure of the data from a normal distribution. The non-normality of water quality data is common and makes interpetation of parametric measures of dispersion (such as standard deviation) difficult or misleading.

Included in these figures are statistics for a group of nine supply wells located near the study area that presumably are little affected by drainage well recharge. These outlying wells, located as indicated in table 11, are referred to as "background" wells. The statistics are included to allow comparison of water quality in wells from the four subgroups in the Orlando area to water quality in a nondrainage-well area.

The most noticeable differences among the constituents shown in figure 11 are for total and fecal coliform in drainage wells that receive street runoff compared to drainage wells that receive lake overflows. Bacteria densities were considerably lower for wells that receive lake overflow, probably because of the retention of bacteria-laden sediment particles in the lake and the dilution and die-off of bacteria during the travel time through the lake to the drainage well intakes. Also, many drainage wells used to control water levels in lakes receive water only during prolonged rainy periods, whereas drainage wells that receive street runoff generally accept water during nearly every storm. Therefore, many more bacteria are probably carried into drainage wells that receive street runoff.

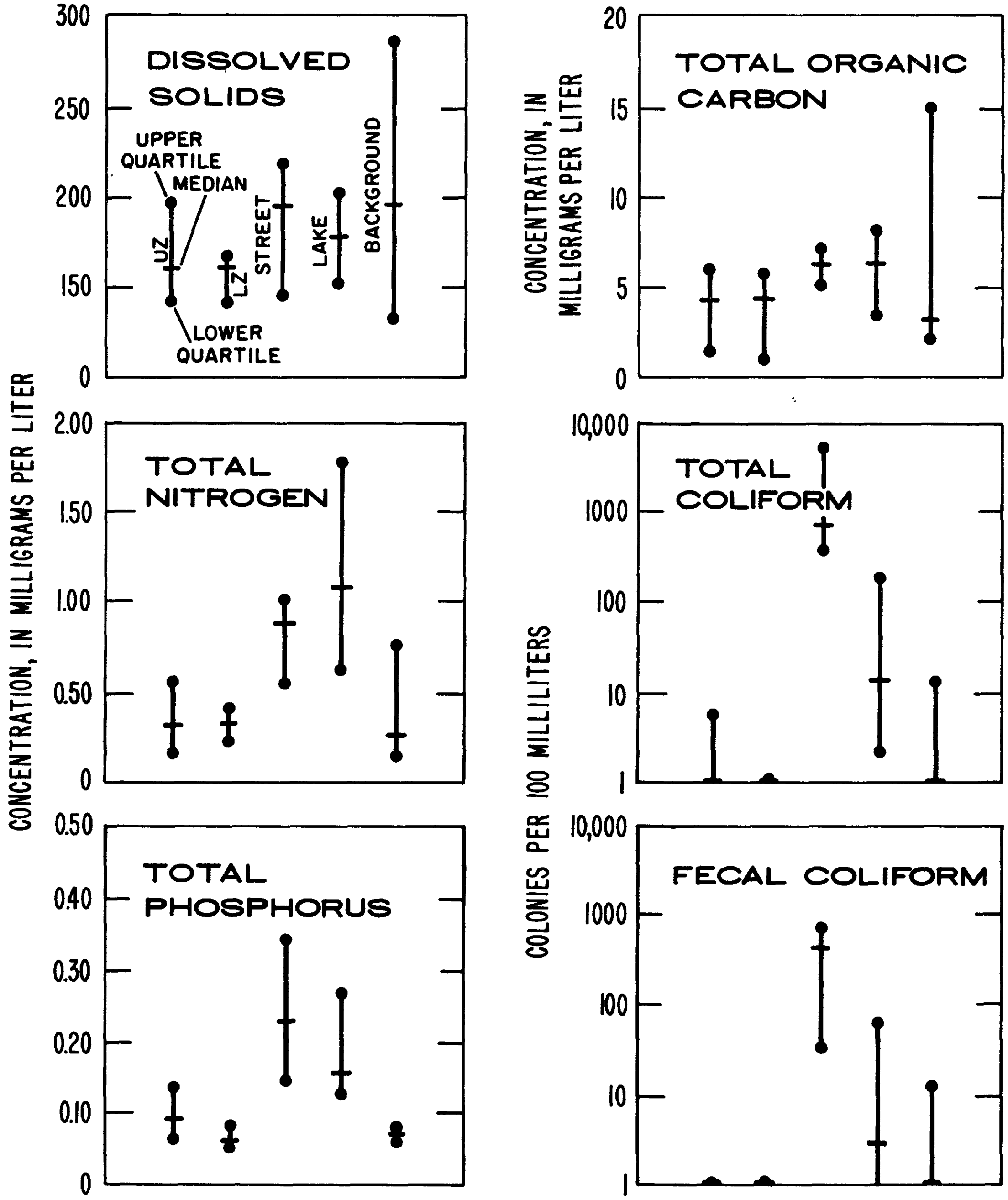
Table 10.--Selected water-quality data for stormwater runoff and drainage wells

[Concentrations in micrograms per liter, except as indicated]

Parameter	Stormwater runoff: Range in mean concentrations at sampling sites or median concentration of all samples		Drainage wells: Median concentrations of 21 wells
	Miami, Fla.[1/]	Maitland, Fla.[2/]	
Dissolved solids, residue (mg/L)	87 - 105	84 - 104	190
Total nitrogen (N) (mg/L)	.96 - 2.0	2.6 - 8.2	1.0
Total phosphorus (P) (mg/L)	.08 - .30	.4 - 1.1	.23
Total organic carbon (C) (mg/L)	5.8 - 14	22 - 55	6
Aluminum (Al), total recoverable	---	390	80
Cadmium (Cd), total recoverable	.7 - .9	---	0
Chromium (Cr), total recoverable	11 - 48	---	10
Copper (Cu), total recoverable	6.5 - 15	19	4
Iron (Fe), total recoverable	207 - 334	400	660
Lead (Pb), total recoverable	167 - 387	200	3
Zinc (Zn), total recoverable	86 - 128	120	10
Total coliform (colonies/100 mL)	8,000 - 186,000	---	39
Fecal coliform (colonies/100 mL)	2,400 - 55,000	---	10

[1/] Data from Mattraw, 1978.

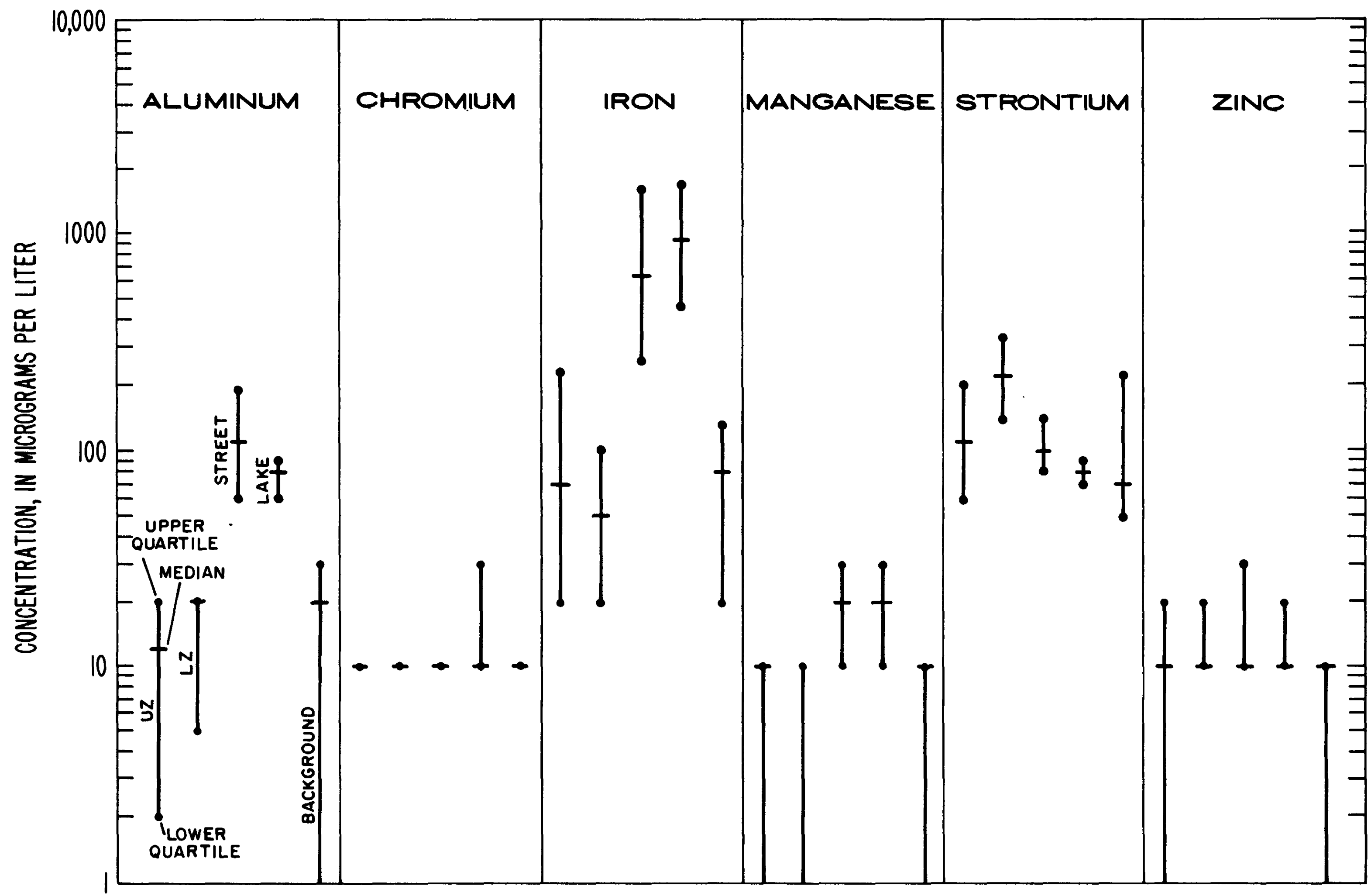
[2/] Samples collected by the U.S. Geological Survey, Orlando.



EXPLANATION: UZ, UPPER-PRODUCING ZONE SUPPLY WELLS; LZ, LOWER-PRODUCING ZONE SUPPLY WELLS; STREET, DRAINAGE WELLS THAT RECEIVE STREET RUNOFF; LAKE, DRAINAGE WELLS THAT RECEIVE LAKE OVERFLOW; BACKGROUND, SUPPLY WELLS IN SURROUNDING AREA WITH NO DRAINAGE WELLS NEARBY.

NOTE: COLIFORM COUNTS BETWEEN 0 AND 1 ARE INCLUDED AT ORDINATE VALUE OF 1.

Figure 11.--Median and interquartile range for dissolved solids, nutrients, and bacteria in selected subgroups of supply wells and drainage wells.



EXPLANATION: UZ, UPPER-PRODUCING ZONE SUPPLY WELLS; LZ, LOWER-PRODUCING ZONE SUPPLY WELLS; STREET, DRAINAGE WELLS THAT RECEIVE STREET RUNOFF; LAKE, DRAINAGE WELLS THAT RECEIVE LAKE OVERFLOW; BACKGROUND, SUPPLY WELLS IN SURROUNDING AREA WITH NO DRAINAGE WELLS NEARBY

NOTE: CONCENTRATIONS BETWEEN 0 AND 1 ARE INCLUDED AT ORDINATE VALUE OF 1. ALL CONCENTRATIONS ARE TOTAL RECOVERABLE EXCEPT FOR STRONTIUM, WHICH IS DISSOLVED.

Figure 12.--Median and interquartile range for selected metals in selected subgroups of supply wells and drainage wells.

Table 11.--Selected information on public-supply wells in areas without drainage wells

Site identification No.	County	Well name	Well depth (feet)	Casing	
				Depth (feet)	Diameter (inches)
281937081250101	Osceola	City of Kissimmee	458	278	16
283303081444801	Lake	City of Clermont, Bloxam Ave.	602	420	16
283314081455501	do.	City of Clermont, Lake Ave. #2	525	---	8
283925081123301	Seminole	City of Oviedo	263	148	12
284437081075601	do.	Mullet Lake Water Association	202	100	8
284705081192001	do.	City of Sanford	350	115	12
284827081522901	Lake	City of Leesburg #9	272	92	12
284827081523501	do.	City of Leesburg #8	376	105	12
285104081404701	do.	City of Eustis	485	174	12

Concentrations of metals shown in figure 12, were generally little different among the three subgroups of supply wells. Also, concentrations of metals in samples from drainage wells that receive street runoff were generally similar to the concentrations found for drainage wells that receive lake overflow. The data imply that assimilation and mixing processes within the aquifer result in a fairly homogeneous mixture of water because direct street runoff in other areas in Florida contains higher concentrations of metals than lake overflow. Generalized conclusions based on the selected constituents shown in figures 11 and 12 are: (1) water quality of supply wells in the study area differs little from the quality of "background" wells in nearby adjacent areas of no drainage wells, (2) water quality is much the same for supply wells finished in the upper or lower producing zones, and (3) except for bacteria densities, (highest in water from drainage wells that receive street runoff), little difference is found in water from drainage wells regardless of the source of inflow.

Point Samples Versus Pump Discharge Samples

Six drainage wells were each sampled twice. One sample was taken from the pump discharge after 2 hours or more of pumping to obtain a composite of water from all zones that yielded water during pumping, though most water injected is probably into a single zone.

A second sample was taken at a point opposite a cavernous zone at greater depth than the known contributing zones because the cavity may indicate a less permeable zone that accepts recharge only when injection rates are high.

The data in table 12 are values for selected water-quality parameters that include metals specified in drinking water regulations, and pesticides detected in point and pumped samples from wells 4, 7, 36, 48, 57, and 77. (See fig. 5.) Well 36 was sampled in April 1978 and in April 1979.

The difference between the pumped and point samples from well 7 was considerable for some parameters (turbidity, total and organic nitrogen, phosphorus, organic carbon, and total recoverable concentrations of nearly all the metals). Most dissolved trace element concentrations in water from the point sample from well 7 were very low compared to total recoverable concentrations and were comparable in magnitude to dissolved concentrations in the pumped sample. The high turbidity and total constituent concentrations in the point sample was probably due to sediment in the well bore resuspended by the pumping or sampling apparatus. The sediment probably contained significant amounts of vegetative debris that washed into the well and supplied the nitrogen, phosphorus, and carbon. The high total recoverable trace element concentrations in the turbid point sample demonstrates the tendency for these elements to become associated with sediments rather than to exist in the dissolved phase. The high concentration of mercury in the point sample from well 7 (6.3 μg/L) is noteworthy in that no other sample, point or pumped, from any other well had mercury in excess of the 0.5 μg/L analytical detection limit.

Table 12.--Comparison of water-quality data for pumped and point samples from six drainage wells

[Dissolved concentrations in micrograms per liter, except as indicated]

Parameter[1/]	Well 4 June 1979 Point	Well 4 June 1979 Pumped	Well 7 May 1979 Point	Well 7 May 1979 Pumped	Well 36 April 1978 Point	Well 36 April 1978 Pumped	Well 36 April 1979 Point	Well 36 April 1979 Pumped	Well 48 April 1978 Point	Well 48 April 1978 Pumped	Well 57 April 1978 Point	Well 57 April 1978 Pumped	Well 77 May 1979 Point	Well 77 May 1979 Pumped
Dissolved solids residue (mg/L)	243	219	174	174	167	170	185	198	170	221	139	141	197	234
Color (Pt-Co units)	100	80	0	0	10	10	50	0	5	5	20	10	10	10
Turbitity (NTU)	7	5	220	2	6	5	4	6	5	3	20	16	3	2
Nitrogen (N), (mg/L), T	1.2	1.0	2.0	.46	.62	.72	1.3	1.3	2.7	2.6	1.0	1.1	.72	1.0
Organic nitrogen (N), (mg/L), T	.94	.72	1.8	.19	.00	.15	.50	.33	.05	.10	.31	.24	.56	.66
Phosphorus (P), (mg/L), T	.26	.23	.86	.25	.14	.12	.10	.11	.07	.07	.28	.27	.37	.17
Organic carbon (C), (mg/L), TR	17	18	16	6.0	3.0	6.0	9.3	2.8	8.0	4.0	8.0	8.0	29	6.0
Total coliform (col/100 mL)	1,750	690	12	8	54	190	160	380	0	0	40	16	>10,000	>10,000
Arsenic (As), D	5	5	3	1	2	3	2	2	2	2	1	1	1	1
Arsenic (As), T	8	6	7	1	2	3	3	2	3	3	1	2	1	1
Barium (Ba), D	30	30	0	0	0	0	0	0	0	0	0	0	0	0
Barium (Ba), TR	100	0	200	0	0	0	0	0	0	0	0	0	0	0
Cadmium (Cd), D	0	0	1	1	0	4	0	0	0	1	0	2	1	3
Cadmium (Cd), TR	3	1	8	1	1	3	0	0	1	0	1	0	2	1
Chromium (Cr), D	<10	<10	20	10	1	1	0	0	0	0	0	0	20	10
Chromium (Cr), TR	40	40	50	10	10	10	10	10	10	20	20	10	20	10
Copper (Cu), D	5	2	0	3	9	39	0	0	0	0	1	2	3	9
Copper (Cu), TR	28	12	110	4	8	---	2	2	1	3	9	7	5	17
Iron (Fe), D	1,700	1,500	50	80	20	1,400	0	970	40	10	0	1,300	50	40
Iron (Fe), TR	2,500	1,900	11,000	340	2,200	1,400	900	1,200	1,700	1,000	3,600	2,300	3,500	1,600
Lead (Pb), D	1	0	4	0	3	---	6	6	0	0	0	2	4	3
Lead (Pb), TR	5	3	240	8	3	---	8	6	1	0	7	3	38	23
Manganese (Mn), D	70	50	0	0	10	90	40	50	10	0	10	10	30	0
Manganese (Mn), TR	70	60	50	10	10	---	30	40	10	10	20	20	40	10
Mercury (Hg), D	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Mercury (Hg), TR	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5
Selenium (Se), D	0	0	0	0	0	0	0	0	3	3	0	0	0	0
Selenium (Se), T	0	0	0	0	0	0	0	0	3	3	0	1	0	0
Chlordane	0	0	1.0	0	0	0	0	0	0	0	0	0	0	.1
2,4-D	0	0	0	0	0	0	0	0	0	.01	0	.01	0	0
2,4,5-TP (Silvex)	0	0	0	0	0	0	0	.01	0	0	0	0	0	0

1/ Parameter: D, dissolved concentrations. Represents material that passes through a 0.45-micrometer filter; T, total concentration. Represents at least 95 percent of the material in a water-suspended sediment mixture; TR, total recoverable concentrations. Represents all readily soluble material digested from a water-suspended sediment mixture, and may include less than 95 percent of the material.

Well 7, which takes stormwater runoff, is in the parking lot of an abandoned citrus-processing facility and is surrounded by a citrus grove. Therefore, the runoff into this well is probably not typical of urban street runoff or lake overflow, but may contain citrus fertilizer and pesticide residues. The large amount of sediment indicates that the point sample from well 7 is not representative of the aquifer. The turbidity (sediment content) and color of the pumped sample from well 7 was minimal.

The differences in point and pumped samples from other wells were not as extreme as for well 7. Color was higher in the April 1979 point sample from well 36, and iron was higher in the point samples from all wells except for the April 1979 sample from well 36.

Quality of Water from Supply Wells as a Function of Drainage Well Proximity

In the commercial area of central Orlando, many supply wells are as close as several hundred feet from drainage wells, but in more outlying parts of the study area, supply wells and drainage wells are separated by several miles. A visual perspective of distances between supply wells and drainage wells may be gained by comparing figure 5, that shows locations of sampled supply wells, with figure 4, that shows locations of all drainage wells inventoried (but not necessarily sampled) during this investigation.

Several measures of drainage-well density in the area upgradient of sampled supply wells were computed so that the water quality of samples from supply wells could be related to proximity of drainage wells. The area upgradient from each supply well was estimated from the potentiometric surface map of September 1978 (fig. 3) by drawing a vector from the well, generally normal to the potentiometric surface contours, in the direction of increasing head. This vector establishes the general direction of water movement toward a well. The actual zone of influence within which recharge could reach a pumped well cannot be determined with available data. For this study, the area within 90 degrees of each side of the generalized flow-direction vector (total of 180 degrees) is considered to be a potential source.

Measures of drainage-well proximity at each supply well sampled were: (1) median distance from the supply well to all known drainage wells in the upgradient area, and (2) number of drainage wells within a 0.25, 0.5, 1, 2, and 5-mile semicircle on the upgradient side of the well. The median distance of a supply well from drainage wells is a generalized numeric measure of position of the supply well in relation to the area of greatest drainage-well density and ranged from 2.5 to 20.5 miles for the 65 supply wells sampled. The counts of drainage wells within the selected radii around a supply well are a more localized measure of drainage-well density. The drainage-well count within a 0.25-mile radius upgradient of a supply well is the most localized measure of drainage-well density.

Table 13.--Rank correlation of water quality in supply wells with median distance to upgradient drainage wells, and number of drainage wells within 0.25, 0.5, 1, 2, or 5 miles upgradient of a supply well

[Coefficient of correlation is given only where there is less than a 5 percent chance of no relationship]

	Total nitrogen (N)	Total phos-phorus (P)	Methylene blue active sub-stances	pH	Total coli-form	Fecal coli-form	Aluminum recoverable (Al)		Total recov-erable chromium (Cr)	Lead (Pb)		Total recov-erable nickel (Ni)
							Total recov-erable	Dis-solved		Total recov-erable	Dis-solved	
Coefficients of correlation for supply wells in upper producing zone												
Median distance	---	-0.38	---	---	-0.44	-0.36	-0.41	---	---	-0.41	---	---
Drainage wells within 0.25 mile	---	---	---	---	---	---	---	---	0.49	---	---	---
Drainage wells within 0.5 mile	---	---	0.39	---	---	---	---	---	---	---	---	---
Drainage wells within 1 mile	0.43	---	.42	---	---	---	---	---	---	---	---	---
Drainage wells within 2 miles	.34	---	---	---	.37	---	---	---	---	---	---	---
Drainage wells within 5 miles	---	---	---	0.43	.42	---	---	---	---	---	---	---
Coefficients of correlation for supply wells in lower producing zone												
Median distance	-0.53	---	---	---	---	---	---	-0.60	---	-0.49	-0.49	-0.55
Drainage wells within 0.25 mile	---	---	---	---	---	---	---	.56	---	---	---	.58
Drainage wells within 0.5 mile	---	---	---	---	---	---	---	---	---	---	---	.49
Drainage wells within 1 mile	.64	---	---	---	---	---	---	---	---	---	---	---
Drainage wells within 2 miles	.67	---	---	---	---	---	---	---	---	---	---	---
Drainage wells within 5 miles	.76	---	---	---	---	---	---	---	---	---	---	---

A summary of the number of drainage wells within the selected radii of the 65 supply wells is as follows:

Radius (miles) around supply well	Number of drainage wells within upgradient radius Minimum	Median	Maximum
0.25	0	0	4
0.50	0	0	12
1.0	0	1	40
2.0	0	4	170
5.0	0	37	311

A rank correlation analysis was done using all water quality parameters and all sampled supply wells to relate water quality to proximity of drainage wells. The rank correlation procedure was used rather than the more familiar Pearson product-moment procedure because the rank correlation is nonparametric and therefore is unaffected by the nature of the distributions of the water quality parameter values, as are product-moment correlations. The analysis was performed separately for supply wells finished in the upper producing zone and in the lower producing zone. Rank correlations are computed using rank of the data value, rather than the data value itself. For example, a rank correlation of dissolved solids concentrations with median drainage well distance among N wells is performed after first assigning a value of 1 to the minimum dissolved solids and minimum median drainage well distance. Then, the data are ranked so that the maximum values of dissolved solids and median drainage well distance received a value of N. The analyses were done using procedures contained in the SAS[1/] statistical package (Helwig and Council, 1979).

Table 13 lists all significant relations between parameters and drainage well proximity measures. Significance was judged at a probability level of 5 percent, meaning that the computed correlation coefficients given in table 13 are probably greater than zero (no correlation) with less than a 5 percent risk of a wrong conclusion. Sign of the correlation coefficients indicates if the relation is direct (positive coefficient) or inverse (negative coefficient).

Table 13 shows that only 10 parameters sampled in supply wells were apparently related to (correlation coefficient >0.9) proximity of drainage wells. None of the parameters were highly related to proximity of drainage wells. The highest degree of correlation was between total nitrogen and number of drainage wells upgradient of supply wells in the lower producing zone. The correlation coefficient for this relation was +0.76, which shows that total nitrogen tends to be higher for supply wells in the lower producing zone that have relatively large numbers of drainage wells within 5 miles in the upgradient semicircle.

[1/] The use of brand or trade names used in this report is for identification only and does not imply endorsement by the U.S. Geological Survey.

All the constituents listed in table 13 increased in concentration with increasing drainage well proximity. The pH was lower in upper-producing zone supply wells that have relatively large numbers of drainage wells within 5 miles.

The square of the correlation coefficient is a measure of the degree of association between two variables. For example, the value 0.76^2 for total nitrogen indicates that 58 percent of the variation in rank of total nitrogen concentrations among the lower producing zone supply wells is explained by rank of the 5-mile drainage well count. Conversely, 42 percent of the variation in rank of total nitrogen is because of other factors. The variation in water quality not explained simply by the number of drainage wells in an area could be due in part to: (1) some drainage wells receive runoff frequently or continuously while others seldom receive runoff; (2) chemical quality of runoff to drainage wells could vary considerably from well to well, either because of differences in surrounding land use or because stormwater-borne contaminants could settle out in lakes before reaching drainage wells receiving lake overflow; and (3) variation in hydraulic properties of the aquifer could affect rates and direction of movement of recharge from drainage wells.

Also, the variation in supply-well water quality apparently related to proximity of drainage wells may be because of another factor that correlates with drainage-well density. For example, drainage wells are generally used to control runoff in developed areas, so there should be a high degree of relation between drainage-well density and degree of development or population density which could be a source of pollution without drainage wells. Therefore, the effect of development on supply-well water quality could not be separated from the effect of drainage wells. For example, application of lawn and garden fertilizers in a high density residential area and subsequent migration of the fertilizer leachate downward through the surficial aquifer to the Floridan aquifer could conceivably affect water quality in the Floridan. Because of the complexity of the factors that control water quality, it is not possible to unequivocally conclude that the correlations of water quality with drainage-well density shown in table 13 are due only to emplacement of water into the Floridan aquifer by drainage wells.

However, the data in table 13 suggest the probability that even if some of the variation in water quality in the Floridan aquifer is because of drainage well recharge, other factors are probably more important. This conclusion does not mean that pollution of supply wells by drainage wells could not occur in the Floridan aquifer.

Another method of analysis is to visually inspect the areal relation between drainage-well density and supply-well water quality. In this method, water-quality data of supply wells are plotted on maps to ascertain patterns in water quality that may relate to drainage-well density. Water movement through the Floridan aquifer is generally easterly in the Orlando area. Therefore, if the aquifer water quality is influenced markedly by drainage-well recharge, wells within and downgradient (east) of the Orlando area should have different chemical characteristics from wells upgradient (west) of Orlando.

The areal distribution of three selected water quality parameters--total nitrogen, total recoverable lead, and total coliform--are shown in figures 13, 14 and 15, respectively. These parameters were selected because they represent different types of compounds or properties that have related causally to drainage-well density, based on results of the rank correlation analysis given in table 13. To make patterns in water quality more noticeable, data from each supply or observation well were assigned classes according to concentration. Symbols that represent the appropriate class are plotted at the well locations.

For example, all wells within the range of 0 to 0.13 mg/L for total nitrogen concentration are plotted in figure 13 as symbol "A." Class intervals were initially defined so that each class contained about 20 percent of the wells, but some intervals were modified to provide more definition of the concentration distribution. For coliform data (plotted in fig. 15), the lowest class contains most of the wells because coliform were not detected in most supply wells.

Figure 13 shows little areal pattern for total nitrogen concentrations. High and low concentrations occurred east and west of Orlando. A small cluster of supply wells a short distance south of State Highway 50 and east of I-4 had relatively high nitrogen concentrations. Another small area of relatively high nitrogen concentration was about 6 miles northwest of the Highway 50 and I-4 intersection. The area of high nitrogen concentrations south of Highway 50 has a high drainage-well density (see fig. 4), but the other area of high nitrogen concentrations contains relatively few drainage wells. The areal pattern of occurrence for total recoverable lead (fig. 14) is also somewhat random, but the highest lead concentration (the 7 to 25 μg/L classes) tended to occur within 5 or 6 miles of the Highway 50 and I-4 intersection. Lower concentrations of lead were also found within this area. Total coliform colony counts (fig. 15) exceeded 1 col/100 mL in only a few supply wells scattered throughout the study area. Therefore, the data plotted in figures 13, 14, and 15 do not show a consistent pattern definitely related to movement of water from areas of high drainage-well density.

Based on these data, contamination of the Floridan aquifer from drainage-well recharge seems to be highly localized. Supply wells that by chance intersect the same transmissive rock openings that drainage wells inject into are apt to be contaminated by the drainage wells. But nearby supply wells could intersect an entirely different set of openings and these wells could be unaffected by drainage-well recharge.

The deep supply wells in the Orlando area are located mostly within the area of high drainage-well density. Because deep wells are obviously more expensive to construct than shallow wells, it may be assumed that some motivating factors, such as a need for better water quality has encouraged development of deep supplies. In the past, water quality has been judged mainly by esthetic criteria and bacteria content. Apparently, it has sometimes been necessary to tap the lower producing zone of the Floridan aquifer to obtain water of the desired quality (Kimrey, 1978) in the greater Orlando area.

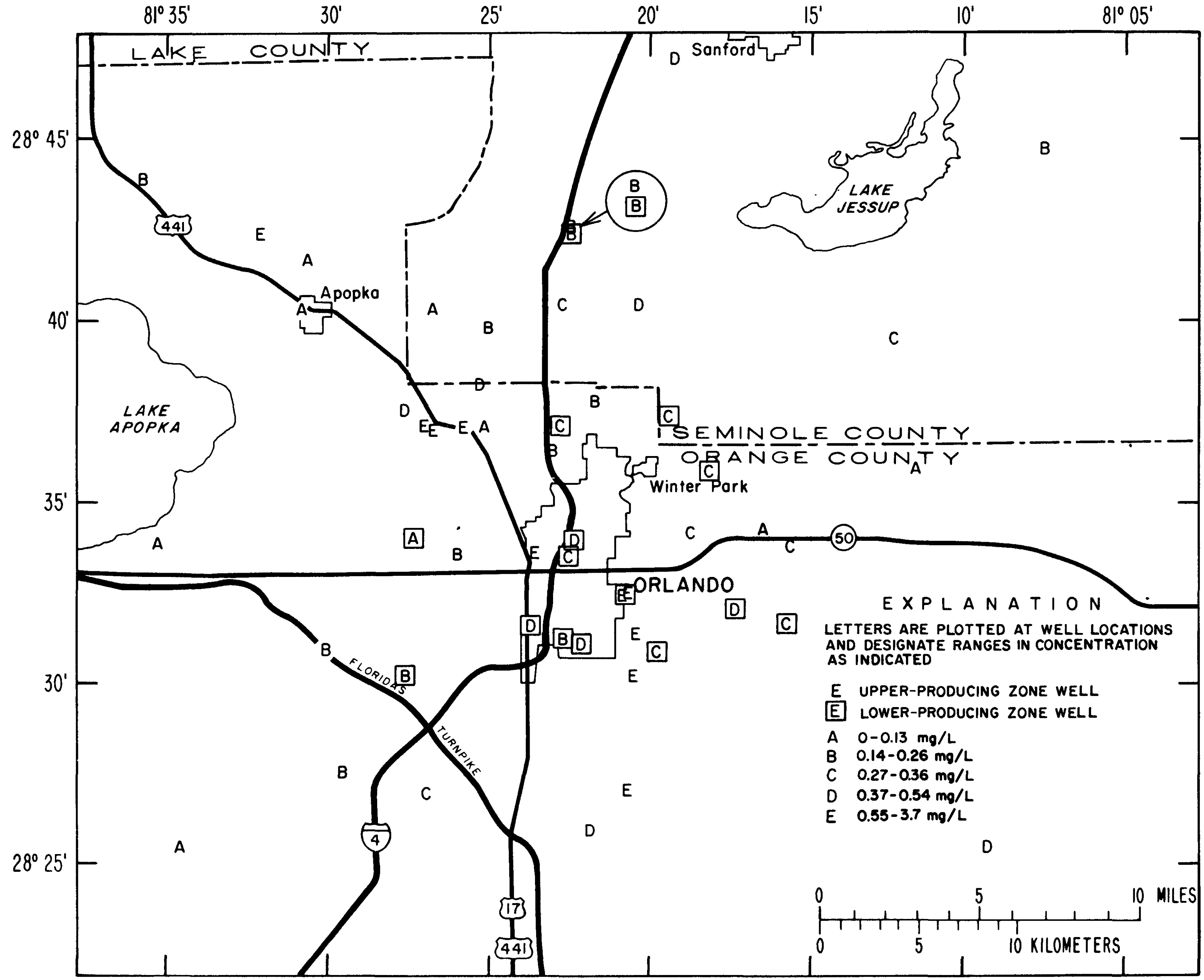


Figure 13.--Areal distribution of total nitrogen in supply wells.

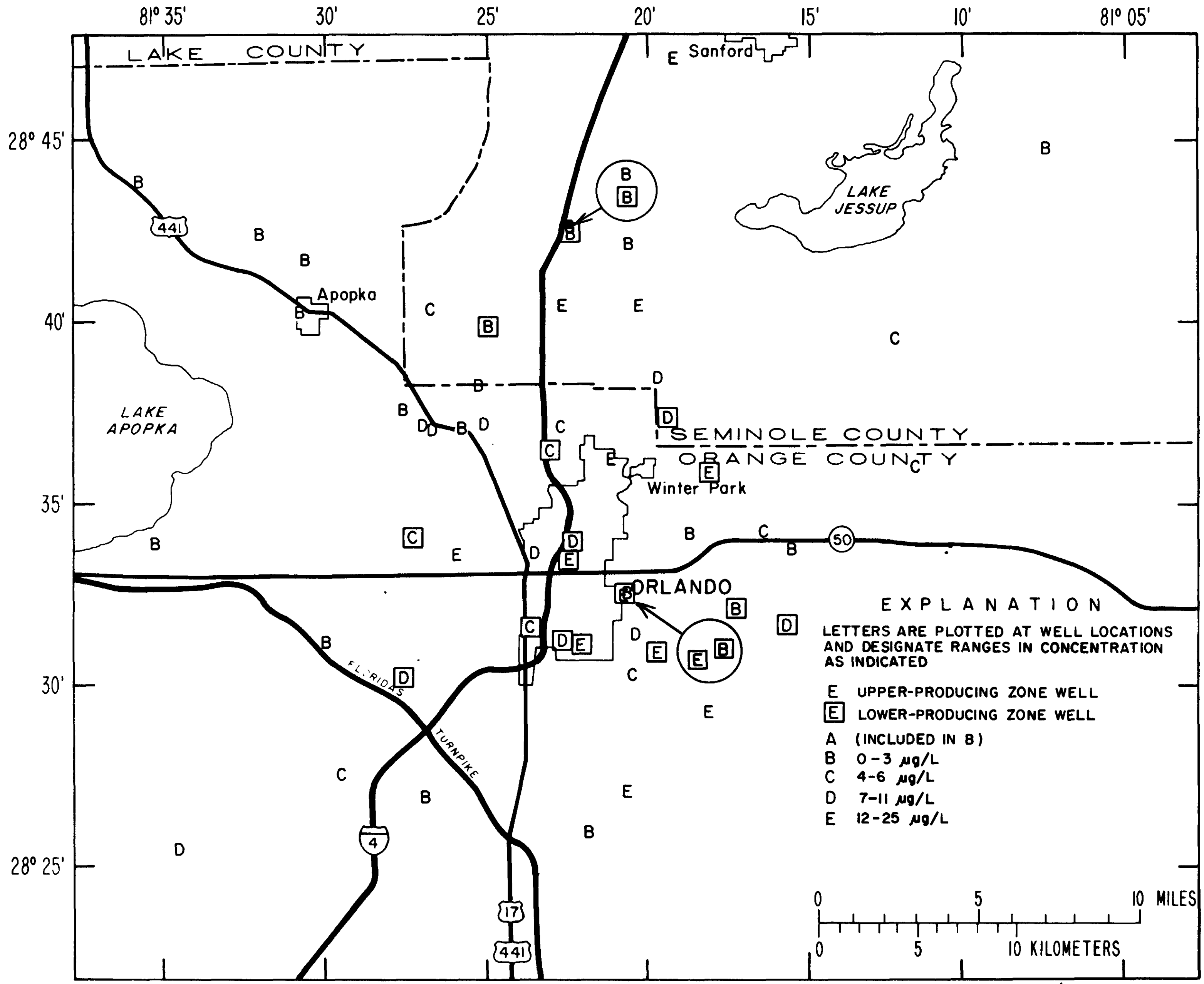


Figure 14.--Areal distribution of total recoverable lead in supply wells.

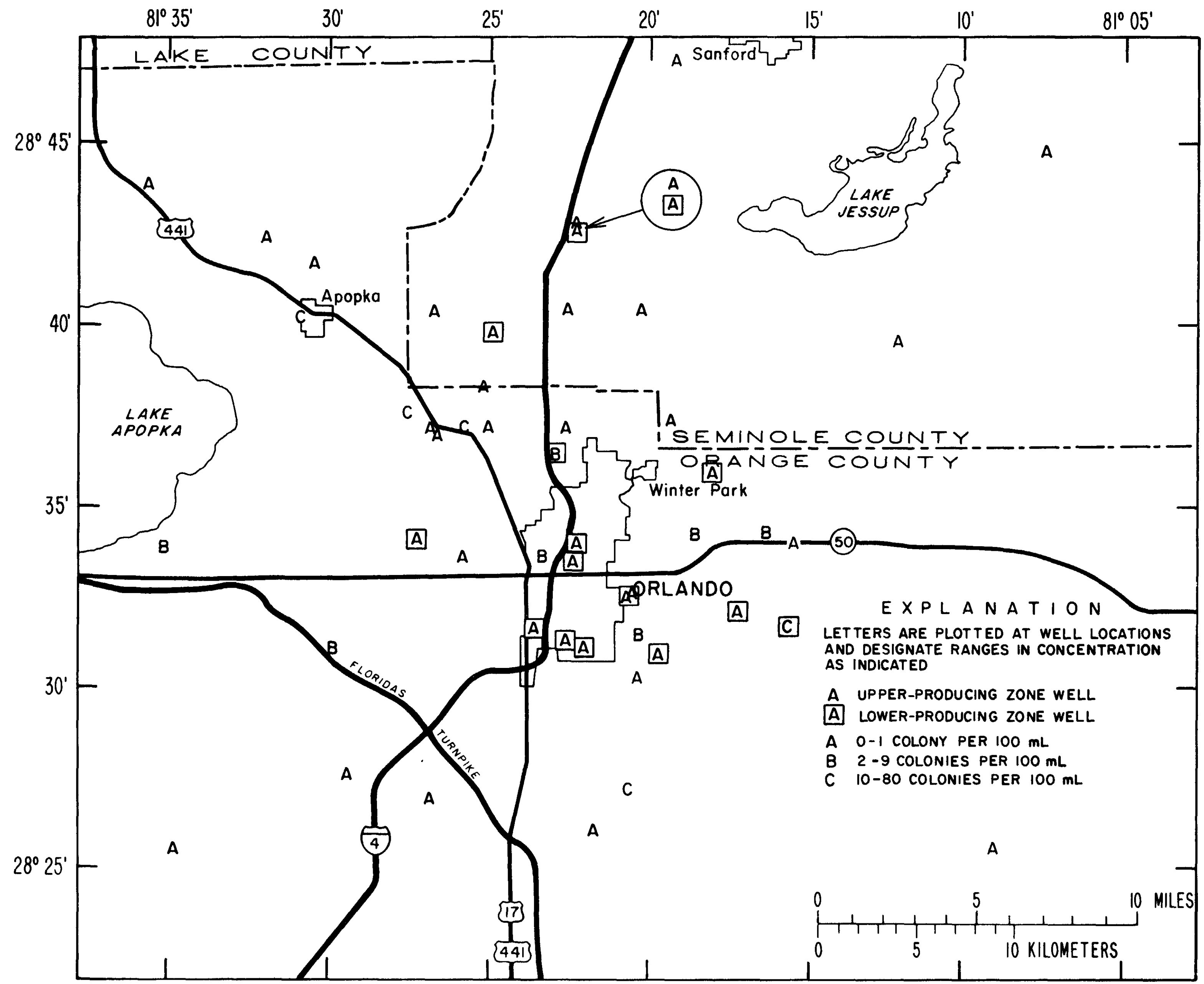


Figure 15.--Areal distribution of total coliform in supply wells.

CONCLUSIONS

Approximately 400 drainage wells, used to control lake levels and dispose of storm runoff, inject large quantities of storm runoff into the same water-bearing zone tapped for many public supplies in the Orlando area. This water-bearing zone extends from about 100 to 600 feet below the land surface and is termed the upper producing zone. About 75 percent of the public-supply wells in the study area tap the upper producing zone. Within this zone water injected by drainage wells moves towards supply wells. All the drainage wells have some potential to affect quality of public water supplies by lateral movement of pollutants in this zone. In addition, the bottom of the upper producing zone is less than 500 feet above the top of the lower producing zone--the zone that supplies about 65 percent of all water (rural, domestic, irrigation, industrial, and public supply) pumped in the study area. The upper and lower producing zones are hydraulically connected. Thus, water from drainage wells has the potential to affect the quality of other public water supplies by vertical movement of pollutants to the lower producing zone. Any deterioration of the Floridan water quality could cause health problems or increase costs of treating the water.

Drainage wells may contribute as much as 40 percent of the total average daily recharge (210 Mgal/d) to the Floridan aquifer in Orange County. This recharge balances discharge and serves as a buffer against upward saltwater encroachment in areas of heavy withdrawals from the Floridan.

During this study, both supply and drainage wells were sampled to determine the chemical characteristics of water in the vicinity of drainage wells to compare these characteristics with water from supply wells, and to ascertain the general, area-wide effect of drainage-well recharge on water quality of the Floridan aquifer. A summary of the major conclusions follows:

1. Drainage wells and upper producing zone supply wells yielded water very similar in chemical characteristics, particularly major dissolved constituents. The water in the upper producing zone of the Floridan aquifer is primarily a calcium and magnesium bicarbonate type. Bicarbonate generally accounts for more than 75 percent of the ions, and calcium and magnesium accounts for more than 85 percent of the cations. But in several supply wells, and several drainage wells, more than 25 percent of the anions consisted of sulfate plus chloride and more than 15 percent of the cations consisted of sodium plus potassium. Water from the lower producing zone (also a calcium and magnesium-bicarbonate type water) was more consistent within its chemical type. Part of this consistency may be because most samples from the lower producing zone were clustered in a small part of the study area or that the zone is deeper and more isolated from surface influences.

2. Water from drainage wells generally has slightly higher concentrations of most constituents than water from supply wells. Moreover, for some constituents, water from drainage wells has a marked tendency toward higher concentrations. The larger differences between the quality of water from drainage wells and supply wells, based on a comparison of median concentrations, were for total nitrogen, total phosphorus, total recoverable iron, and total coliform. The comparisons are as follows:

	Drainage wells	Supply wells
Total nitrogen (N)	1.0 mg/L	0.29 mg/L
Total phosphorus (P)	.23 mg/L	.07 mg/L
Total recoverable iron (Fe)	660 µg/L	60 µg/L
Total coliform	39 col/100 mL	0 col/100 mL

3. Color, hydrogen sulfide, iron, and manganese exceeded the National Secondary Drinking Water Regulation recommended maximum in some supply and drainage wells. The frequency of exceedance was greater for drainage wells than for supply wells. Concentrations of metals and pesticides in water from either well category did not exceed the limit specified in the Florida DER standards for potable ground water.

4. Only 6 pesticide compounds of 25 analyzed were detected in water from drainage wells; only two of these were detected in supply wells. Concentrations were much less than the maximum allowable concentrations specified in the Florida DER potable ground-water standards.

5. Water quality for drainage wells that receive street runoff was about the same as water quality for drainage wells that receive lake overflow, except for bacteria colony counts. Bacteria counts were considerably lower in wells that receive lake overflow than for those that receive direct street runoff.

6. The quality of water from the group of supply wells in the Orlando area is about the same as the quality of water from wells in adjacent areas where no drainage wells exist. However, for the supply wells in the Orlando area, correlation coefficients based on water quality data and distances between supply and drainage wells upgradient from supply wells indicate a relation between water quality and the number of drainage wells in an area. The highest correlation (0.76) was for total nitrogen in lower-producing zone supply wells as a function of number of drainage wells within 5 miles in the upgradient semicircle. This correlation analysis may not mean a direct cause-and-effect relation between water quality and drainage-well density. For example, high population density could be a source of pollutants independent of drainage wells.

7. Areal patterns of selected water quality constituents do not appear to relate to drainage-well density. Results of this study indicate that, for the quality criteria used, widespread contamination of the Floridan aquifer probably has not occurred from drainage-well recharge. The bacterial contamination found in some drainage wells appears highly localized. Water from drainage wells would generally be acceptable for public supply use if bacteria were not present. Supply wells that intersect the same interconnected rock openings as drainage wells are apt to be contaminated by drainage-well recharge. However, nearby supply wells may intersect an entirely different set of openings and be unaffected.

8. Although no serious health hazards were noted in water from supply wells during this study, the threat of pollution by drainage wells is a possibility which perhaps could be aborted by a basic monitoring program which might include, for example: (a) Annual samples of five or more upper producing zone and one lower producing zone public-supply well located as close as possible to and downgradient from drainage wells or a high density drainage-well area; (b) samples taken during the period June through September would be most representative because recharge from drainage wells and the hydraulic gradient from drainage to supply wells are then at a maximum; (c) perhaps the list of water-quality parameters to be sampled could be expanded to include the toxic organic compounds and metals of the EPA list of 129 priority pollutants; (d) trace metal analysis could include the list given in the Florida DER criteria for potable ground-water supplies, emphasizing analysis of total recoverable concentrations.

Also, efforts to quantify the loads of undesirable constituents entering the Floridan aquifer from drainage wells, and the capacity of the aquifer to remove these materials would permit estimates of long-term impacts of recharge on the potable water supply to be made.

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SUPPLEMENTARY DATA I--QUALITY OF WATER ANALYSES FOR SUPPLY WELLS

The following table lists the quality-of-water data for supply wells used in this report. The data are categorized as follows:

(1) Major inorganic chemcial constituents, physical properties, and bacteria
(2) Nutrients
(3) Trace elements
(4) Organic compounds

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria

STATION NUMBER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (UMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (FTU)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
281937081250101	72-04-13	230	8.0	26.0	--	--	--	--	--	--	100
	76-08-17	240	--	25.0	5	1.0	--	--	--	--	100
	76-08-17	242	--	30.0	--	1.0	--	--	--	--	--
	77-09-04	232	7.1	24.5	0	--	4	7	0	--	110
	78-10-10	205	7.5	24.0	--	--	--	--	--	--	120
	78-12-11	205	8.1	24.0	--	--	--	--	--	--	110
	79-03-20	225	7.5	23.5	--	--	--	--	--	--	93
	79-12-04	220	--	--	--	--	--	--	--	--	--
282331081370801	79-03-26	258	7.9	23.0	--	--	--	--	--	--	110
282529081343001	71-05-06	--	--	25.0	--	--	--	--	--	--	--
	77-09-04	171	8.2	23.5	0	--	3	0	0	--	85
282530081094001	64-02-13	786	7.9	24.4	40	--	--	--	--	--	360
	64-02-14	600	8.1	--	20	--	--	--	--	--	288
	64-02-17	660	7.7	--	20	--	--	--	--	--	312
	64-02-18	680	7.8	--	25	--	--	--	--	--	316
	65-01-13	710	8.0	23.9	15	--	--	--	--	--	336
	66-04-28	750	7.6	24.4	5	--	--	--	--	--	330
	67-05-11	740	7.5	25.6	15	--	--	--	--	--	310
	67-11-09	700	7.5	24.0	10	--	--	--	--	--	330
	68-05-23	710	7.6	25.0	15	--	--	--	--	--	320
	69-05-15	694	8.2	25.0	10	--	--	--	--	--	313
	70-04-30	683	8.7	25.0	10	--	--	--	--	--	320
	71-06-03	667	7.0	25.0	20	--	--	--	--	--	300
	72-04-27	690	7.8	--	10	--	--	--	--	--	290
	72-05-02	690	8.1	--	20	--	--	--	--	--	310
	74-06-11	684	--	25.0	20	--	--	--	--	--	320
	76-05-12	--	--	25.0	5	--	--	--	--	--	300
	77-06-02	--	--	--	20	--	--	--	--	--	300
	77-09-04	670	7.6	24.0	10	--	10	0	0	--	300
	79-05-30	--	--	24.5	10	--	--	--	--	--	300
	80-06-02	680	7.3	25.5	5	--	--	--	--	--	280
282552081345301	80-03-12	176	8.0	25.0	5	--	--	--	--	--	84
282558081215401	77-09-04	324	7.1	24.0	0	--	5	0	0	--	160
282647081354801	79-03-26	245	7.6	23.5	--	--	--	--	--	--	110
282654081265701	62-06-04	222	7.5	22.8	5	--	--	--	--	--	106
	77-09-06	230	7.7	--	0	--	5	0	0	--	120
282705081204601	61-01-25	303	8.4	23.3	--	--	--	--	--	--	144
	77-09-04	341	7.2	24.5	0	--	8	60	5	--	160
282732081293001	77-09-05	266	7.5	23.0	0	--	1	0	0	--	130
282738081341401	79-05-29	230	7.8	24.0	--	--	--	--	--	--	120

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
281937081250101	72-04-13	32	5.7	5.3	.7	130	.0	6.0	.2
	76-08-17	33	5.0	5.9	.8	136	3.0	5.9	.1
	76-08-17	--	--	--	--	--	--	--	.2
	77-09-04	33	5.5	5.6	.9	130	1.3	5.7	.1
	78-10-10	37	6.0	4.5	.7	--	19	4.7	--
	78-12-11	33	5.4	5.8	.7	--	<5.0	5.0	--
	79-03-20	29	5.0	4.0	.7	--	6.5	<4.0	--
	79-12-04	--	--	--	--	--	1.3	6.2	--
282331081370801	79-03-26	37	4.7	3.8	.1	--	28	<4.0	--
282529081343001	71-05-06	--	--	--	--	--	--	--	--
	77-09-04	25	5.4	2.8	.5	100	2.3	4.3	.1
282530081094001	64-02-13	116	17	36	2.4	250	144	55	.2
	64-02-14	98	11	24	1.8	278	68	27	.8
	64-02-17	106	12	26	2.0	261	100	34	.3
	64-02-18	106	14	26	2.0	270	98	36	.2
	65-01-13	112	14	29	1.8	248	126	42	.3
	66-04-28	107	16	26	1.8	242	130	40	.3
	67-05-11	101	15	27	1.9	246	114	40	.1
	67-11-09	103	17	26	1.8	240	120	39	.2
	68-05-23	101	16	26	1.7	242	107	41	.4
	69-05-15	100	15	26	1.8	240	114	40	.2
	70-04-30	101	16	26	1.8	184	110	37	.2
	71-06-03	96	15	24	1.6	270	106	35	.3
	72-04-27	92	15	26	1.7	240	110	37	.3
	72-05-02	100	15	26	2.0	236	110	34	.3
	74-06-11	100	16	25	1.9	244	110	35	.3
	76-05-12	95	15	25	1.6	238	100	36	.3
	77-06-02	96	15	25	1.8	230	110	35	.1
	77-09-04	95	15	24	2.0	240	100	35	.1
	79-05-30	95	14	23	1.7	240	110	36	.2
	80-06-02	87	14	27	1.5	--	100	35	.2
282552081345301	80-03-12	25	5.2	2.9	.4	--	2.4	4.3	.1
282558081215401	77-09-04	50	8.6	8.7	1.4	190	3.2	10	.2
282647081354801	79-03-26	25	12	3.8	1.0	--	30	<4.0	--
282654081265701	62-06-04	34	5.1	4.6	.8	118	5.2	5.0	.1
	77-09-06	37	5.7	5.7	1.1	120	9.4	9.0	.1
282705081204601	61-01-25	--	--	--	--	180	--	--	--
	77-09-04	46	9.8	8.8	1.0	180	3.2	13	.2
282732081293001	77-09-05	43	6.2	5.0	1.8	130	13	9.8	.1
282738081341401	79-05-29	34	8.0	4.0	1.6	--	16	5.9	--

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)
281937081250101	72-04-13	11	134	130
	76-08-17	11	127	132
	76-08-17	--	174	--
	77-09-04	12	126	128
	78-10-10	--	131	--
	78-12-11	--	134	--
	79-03-20	--	125	--
	79-12-04	--	--	--
282331081370801	79-03-26	--	--	--
282529081343001	71-05-06	9.2	--	--
	77-09-04	8.9	100	99
282530081094001	64-02-13	21	612	515
	64-02-14	24	432	392
	64-02-17	23	476	432
	64-02-18	23	500	433
	65-01-13	21	512	468
	66-04-28	21	--	462
	67-05-11	22	476	442
	67-11-09	20	478	445
	68-05-23	20	503	434
	69-05-15	24	455	440
	70-04-30	22	488	433
	71-06-03	20	461	431
	72-04-27	24	450	430
	72-05-02	22	468	427
	74-06-11	22	487	432
	76-05-12	22	454	414
	77-06-02	21	437	419
	77-09-04	21	436	412
	79-05-30	20	466	420
	80-06-02	20	455	400
282552081345301	80-03-12	9.1	95	98
282558081215401	77-09-04	12	185	188
282647081354801	79-03-26	--	--	--
282654081265701	62-06-04	9.6	124	123
	77-09-06	9.1	123	136
282705081204601	61-01-25	--	--	--
	77-09-04	13	187	184
282732081293001	77-09-05	8.7	161	152
282738081341401	79-05-29	--	--	--

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (FTU)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)
282835081305201	79-05-29	210	7.7	24.0	--	--	--	--	--	--	110
282912081181501	77-11-14	490	7.1	20.0	5	1.0	--	--	--	--	130
283006081273701	76-06-23	--	--	26.0	5	--	40	2	--	--	120
	77-09-02	260	7.8	24.5	0	--	30	0	0	--	120
283013081203401	61-01-25	226	7.3	--	5	--	--	--	--	--	97
	77-09-03	315	8.0	23.0	0	--	7	0	0	--	120
283051081195101	77-09-02	278	7.8	25.0	0	--	4	0	0	--	130
283054081042601	65-05-19	620	7.7	23.3	15	--	--	--	--	--	260
	66-06-16	600	7.8	23.3	0	--	--	--	--	--	256
	67-05-08	620	8.4	23.9	0	--	--	--	--	--	250
	68-05-23	630	7.6	--	10	--	--	--	--	--	254
	69-05-12	590	7.8	24.0	0	--	--	--	--	--	252
	70-04-21	622	7.3	24.0	10	--	--	--	--	--	260
	71-06-07	600	8.2	23.5	10	--	--	--	--	--	260
	77-09-04	239	7.3	23.0	0	--	11	0	0	--	260
283054081295901	77-09-04	236	7.3	24.0	0	--	2	8	0	--	110
283103081221101	77-09-02	270	7.6	25.0	0	--	12	0	0	--	140
283111081224201	77-09-02	255	7.8	25.0	0	--	2	0	0	--	120
283121081202901	77-09-03	370	8.0	23.5	0	--	0	2	0	--	150
283135081155201	62-06-18	266	--	25.0	7	--	--	--	--	--	122
	77-09-03	273	7.9	24.5	0	--	4	34	4	--	120
283135081234301	62-06-26	276	7.7	23.3	7	--	--	--	--	--	134
	77-09-06	278	8.0	--	0	--	13	0	0	--	140
283202081172501	62-06-18	255	7.5	23.9	10	--	--	--	--	--	126
	63-12-20	250	7.5	23.9	15	--	--	--	--	--	124
	77-09-07	265	7.8	24.0	0	--	40	0	0	--	130
283225081205101	62-06-01	273	7.3	24.4	10	--	--	--	--	--	120
	77-09-02	295	7.9	24.5	0	--	4	0	0	--	130
283228081204201	77-09-02	285	7.8	24.5	0	--	4	0	0	--	130
283303081444801	68-05-09	198	7.2	--	40	--	--	--	--	--	88
	77-09-02	235	7.8	--	0	--	--	52	52	--	110
283314081455501	77-09-06	344	7.8	24.0	0	--	2	0	0	--	160
283327081223201	62-06-01	267	7.4	25.0	5	--	--	--	--	--	124
	77-09-02	250	7.5	25.0	0	--	2	0	0	--	120
283331081255701	77-09-03	235	8.0	23.0	0	--	4	0	0	--	120
283333081233502	62-08-22	372	7.5	23.9	5	--	--	--	--	--	165
	62-08-23	359	7.8	23.3	5	--	--	--	--	--	168
	62-08-30	348	7.5	23.3	5	--	--	--	--	--	162
	62-08-31	351	7.4	23.3	10	--	--	--	--	--	158
	62-09-05	325	7.5	23.3	5	--	--	--	--	--	150

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
282835081305201	79-05-29	37	5.1	<3.1	.8	--	2.1	9.2	--
282912081181501	77-11-14	41	7.0	9.6	1.3	150	7.8	20	.2
283006081273701	76-06-23	35	8.8	5.2	.8	125	19	7.8	.3
	77-09-02	35	8.5	5.2	1.9	120	17	7.9	.1
283013081203401	61-01-25	31	4.7	8.3	.8	122	1.2	9.5	.3
	77-09-03	36	7.4	10	1.9	140	4.9	14	.1
283051081195101	77-09-02	38	8.2	7.0	1.0	140	5.1	9.7	.1
283054081042601	65-05-19	86	11	33	1.3	306	14	43	.5
	66-06-16	86	10	34	1.2	308	12	42	.5
	67-05-08	86	9.6	33	1.3	292	11	42	.6
	68-05-23	85	10	33	1.2	308	15	45	.5
	69-05-12	84	10	32	1.2	302	12	42	.6
	70-04-21	86	10	33	1.2	300	14	41	.5
	71-06-07	86	10	36	1.4	300	16	40	.6
	77-09-04	87	9.7	32	1.3	290	15	42	.4
283054081295901	77-09-04	36	5.2	6.8	.8	100	16	12	.1
283103081221101	77-09-02	42	9.3	7.1	1.1	160	7.3	9.5	.1
283111081224201	77-09-02	36	8.3	5.8	.9	140	5.9	8.5	.1
283121081202901	77-09-03	46	8.9	12	5.4	150	32	20	.1
283135081155201	62-06-18	36	7.8	7.8	1.0	136	10	11	.3
	77-09-03	35	7.6	7.7	1.0	130	8.3	11	.2
283135081234301	62-06-26	38	9.5	7.0	1.0	154	5.2	10	.3
	77-09-06	40	8.5	7.0	1.1	150	4.6	9.3	.2
283202081172501	62-06-18	36	8.8	6.5	.8	132	10	10	.2
	63-12-20	38	7.1	5.2	1.0	133	13	10	.2
	77-09-07	>38	8.0	6.8	1.1	130	10	9.8	.1
283225081205101	62-06-01	34	8.5	9.1	1.5	136	5.2	11	.1
	77-09-02	36	8.7	8.8	1.6	140	4.1	13	.1
283228081204201	77-09-02	37	9.0	8.2	1.2	150	4.2	11	.1
283303081444801	68-05-09	27	5.0	6.3	.5	106	.4	10	.3
	77-09-02	31	6.8	6.8	.7	110	5.7	11	.2
283314081455501	77-09-06	46	9.7	11	1.4	150	16	17	.1
283327081223201	62-06-01	37	7.7	6.1	1.0	142	6.4	8.0	.1
	77-09-02	35	8.2	6.6	1.0	130	5.3	9.7	.1
283331081255701	77-09-03	35	6.9	4.1	.8	130	2.3	6.5	.1
283333081233502	62-08-22	48	11	15	2.2	178	23	16	.5
	62-08-23	46	13	13	1.6	196	10	15	.4
	62-08-30	53	7.3	12	1.6	192	4.8	15	.3
	62-08-31	47	9.8	12	1.4	114	57	76	.3
	62-09-05	46	8.5	12	1.6	174	4.4	15	.3

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)
282835081305201	79-05-29	--	--	--
282912081181501	77-11-14	11	168	172
283006081273701	76-06-23	11	176	150
	77-09-02	11	157	147
283013081203401	61-01-25	11	124	128
	77-09-03	7.8	158	151
283051081195101	77-09-02	11	162	149
283054081042601	65-05-19	33	404	373
	66-06-16	31	--	369
	67-05-08	32	378	369
	68-05-23	31	379	374
	69-05-12	34	380	368
	70-04-21	35	384	370
	71-06-07	33	402	372
	77-09-04	34	377	365
283054081295901	77-09-04	9.3	141	136
283103081221101	77-09-02	11	169	167
283111081224201	77-09-02	11	155	146
283121081202901	77-09-03	5.7	236	204
283135081155201	62-06-18	11	172	152
	77-09-03	11	159	146
283135081234301	62-06-26	11	178	158
	77-09-06	12	166	157
283202081172501	62-06-18	7.7	168	145
	63-12-20	7.9	150	149
	77-09-07	8.9	163	147
283225081205101	62-06-01	8.4	161	149
	77-09-02	8.2	164	150
283228081204201	77-09-02	9.3	160	154
283303081444801	68-05-09	10	117	112
	77-09-02	12	138	129
283314081455501	77-09-06	15	207	190
283327081223201	62-06-01	12	151	148
	77-09-02	11	142	141
283331081255701	77-09-03	7.1	128	127
283333081233502	62-08-22	12	216	216
	62-08-23	19	211	215
	62-08-30	15	212	207
	62-08-31	14	214	223
	62-09-05	13	189	187

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (UMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (FTU)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
283333081233502	79-04-27	338	7.6	24.5	0	3.0	35	28	3	30	140
	79-04-27	290	8.1	25.5	0	70	40	8	2	1	140
283348081351201	75-05-19	243	8.2	--	0	--	--	--	--	--	110
	77-09-02	244	8.0	--	0	--	0	6	2	--	110
283350081154301	77-09-03	278	7.2	24.5	0	--	2	0	0	--	130
283353081222401	61-01-16	349	7.5	25.0	3	--	--	--	--	--	141
	62-07-05	261	8.0	25.0	5	--	--	--	--	--	120
	65-05-19	260	7.2	24.4	5	--	--	--	--	--	132
	66-06-16	262	7.4	25.0	0	--	--	--	--	--	122
	67-05-05	270	7.8	--	0	--	--	--	--	--	120
	68-05-21	262	7.2	24.0	5	--	--	--	--	--	122
	69-05-14	260	8.1	25.0	0	--	--	--	--	--	122
	70-04-28	274	7.2	25.5	0	--	--	--	--	--	120
	71-05-25	250	8.3	25.5	0	--	--	--	--	--	120
	72-05-12	258	--	25.0	--	--	--	--	--	--	--
	75-05-30	267	7.7	--	5	--	--	--	--	--	120
	76-08-06	265	--	25.5	10	1.0	--	--	--	--	120
	76-08-06	229	--	26.5	--	1.0	--	--	--	--	--
	77-09-02	258	7.7	25.0	0	--	3	0	0	--	120
	80-03-04	260	7.3	24.0	5	--	--	--	--	--	120
283357081272201	62-06-01	214	7.6	25.0	0	--	--	--	--	--	102
	77-09-07	220	7.9	25.0	0	--	7	0	0	--	98
283408081184801	77-09-03	302	7.2	24.0	0	--	4	8	0	--	140
283412081163401	77-09-03	415	7.1	23.0	20	--	6	8	4	--	220
283548081181401	77-09-02	260	7.3	25.0	0	--	2	0	0	--	120
283555081115201	77-09-01	285	--	--	0	--	2	0	0	--	130
283607081211301	62-06-21	268	7.5	23.3	2	--	--	--	--	--	130
	65-05-19	270	7.6	23.3	0	--	--	--	--	--	140
	66-06-16	285	7.5	23.3	0	--	--	--	--	--	136
	67-05-05	270	7.6	23.9	0	--	--	--	--	--	120
	68-05-21	280	7.2	23.0	10	--	--	--	--	--	130
	69-05-13	270	7.9	24.0	0	--	--	--	--	--	137
	70-04-24	314	7.1	24.5	5	--	--	--	--	--	150
	71-05-25	270	7.3	24.0	5	--	--	--	--	--	127
	72-05-11	288	--	23.0	--	--	--	--	--	--	--
	77-09-02	278	7.3	23.5	0	--	0	--	--	--	130
283608081211601	62-06-21	295	7.5	23.3	12	--	--	--	--	--	150
	80-03-04	313	7.5	25.0	5	--	--	--	--	--	140
283623081230501	62-06-21	220	7.7	23.3	3	--	--	--	--	--	104
	77-09-05	212	7.2	24.0	0	--	4	2	0	--	110

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
283333081233502	79-04-27	42	7.8	10	1.8	176	7.6	15	.2
	79-04-27	42	8.4	11	1.7	--	8.5	17	.2
283348081351201	75-05-19	32	7.5	5.1	1.5	120	13	8.0	.1
	77-09-02	33	7.0	5.4	.9	110	14	8.2	.1
283350081154301	77-09-03	41	6.9	7.0	.9	160	5.3	9.3	.2
283353081222401	61-01-16	35	13	6.6	.5	144	5.2	10	.2
	62-07-05	35	7.9	6.1	1.0	144	4.8	7.0	.1
	65-05-19	18	21	6.5	1.0	146	6.0	11	.2
	66-06-16	35	8.5	6.7	1.0	144	6.0	12	.3
	67-05-05	34	8.3	6.5	1.0	142	3.6	11	.2
	68-05-21	35	8.4	6.3	.9	150	4.2	12	.2
	69-05-14	35	8.3	6.2	1.0	140	2.8	10	.3
	70-04-28	35	8.4	7.2	.9	132	4.8	16	1.1
	71-05-25	34	8.5	6.6	.9	136	6.0	10	.3
	72-05-12	--	--	--	--	--	--	--	--
	75-05-30	34	8.2	6.6	1.0	138	5.0	8.2	.2
	76-08-06	35	7.6	7.3	1.0	142	6.2	8.9	.3
	76-08-06	--	--	--	--	--	--	--	1.1
	77-09-02	34	8.3	6.7	1.0	130	4.7	9.9	.1
	80-03-04	34	8.1	6.9	.8	--	5.2	9.8	.2
283357081272201	62-06-01	29	7.2	4.2	.8	120	.4	4.0	.0
	77-09-07	27	7.4	4.8	.8	110	2.1	10	.5
283408081184801	77-09-03	41	7.9	6.8	.8	170	5.0	9.3	.2
283412081163401	77-09-03	80	5.0	5.5	.7	260	.6	6.6	.1
283548081181401	77-09-02	34	8.1	7.0	.9	130	5.0	9.7	.1
283555081115201	77-09-01	40	7.0	6.8	.9	130	2.5	20	.1
283607081211301	62-06-21	36	9.7	7.1	.9	148	4.4	11	.3
	65-05-19	37	11	5.0	.9	148	5.2	11	.2
	66-06-16	38	10	7.1	1.0	156	7.6	12	.3
	67-05-05	35	8.7	7.0	.9	146	4.8	13	.3
	68-05-21	37	9.2	6.5	.9	158	4.0	13	.3
	69-05-13	35	12	6.5	1.0	148	5.6	13	.3
	70-04-24	41	11	7.0	1.1	160	14	11	.3
	71-05-25	36	8.9	7.1	.9	144	4.8	12	.2
	72-05-11	--	--	--	--	--	--	--	--
	77-09-02	38	9.3	7.3	1.1	150	6.3	12	.2
283608081211601	62-06-21	40	12	7.4	1.1	160	9.2	10	.3
	80-03-04	40	9.9	7.5	1.0	--	10	11	.2
283623081230501	62-06-21	29	7.7	5.2	.8	122	4.8	8.0	.2
	77-09-05	31	7.8	5.6	.9	120	4.8	8.7	.1

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
283333081233502	79-04-27	11	181	174
	79-04-27	11	183	172
283348081351201	75-05-19	10	144	137
	77-09-02	10	139	133
283350081154301	77-09-03	13	160	163
283353081222401	61-01-16	11	155	153
	62-07-05	12	143	145
	65-05-19	11	176	147
	66-06-16	10	--	150
	67-05-05	11	141	146
	68-05-21	11	148	152
	69-05-14	12	161	147
	70-04-28	12	157	150
	71-05-25	11	154	145
	72-05-12	--	--	--
	75-05-30	10	148	142
	76-08-06	10	--	146
	76-08-06	--	124	--
	77-09-02	11	175	140
	80-03-04	11	147	142
283357081272201	62-06-01	11	119	116
	77-09-07	10	123	117
283408081184801	77-09-03	11	164	166
283412081163401	77-09-03	16	240	244
283548081181401	77-09-02	10	142	139
283555081115201	77-09-01	11	175	153
283607081211301	62-06-21	10	172	153
	65-05-19	18	--	161
	66-06-16	10	--	163
	67-05-05	10	153	152
	68-05-21	10	153	159
	69-05-13	12	167	161
	70-04-24	11	180	175
	71-05-25	10	162	153
	72-05-11	--	--	--
	77-09-02	9.6	167	158
283608081211601	62-06-21	11	192	170
	80-03-04	9.0	178	167
283623081230501	62-06-21	9.3	140	125
	77-09-05	8.8	137	127

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	COLOR (PLAT-INUM-COBALT UNITS)	TUR-BID-ITY (FTU)	OXYGEN DEMAND, CHEM-ICAL (HIGH LEVEL) (MG/L)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)
283656081264501	77-09-03	249	6.6	24.0	0	--	4	0	0	--	100
283658081254801	77-09-03	241	7.0	24.0	0	--	4	10	--	--	110
283702081265801	77-09-03	276	7.1	24.0	0	--	0	0	0	--	130
283703081225001	77-09-01	335	--	23.0	0	--	2	0	0	--	160
283707081250901	77-09-03	219	7.3	24.0	0	--	0	0	0	--	100
283717081193101	62-06-21	254	7.5	25.0	5	--	--	--	--	--	124
	73-06-26	260	7.8	24.5	0	--	--	--	--	--	120
	77-09-02	265	7.2	25.0	0	--	8	0	0	--	120
283729081273701	77-09-03	245	7.6	23.0	0	--	4	54	0	--	110
283743081214501	75-05-30	252	7.7	--	0	--	--	--	--	--	130
	80-03-05	268	7.5	22.5	5	--	--	--	--	--	120
283809081251802	73-06-26	268	7.7	23.0	5	--	--	--	--	--	130
	77-09-07	264	7.7	23.0	0	--	10	0	0	--	130
283823081195001	77-11-14	--	7.1	23.0	0	2.0	--	--	--	--	100
283855081192801	80-03-06	243	7.8	26.0	5	--	--	--	--	--	110
283925081123301	73-06-06	460	7.7	24.5	0	--	--	--	--	--	140
	77-09-01	445	7.9	25.0	0	--	6	0	0	--	140
283943081250201	77-09-06	225	7.9	24.0	0	--	0	0	0	--	110
284014081264901	73-06-13	260	8.1	24.5	0	--	--	--	--	--	130
	77-09-06	255	7.8	23.5	0	--	4	0	0	--	130
284014081304601	61-01-11	317	7.7	23.3	5	--	--	--	--	--	164
	65-05-20	290	7.9	23.3	0	--	--	--	--	--	136
	66-06-16	290	7.5	24.4	5	--	--	--	--	--	142
	67-05-05	288	8.2	23.9	0	--	--	--	--	--	140
	68-05-21	301	7.5	23.0	5	--	--	--	--	--	138
	69-05-13	285	7.9	24.0	0	--	--	--	--	--	138
	70-04-24	295	7.3	24.5	0	--	--	--	--	--	140
	71-05-25	300	8.2	24.5	0	--	--	--	--	--	140
	72-05-09	334	--	23.5	--	--	--	--	--	--	--
	77-09-01	264	--	--	0	--	--	80	0	--	120
284017081202401	71-02-25	330	8.1	--	0	--	--	--	--	--	150
	77-09-02	372	7.1	24.0	0	--	10	0	0	--	180
284020081224501	77-09-01	270	8.2	25.0	0	--	2	0	0	--	120
284134081303801	77-09-01	330	7.4	--	0	--	0	0	0	--	150
284202081204401	73-06-07	269	7.9	23.5	0	--	--	--	--	--	130
	77-11-02	--	7.4	24.0	0	1.0	--	--	--	--	120
284217081320201	77-09-06	369	7.1	23.0	0	--	4	0	0	--	170
	78-06-26	--	--	24.5	--	--	--	--	--	--	--
284221081223401	73-06-07	240	7.8	24.5	0	--	--	--	--	--	110
	77-09-06	285	8.0	24.5	0	--	10	0	0	--	130

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)
283656081264501	77-09-03	28	7.2	11	.8	91	5.7	14	.1
283658081254801	77-09-03	29	10	9.8	.9	110	12	14	.2
283702081265801	77-09-03	32	11	6.4	.6	140	4.3	8.8	.1
283703081225001	77-09-01	45	11	9.0	2.1	160	20	15	.2
283707081250901	77-09-03	31	6.5	5.1	.6	120	3.8	8.1	.1
283717081193101	62-06-21	35	8.9	6.5	.8	140	5.6	9.0	.2
	73-06-26	35	8.2	6.8	1.1	138	5.6	10	.2
	77-09-02	35	8.4	7.0	.9	140	<.3	9.3	.1
283729081273701	77-09-03	32	6.6	6.4	.9	120	3.5	8.6	.1
283743081214501	75-05-30	41	5.4	11	1.4	115	14	15	.2
	80-03-05	36	8.1	5.7	.7	--	3.6	8.9	.2
283809081251802	73-06-26	37	8.7	4.9	.8	149	.8	8.0	.6
	77-09-07	38	8.7	5.3	.8	150	2.1	8.5	.2
283823081195001	77-11-14	29	7.5	5.3	1.0	130	3.5	11	.1
283855081192801	80-03-06	31	7.6	5.4	.7	--	3.2	8.1	.2
283925081123301	73-06-06	41	9.4	34	1.9	136	12	62	.2
	77-09-01	40	9.5	33	1.9	140	10	59	.1
283943081250201	77-09-06	31	7.8	4.6	.8	120	2.7	7.4	.1
284014081264901	73-06-13	42	5.4	4.0	.6	144	4.4	6.0	.3
	77-09-06	36	8.8	5.7	1.6	130	13	9.5	.2
284014081304601	61-01-11	46	12	7.0	.4	184	2.8	9.0	.2
	65-05-20	43	6.9	7.4	1.0	168	5.2	10	.2
	66-06-16	37	12	7.1	.8	166	3.6	12	.1
	67-05-05	36	11	7.6	.8	164	2.4	12	.3
	68-05-21	37	11	6.9	.8	168	6.6	13	.2
	69-05-13	37	11	7.1	.8	164	4.8	11	.3
	70-04-24	36	12	7.8	.8	182	5.2	11	.2
	71-05-25	36	12	8.2	.6	164	6.0	10	.3
	72-05-09	--	--	--	--	--	--	--	--
	77-09-01	32	9.1	7.4	1.0	130	12	11	.2
284017081202401	71-02-25	42	12	5.4	1.0	188	4.0	10	.2
	77-09-02	55	11	6.7	2.0	200	14	11	.2
284020081224501	77-09-01	36	8.4	6.3	.9	140	7.3	10	.1
284134081303801	77-09-01	42	11	5.3	1.0	130	41	8.2	.2
284202081204401	73-06-07	34	9.6	5.2	.7	152	.4	6.0	.3
	77-11-02	33	9.5	7.4	1.1	140	.8	9.8	.1
284217081320201	77-09-06	43	15	8.0	3.7	130	39	14	.1
	78-06-26	--	--	--	--	--	--	--	--
284221081223401	73-06-07	31	7.4	5.2	.7	112	10	7.0	.3
	77-09-06	38	8.6	6.5	.9	110	31	10	.2

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
283656081264501	77-09-03	8.4	150	120
283658081254801	77-09-03	9.0	147	139
283702081265801	77-09-03	8.5	150	141
283703081225001	77-09-01	10	206	192
283707081250901	77-09-03	7.9	128	122
283717081193101	62-06-21	11	158	146
	73-06-26	10	144	150
	77-09-02	11	152	141
283729081273701	77-09-03	7.4	--	125
283743081214501	75-05-30	8.7	168	154
	80-03-05	10	152	145
283809081251802	73-06-26	9.0	145	143
	77-09-07	10	147	148
283823081195001	77-11-14	9.2	136	131
283855081192801	80-03-06	10	129	133
283925081123301	73-06-06	9.8	263	238
	77-09-01	10	251	233
283943081250201	77-09-06	9.7	113	123
284014081264901	73-06-13	6.4	142	140
	77-09-06	7.7	157	147
284014081304601	61-01-11	15	188	184
	65-05-20	12	--	169
	66-06-16	12	--	167
	67-05-05	12	163	163
	68-05-21	11	171	170
	69-05-13	20	183	174
	70-04-24	12	178	175
	71-05-25	12	178	166
	72-05-09	--	--	--
	77-09-01	11	148	148
284017081202401	71-02-25	11	188	179
	77-09-02	11	211	210
284020081224501	77-09-01	8.8	145	147
284134081303801	77-09-01	11	198	184
284202081204401	73-06-07	11	146	142
	77-11-02	11	139	142
284217081320201	77-09-06	10	228	197
	78-06-26	--	--	--
284221081223401	73-06-07	10	130	127
	77-09-06	.5	146	150

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (UMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (FTU)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
284227081223501	77-09-06	230	7.9	24.0	0	--	4	0	0	--	110
284337081354601	60-12-30	221	8.0	23.9	--	--	--	--	--	--	106
	77-09-04	222	8.1	23.5	0	--	0	0	0	--	110
284352081361701	60-12-30	232	7.4	23.3	5	--	--	--	--	--	115
	65-05-20	240	7.7	23.3	0	--	--	--	--	--	110
	66-06-16	225	7.7	--	0	--	--	--	--	--	108
	66-06-17	225	7.4	23.9	10	--	--	--	--	--	106
	67-05-05	238	7.2	23.9	0	--	--	--	--	--	110
	68-05-21	234	7.3	23.0	10	--	--	--	--	--	109
	69-05-13	220	7.7	24.0	0	--	--	--	--	--	106
	70-04-24	235	6.8	24.5	0	--	--	--	--	--	110
	71-05-25	240	8.2	24.5	0	--	--	--	--	--	120
	72-05-10	327	--	23.0	--	--	--	--	--	--	--
	80-03-06	230	7.5	25.5	5	--	--	--	--	--	100
284437081075601	74-03-08	338	7.6	22.5	4	--	--	--	--	--	170
	77-09-06	315	7.7	22.5	0	--	3	0	0	--	160
284705081192001	73-11-08	288	8.2	24.0	7	--	--	--	--	--	150
	75-05-20	302	8.4	24.5	0	--	--	--	--	--	140
	76-08-05	306	8.4	24.0	0	1.0	--	--	--	--	130
	76-08-05	300	--	28.0	--	2.0	--	--	--	--	--
	77-09-01	278	7.9	24.0	0	--	7	0	0	--	140
	80-03-05	312	7.3	24.0	5	--	--	--	--	--	140
284827081522901	77-09-06	325	7.6	23.5	0	--	0	0	0	--	160
284827081523501	77-09-02	325	7.8	--	0	--	2	14	12	--	160
285104081404701	71-06-07	190	7.2	24.0	0	--	--	--	--	--	86
	75-05-13	189	8.2	--	0	--	--	--	--	--	87
	77-09-02	186	8.0	--	0	--	2	14	14	--	81

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
284227081223501	77-09-06	31	7.9	5.0	.9	120	3.1	7.6	.2
284337081354601	60-12-30	--	--	--	--	128	--	6.0	--
	77-09-04	29	9.4	5.5	.9	120	3.3	7.9	.1
284352081361701	60-12-30	28	11	5.4	.4	128	3.2	7.5	.2
	65-05-20	36	5.0	4.9	1.2	131	3.2	7.0	.1
	66-06-16	28	9.2	4.9	.7	128	1.2	7.0	.2
	66-06-17	26	10	5.2	.7	128	2.0	8.0	.2
	67-05-05	28	9.3	5.1	.8	129	.4	8.0	.2
	68-05-21	28	9.5	4.9	.8	128	1.0	10	.2
	69-05-13	27	9.2	5.3	.8	120	1.6	12	.3
	70-04-24	29	10	5.2	.7	121	7.6	10	.2
	71-05-25	30	10	7.0	1.3	134	6.0	10	.3
	72-05-10	--	--	--	--	--	--	--	--
	80-03-06	26	8.6	5.3	.7	--	3.9	7.4	.2
284437081075601	74-03-08	61	2.9	6.4	1.4	199	.2	9.2	<.1
	77-09-06	61	2.6	6.8	.9	190	.8	9.9	.1
284705081192001	73-11-08	46	8.1	7.3	.9	151	6.9	11	<.1
	75-05-20	44	7.5	7.2	1.1	150	8.5	15	.2
	76-08-05	42	6.0	8.8	1.1	150	3.4	14	.1
	76-08-05	--	--	--	--	--	--	--	.8
	77-09-01	45	6.7	8.0	1.3	146	8.1	14	.1
	80-03-05	44	6.9	7.1	.9	146	12	12	.1
284827081522901	77-09-06	54	6.2	8.2	1.4	180	5.6	11	.1
284827081523501	77-09-02	55	6.4	7.5	1.3	180	4.4	11	.1
285104081404701	71-06-07	22	7.6	4.8	.8	100	4.4	7.5	.2
	75-05-13	22	7.8	5.1	1.0	100	3.7	7.0	.1
	77-09-02	20	7.6	4.8	.8	94	2.0	7.0	.1

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria—Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
284227081223501	77-09-06	11	112	126
284337081354601	60-12-30	--	--	--
	77-09-04	12	130	127
284352081361701	60-12-30	12	135	131
	65-05-20	13	--	136
	66-06-16	13	--	127
	66-06-17	12	--	127
	67-05-05	12	126	127
	68-05-21	13	129	130
	69-05-13	13	131	131
	70-04-24	13	143	135
	71-05-25	11	148	142
	72-05-10	--	--	--
	80-03-06	12	125	124
284437081075601	74-03-08	10	206	190
	77-09-06	10	188	187
284705081192001	73-11-08	9.3	159	167
	75-05-20	8.9	166	167
	76-08-05	8.6	184	160
	76-08-05	--	170	--
	77-09-01	9.3	170	167
	80-03-05	8.9	164	164
284827081522901	77-09-06	15	--	190
284827081523501	77-09-02	16	--	191
285104081404701	71-06-07	11	110	108
	75-05-13	11	102	107
	77-09-02	11	103	100

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Nutrients

STATION NUMBER	DATE OF SAMPLE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)
281937081250101	72-04-13	.12	--	.002	--	--	--	--	--	--	--
	76-08-17	.01	--	.000	--	--	--	--	--	--	--
	76-08-17	.02	--	.000	--	--	--	--	--	--	--
	77-09-04	.00	--	.000	--	.140	--	.00	--	.14	.060
	79-03-20	--	.00	--	.000	--	.100	--	--	--	.060
282331081370801	79-03-26	--	--	--	.000	--	.190	--	.26	--	--
282529081343001	71-05-06	--	--	--	.000	--	--	--	--	--	--
	77-09-04	.06	--	.000	--	.020	--	.00	--	.08	.060
282530081094001	68-05-23	--	.05	--	--	--	--	--	--	--	--
	69-05-15	--	.00	--	--	--	--	--	--	--	--
	72-04-27	.00	--	.001	--	--	--	--	--	--	--
	72-05-02	.27	--	.016	--	--	--	--	--	--	--
	77-09-04	.00	--	.000	--	.380	--	.07	--	.45	.090
282558081215401	77-09-04	.00	--	.000	--	.290	--	.13	--	.42	.070
282647081354801	79-03-26	--	--	--	.000	--	.030	--	.52	--	--
282654081265701	77-09-06	.00	--	.000	--	.260	--	.00	--	.28	.110
282705081204601	77-09-04	.01	--	.000	--	.560	--	.22	--	.79	.110
282732081293001	77-09-05	.00	--	.000	--	.220	--	.02	--	.24	.190
282912081181501	77-11-14	.03	--	.000	--	--	--	--	--	--	--
283006081273701	76-06-23	.00	--	.000	--	.190	--	.11	--	.30	.050
	77-09-02	.00	--	.000	--	.200	--	.01	--	.21	.050
283013081203401	77-09-03	.00	--	.000	--	.600	--	.00	--	.60	.060
283051081195101	77-09-02	.00	--	.000	--	.340	--	.02	--	.36	.050
283054081042601	68-05-23	--	.02	--	--	--	--	--	--	--	--
	69-05-12	--	.56	--	--	--	--	--	--	--	--
	70-04-21	--	--	--	.001	--	--	--	--	--	--
	71-06-07	--	--	--	.000	--	--	--	--	--	--
	77-09-04	.00	--	.000	--	.460	--	.14	--	.60	.010
283054081295901	77-09-04	.00	--	.000	--	.140	--	.00	--	.14	.130
283103081221101	77-09-02	.00	--	.000	--	.370	--	.04	--	.41	.070
283111081224201	77-09-02	.00	--	.000	--	.250	--	.00	--	.25	.060
283121081202901	77-09-03	.00	--	.000	--	.770	--	.04	--	.81	.080
283135081155201	77-09-03	.00	--	.000	--	.270	--	.00	--	.27	.030
283135081234301	77-09-06	.00	--	.000	--	.310	--	.06	--	.37	.080
283202081172501	77-09-07	.00	--	.000	--	.290	--	.08	--	.37	.050
283225081205101	77-09-02	.02	--	.010	--	1.100	--	.06	--	1.1	.130
283228081204201	77-09-02	.00	--	.000	--	.780	--	.03	--	.81	.090
283303081444801	68-05-09	--	.23	--	--	--	--	--	--	--	--
	77-09-02	.67	--	.010	--	.280	--	.09	--	1.0	.110
283314081455501	77-09-06	2.3	--	.000	--	.010	--	.02	--	2.3	.080

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)
281937081250101	72-04-13	--	--	--
	76-08-17	--	--	--
	76-08-17	--	--	--
	77-09-04	--	.050	--
	79-03-20	--	--	--
282331081370801	79-03-26	--	--	--
282529081343001	71-05-06	--	--	--
	77-09-04	--	.060	--
282530081094001	68-05-23	--	--	--
	69-05-15	--	--	--
	72-04-27	--	--	--
	72-05-02	--	--	--
	77-09-04	--	.090	--
282558081215401	77-09-04	--	.070	--
282647081354801	79-03-26	--	--	--
282654081265701	77-09-06	--	.110	--
282705081204601	77-09-04	--	.100	--
282732081293001	77-09-05	--	.170	--
282912081181501	77-11-14	--	--	--
283006081273701	76-06-23	--	.050	--
	77-09-02	--	.040	--
283013081203401	77-09-03	--	.060	--
283051081195101	77-09-02	--	.050	--
283054081042601	68-05-23	--	--	--
	69-05-12	--	--	--
	70-04-21	--	--	--
	71-06-07	--	--	--
	77-09-04	--	.010	--
283054081295901	77-09-04	--	.130	--
283103081221101	77-09-02	--	.050	--
283111081224201	77-09-02	--	.050	--
283121081202901	77-09-03	--	.080	--
283135081155201	77-09-03	--	.030	--
283135081234301	77-09-06	--	.080	--
283202081172501	77-09-07	--	.050	--
283225081205101	77-09-02	--	.130	--
283228081204201	77-09-02	--	.090	--
283303081444801	68-05-09	--	--	--
	77-09-02	--	.100	--
283314081455501	77-09-06	--	.080	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRATE DISSOLVED (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NITRITE DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, ORGANIC DISSOLVED (MG/L AS N)	NITROGEN, TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)
283327081223201	77-09-02	.00	--	.000	--	.300	--	.05	--	.35	.050
283331081255701	77-09-03	.00	--	.000	--	.140	--	.00	--	.14	.110
283333081233502	62-08-22	--	.00	--	--	--	--	--	--	--	--
	62-08-23	--	.02	--	--	--	--	--	--	--	--
	62-08-30	--	.63	--	--	--	--	--	--	--	--
	62-08-31	--	.00	--	--	--	--	--	--	--	--
	62-09-05	--	.05	--	--	--	--	--	--	--	--
	79-04-27	.00	.00	.000	.000	.870	.870	.02	.02	.89	.140
	79-04-27	.01	.01	.000	.000	.810	.810	.39	.08	1.2	.180
283348081351201	75-05-19	.00	--	.010	--	.010	--	.06	--	.08	.050
	77-09-02	.00	--	.000	--	.020	--	.07	--	.09	.050
283350081154301	77-09-03	.00	--	.000	--	.280	--	.01	--	.29	.050
283353081222401	68-05-21	--	.00	--	--	--	--	--	--	--	--
	69-05-14	--	.43	--	--	--	--	--	--	--	--
	70-04-28	--	--	--	.001	--	--	--	--	--	--
	71-05-25	--	--	--	.000	--	--	--	--	--	--
	75-05-30	.00	--	.000	--	.350	--	.11	--	.46	.050
	76-08-06	.00	--	.000	--	--	--	--	--	--	--
	76-08-06	.02	--	.000	--	--	--	--	--	--	--
	77-09-02	.00	--	.000	--	.350	--	.00	--	.35	.050
283357081272201	77-09-07	.00	--	.000	--	.130	--	.00	--	.13	.050
283408081184801	77-09-03	.00	--	.000	--	.360	--	.00	--	.36	.080
283412081163401	77-09-03	.00	--	.000	--	.080	--	.00	--	.08	.200
283548081181401	77-09-02	.00	--	.000	--	.280	--	.00	--	.28	.050
283555081115201	77-09-01	.02	--	.000	--	.020	--	.01	--	.05	.070
283607081211301	62-06-21	--	.02	--	--	--	--	--	--	--	--
	65-05-19	--	.00	--	--	--	--	--	--	--	--
	66-06-16	--	.02	--	--	--	--	--	--	--	--
	67-05-05	--	.00	--	--	--	--	--	--	--	--
	68-05-21	--	.02	--	--	--	--	--	--	--	--
	69-05-13	--	.41	--	--	--	--	--	--	--	--
	70-04-24	--	.00	--	.001	--	--	--	--	--	--
	71-05-25	--	.43	--	--	--	--	--	--	--	--
	77-09-02	.00	--	.000	--	.440	--	.00	--	.44	.090
283608081211601	62-06-21	--	.02	--	--	--	--	--	--	--	--
283623081230501	77-09-05	.00	--	.000	--	.170	--	.00	--	.17	.060
283656081264501	77-09-03	3.6	--	.010	--	.000	--	.05	--	3.6	.300
283658081254801	77-09-03	.93	--	.010	--	.000	--	.03	--	.97	.220
283702081265801	77-09-03	.89	--	.010	--	.020	--	.03	--	.95	.100
283703081225001	77-09-01	.00	--	.000	--	.250	--	.03	--	.28	.210

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, TOTAL (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)
283327081223201	77-09-02	--	.040	--
283331081255701	77-09-03	--	.110	--
283333081233502	62-08-22	--	--	--
	62-08-23	--	--	--
	62-08-30	--	--	--
	62-08-31	--	--	--
	62-09-05	--	--	--
	79-04-27	.140	.140	.130
	79-04-27	.110	.050	.110
283348081351201	75-05-19	--	.050	--
	77-09-02	--	.050	--
283350081154301	77-09-03	--	.050	--
283353081222401	68-05-21	--	--	--
	69-05-14	--	--	--
	70-04-28	--	--	--
	71-05-25	--	--	--
	75-05-30	--	.050	--
	76-08-06	--	--	--
	76-08-06	--	--	--
	77-09-02	--	.050	--
283357081272201	77-09-07	--	.040	--
283408081184801	77-09-03	--	.080	--
283412081163401	77-09-03	--	.150	--
283548081181401	77-09-02	--	.040	--
283555081115201	77-09-01	--	.070	--
283607081211301	62-06-21	--	--	--
	65-05-19	--	--	--
	66-06-16	--	--	--
	67-05-05	--	--	--
	68-05-21	--	--	--
	69-05-13	--	--	--
	70-04-24	--	--	--
	71-05-25	--	--	--
	77-09-02	--	.090	--
283608081211601	62-06-21	--	--	--
283623081230501	77-09-05	--	.060	--
283656081264501	77-09-03	--	.290	--
283658081254801	77-09-03	--	.220	--
283702081265801	77-09-03	--	.100	--
283703081225001	77-09-01	--	.210	--

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)
283707081250901	77-09-03	.00	--	.000	--	.070	--	.05	--	.12	.100
283717081193101	73-06-26	.14	--	.000	--	--	--	--	--	--	--
	77-09-02	.00	--	.000	--	.280	--	.01	--	.29	.050
283729081273701	77-09-03	.24	--	.000	--	.160	--	.01	--	.41	.190
283743081214501	75-05-30	.02	--	.000	--	.070	--	.10	--	.19	.020
283809081251802	73-06-26	.17	--	.003	--	--	--	--	--	--	--
	77-09-07	.00	--	.000	--	.400	--	.00	--	.40	.110
283823081195001	77-11-14	.03	--	.000	--	--	--	--	--	--	--
283925081123301	73-06-06	.09	--	.000	--	--	--	--	--	--	--
	77-09-01	.00	--	.000	--	.290	--	.01	--	.30	.060
283943081250201	77-09-06	.00	--	.000	--	.170	--	.00	--	.17	.080
284014081264901	73-06-13	.02	--	.000	--	--	--	--	--	--	--
	77-09-06	.00	--	.000	--	.120	--	.00	--	.12	.180
284014081304601	68-05-21	--	.00	--	--	--	--	--	--	--	--
	69-05-13	--	.11	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	.000	--	--	--	--	--	--
	77-09-01	.00	--	.000	--	.090	--	.00	--	.09	.030
284017081202401	71-02-25	--	--	--	.000	--	--	--	--	--	--
	77-09-02	.00	--	.000	--	.400	--	.03	--	.43	.240
284020081224501	77-09-01	.00	--	.000	--	.280	--	.01	--	.29	.110
284134081303801	77-09-01	.01	--	.010	--	.110	--	.00	--	.13	.040
284202081204401	73-06-07	.03	--	.001	--	--	--	--	--	--	--
	77-11-02	.00	--	.000	--	--	--	--	--	--	--
284217081320201	77-09-06	3.6	--	.000	--	.010	--	.00	--	3.6	.130
284221081223401	73-06-07	.02	--	.000	--	--	--	--	--	--	--
	77-09-06	.00	--	.000	--	.100	--	.05	--	.15	.040
284227081223501	77-09-06	.00	--	.000	--	.160	--	.00	--	.16	.060
284337081354601	77-09-04	.01	--	.000	--	.100	--	.03	--	.14	.030
284352081361701	68-05-21	--	.00	--	--	--	--	--	--	--	--
	69-05-13	--	.02	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	.000	--	--	--	--	--	--
	71-05-25	--	--	--	.000	--	--	--	--	--	--
284437081075601	77-09-06	.00	--	.000	--	.140	--	.07	--	.21	.050
284705081192001	75-05-20	.52	--	.010	--	.050	--	.14	--	.72	.070
	76-08-05	.26	--	.150	--	--	--	--	--	--	--
	76-08-05	.60	--	.000	--	--	--	--	--	--	--
	77-09-01	.19	--	.070	--	.090	--	.01	--	.36	.070
284827081522901	77-09-06	.14	--	.010	--	.030	--	.00	--	.18	.050
284827081523501	77-09-02	.00	--	.010	--	.030	--	.00	--	.04	.060
285104081404701	71-06-07	--	--	--	.000	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)
283707081250901	77-09-03	--	.100	--
283717081193101	73-06-26	--	--	--
	77-09-02	--	.050	--
283729081273701	77-09-03	--	.160	--
283743081214501	75-05-30	--	.020	--
283809081251802	73-06-26	--	--	--
	77-09-07	--	.110	--
283823081195001	77-11-14	--	--	--
283925081123301	73-06-06	--	--	--
	77-09-01	--	.060	--
283943081250201	77-09-06	--	.070	--
284014081264901	73-06-13	--	--	--
	77-09-06	--	.180	--
284014081304601	68-05-21	--	--	--
	69-05-13	--	--	--
	71-05-25	--	--	--
	77-09-01	--	.030	--
284017081202401	71-02-25	--	--	--
	77-09-02	--	.240	--
284020081224501	77-09-01	--	.110	--
284134081303801	77-09-01	--	.040	--
284202081204401	73-06-07	--	--	--
	77-11-02	--	--	--
284217081320201	77-09-06	--	.130	--
284221081223401	73-06-07	--	--	--
	77-09-06	--	.040	--
284227081223501	77-09-06	--	.050	--
284337081354601	77-09-04	--	.030	--
284352081361701	68-05-21	--	--	--
	69-05-13	--	--	--
	70-04-24	--	--	--
	71-05-25	--	--	--
284437081075601	77-09-06	--	.050	--
284705081192001	75-05-20	--	.070	--
	76-08-05	--	--	--
	76-08-05	--	--	--
	77-09-01	--	.070	--
284827081522901	77-09-06	--	.050	--
284827081523501	77-09-02	--	.060	--
285104081404701	71-06-07	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS—Continued

Nutrients—Continued

STATION NUMBER	DATE OF SAMPLE	NITRO-GEN, NITRATE TOTAL (MG/L AS N)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, ORGANIC DIS-SOLVED (MG/L AS N)	NITRO-GEN, TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)
285104081404701	75-05-13	.02	--	.010	--	.090	--	.02	--	.14	.040
	77-09-02	.00	--	.000	--	.100	--	.01	--	.11	.030

STATION NUMBER	DATE OF SAMPLE	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)
285104081404701	75-05-13	--	.030	--
	77-09-02	--	.030	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements

STATION NUMBER	DATE OF SAMPLE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, TOTAL RECOVERABLE (UG/L AS B)	BORON, DISSOLVED (UG/L AS B)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM DISSOLVED (UG/L AS CD)
281937081250101	72-04-13	--	--	--	--	--	--	--	--	--	--
	76-08-17	--	--	0	--	0	--	--	--	0	--
	76-08-17	--	--	0	--	0	--	--	--	0	--
	77-09-04	30	0	1	0	0	0	--	--	0	0
	78-10-10	--	--	--	--	--	--	--	--	--	--
	78-12-11	--	--	--	--	--	--	--	--	--	--
	79-03-20	--	--	--	--	--	--	--	--	--	--
282331081370801	79-03-26	--	--	--	--	--	--	--	--	--	--
282529081343001	77-09-04	10	0	0	0	0	0	--	--	0	0
282530081094001	66-04-28	--	--	--	--	--	--	--	--	--	--
	67-05-11	--	--	--	--	--	--	--	--	--	--
	67-11-09	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-15	--	--	--	--	--	--	--	--	--	--
	70-04-30	--	--	--	--	--	--	--	--	--	--
	71-06-03	--	--	--	--	--	--	--	--	--	--
	72-04-27	--	--	--	--	--	--	--	--	--	--
	72-05-02	--	--	--	--	--	--	--	--	--	--
	74-06-11	--	--	--	--	--	--	--	--	--	--
	76-05-12	--	--	--	--	--	--	--	--	--	--
	77-06-02	--	--	--	--	--	--	--	--	--	--
	77-09-04	0	0	0	0	0	0	--	--	0	0
	79-05-30	--	--	--	--	--	--	--	--	--	--
	80-06-02	--	--	--	--	--	--	--	--	--	--
282552081345301	80-03-12	--	--	--	--	--	--	--	--	--	--
282558081215401	77-09-04	0	0	0	0	0	0	--	--	0	0
282647081354801	79-03-26	--	--	--	--	--	--	--	--	--	--
282654081265701	77-09-06	0	0	1	0	0	0	--	--	0	0
282705081204601	77-09-04	40	20	0	0	0	0	--	--	0	0
282732081293001	77-09-05	20	40	0	0	0	0	--	--	0	0
282738081341401	79-05-29	--	--	--	--	--	--	--	--	--	--
282835081305201	79-05-29	--	--	--	--	--	--	--	--	--	--
282912081181501	77-11-14	--	--	1	--	100	--	--	--	2	--
283006081273701	76-06-23	50	--	0	--	--	--	20	--	1	--
	77-09-02	20	20	0	0	0	0	--	--	0	0
283013081203401	77-09-03	10	10	0	0	0	0	--	--	0	0
283051081195101	77-09-02	30	10	0	0	0	0	--	--	0	0
283054081042601	67-05-08	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-12	--	--	--	--	--	--	--	--	--	--

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	CHROMIUM, DISSOLVED (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)
281937081250101	72-04-13	--	--	--	--	--	--	--	--	--	--
	76-08-17	40	--	--	--	--	--	--	--	1	--
	76-08-17	40	--	--	--	--	--	--	--	5	--
	77-09-04	<10	0	0	0	5	0	10	40	0	0
	78-10-10	--	--	--	--	--	--	--	--	--	--
	78-12-11	--	--	--	--	--	--	--	--	--	--
	79-03-20	--	--	--	--	--	--	--	--	--	--
282331081370801	79-03-26	--	--	--	--	--	--	--	--	--	--
282529081343001	77-09-04	<10	0	0	0	2	0	20	0	7	0
282530081094001	66-04-28	--	--	--	--	--	--	--	--	--	--
	67-05-11	--	--	--	--	--	--	--	--	--	--
	67-11-09	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-15	--	--	--	--	--	--	--	--	--	--
	70-04-30	--	--	--	--	--	--	--	--	--	--
	71-06-03	--	--	--	--	--	--	--	--	--	--
	72-04-27	--	--	--	--	--	--	--	--	--	--
	72-05-02	--	--	--	--	--	--	--	--	--	--
	74-06-11	--	--	--	--	--	--	--	--	--	--
	76-05-12	--	--	--	--	--	--	--	--	--	--
	77-06-02	--	--	--	--	--	--	--	--	--	--
	77-09-04	<10	0	0	0	19	0	290	130	0	0
	79-05-30	--	--	--	--	--	--	--	--	--	--
	80-06-02	--	--	--	--	--	--	--	--	--	--
282552081345301	80-03-12	--	--	--	--	--	--	--	--	--	--
282558081215401	77-09-04	<10	0	0	0	0	0	50	60	0	0
282647081354801	79-03-26	--	--	--	--	--	--	--	--	--	--
282654081265701	77-09-06	<10	3	0	0	4	4	20	10	0	0
282705081204601	77-09-04	<10	2	0	0	4	0	30	10	15	0
282732081293001	77-09-05	<10	0	2	0	5	0	80	30	4	4
282738081341401	79-05-29	--	--	--	--	--	--	--	90	--	--
282835081305201	79-05-29	--	--	--	--	--	--	--	80	--	--
282912081181501	77-11-14	<10	--	--	--	12	--	110	--	23	--
283006081273701	76-06-23	10	--	0	--	0	--	70	--	7	--
	77-09-02	<10	0	0	0	0	0	120	20	9	5
283013081203401	77-09-03	<10	0	0	0	7	0	30	10	3	2
283051081195101	77-09-02	<10	0	0	0	32	2	90	0	15	4
283054081042601	67-05-08	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-12	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)
281937081250101	72-04-13	--	--	--	--	--	--	--	--	--	--
	76-08-17	--	--	--	--	.0	--	--	--	--	0
	76-08-17	--	--	--	--	.0	--	--	--	--	0
	77-09-04	--	--	0	0	.1	.0	--	3	4	0
	78-10-10	--	--	--	--	--	--	--	--	--	--
	76-12-11	--	--	--	--	--	--	--	--	--	--
	79-03-20	--	--	--	--	--	--	--	--	--	--
282331081370801	79-03-26	--	--	--	--	--	--	--	--	--	--
282529081343001	77-09-04	--	--	10	0	.1	.0	--	5	2	0
282530081094001	66-04-28	--	--	--	--	--	--	--	--	--	--
	67-05-11	--	--	--	--	--	--	--	--	--	--
	67-11-09	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-15	--	--	--	--	--	--	--	--	--	--
	70-04-30	--	--	--	--	--	--	--	--	--	--
	71-06-03	--	--	--	--	--	--	--	--	--	--
	72-04-27	--	--	--	--	--	--	--	--	--	--
	72-05-02	--	--	--	--	--	--	--	--	--	--
	74-06-11	--	--	--	--	--	--	--	--	--	--
	76-05-12	--	--	--	--	--	--	--	--	--	--
	77-06-02	--	--	--	--	--	--	--	--	--	--
	77-09-04	--	--	10	10	<.5	<.5	--	0	0	0
	79-05-30	--	--	--	--	--	--	--	--	--	--
	80-06-02	--	--	--	--	--	--	--	--	--	--
282552081345301	80-03-12	--	--	--	--	--	--	--	--	--	--
282558081215401	77-09-04	--	--	10	0	<.5	<.5	--	0	0	0
282647081354801	79-03-26	--	--	--	--	--	--	--	--	--	--
282654081265701	77-09-06	--	--	0	0	<.5	<.5	--	0	0	0
282705081204601	77-09-04	--	--	0	0	.1	.1	--	6	0	0
282732081293001	77-09-05	--	--	20	10	.0	.0	--	5	2	0
282738081341401	79-05-29	--	--	--	--	--	--	--	--	--	--
282835081305201	79-05-29	--	--	--	--	--	--	--	--	--	--
282912081181501	77-11-14	--	--	10	--	<.5	--	--	--	--	0
283006081273701	76-06-23	0	--	0	--	.2	--	5	2	--	--
	77-09-02	--	--	0	0	.2	.0	--	5	.3	0
283013081203401	77-09-03	--	--	0	0	.0	.0	--	0	4	0
283051081195101	77-09-02	--	--	0	0	.2	.0	--	2	5	0
283054081042601	67-05-08	--	--	--	--	--	--	--	--	--	--
	68-05-23	--	--	--	--	--	--	--	--	--	--
	69-05-12	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	SELENIUM, DISSOLVED (UG/L AS SE)	STRONTIUM, TOTAL RECOVERABLE (UG/L AS SR)	STRONTIUM, DISSOLVED (UG/L AS SR)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)
281937081250101	72-04-13	--	--	220	--	--
	76-08-17	--	--	220	--	--
	76-08-17	--	--	--	--	--
	77-09-04	0	--	170	0	0
	78-10-10	--	--	<286	--	--
	78-12-11	--	--	294	--	--
	79-03-20	--	--	204	--	--
282331081370801	79-03-26	--	--	<200	--	--
282529081343001	77-09-04	0	--	120	0	0
282530081094001	66-04-28	--	--	13	--	--
	67-05-11	--	--	12	--	--
	67-11-09	--	--	13	--	--
	68-05-23	--	--	1	--	--
	69-05-15	--	--	1	--	--
	70-04-30	--	--	13	--	--
	71-06-03	--	--	14	--	--
	72-04-27	--	--	1400	--	--
	72-05-02	--	--	1300	--	--
	74-06-11	--	--	1600	--	--
	76-05-12	--	--	1300	--	--
	77-06-02	--	--	1300	--	--
	77-09-04	0	--	1200	10	10
	79-05-30	--	--	1300	--	--
	80-06-02	--	--	1300	--	--
282552081345301	80-03-12	--	--	120	--	--
282558081215401	77-09-04	0	--	150	0	0
282647081354801	79-03-26	--	--	200	--	--
282654081265701	77-09-06	0	--	90	10	10
282705081204601	77-09-04	0	--	100	0	0
282732081293001	77-09-05	0	--	100	70	0
282738081341401	79-05-29	--	--	<220	--	--
282835081305201	79-05-29	--	--	<222	--	--
282912081181501	77-11-14	--	--	490	130	--
283006081273701	76-06-23	--	--	890	20	--
	77-09-02	0	--	730	0	0
283013081203401	77-09-03	0	--	90	0	0
283051081195101	77-09-02	0	--	290	20	0
283054081042601	67-05-08	--	--	7	--	--
	68-05-23	--	--	0	--	--
	69-05-12	--	--	0	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, TOTAL RECOVERABLE (UG/L AS B)	BORON, DISSOLVED (UG/L AS B)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM DISSOLVED (UG/L AS CD)
283054081042601	70-04-21	--	--	--	--	--	--	--	--	--	--
	71-06-07	--	--	--	--	--	--	--	--	--	--
	77-09-04	10	10	0	0	0	0	--	--	0	0
283054081295901	77-09-04	20	0	0	0	0	0	--	--	0	0
283103081221101	77-09-02	20	20	0	0	0	0	--	--	0	0
283111081224201	77-09-02	20	20	1	0	0	0	--	--	0	0
283121081202901	77-09-03	10	10	0	0	0	0	--	--	0	0
283135081155201	77-09-03	20	10	0	0	0	0	--	--	0	0
283135081234301	77-09-06	0	0	0	0	0	0	--	--	0	0
283202081172501	77-09-07	0	0	0	0	0	0	--	--	0	0
283225081205101	77-09-02	20	20	0	0	0	0	--	--	0	0
283228081204201	77-09-02	30	10	1	0	0	0	--	--	0	0
283303081444801	68-05-09	--	--	--	--	--	--	--	--	--	--
	77-09-02	40	0	0	0	0	0	--	--	0	0
283314081455501	77-09-06	0	0	0	0	0	0	--	--	0	0
283327081223201	77-09-02	10	20	0	0	0	0	--	--	0	0
283331081255701	77-09-03	20	10	0	0	0	0	--	--	0	0
283333081233502	79-04-27	20	0	2	2	0	0	30	30	0	0
	79-04-27	10	0	13	3	0	0	30	40	4	0
283348081351201	75-05-19	--	--	--	--	--	--	--	--	--	--
	77-09-02	30	10	0	0	0	0	--	--	0	0
283350081154301	77-09-03	20	0	0	0	0	0	--	--	0	0
283353081222401	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-14	--	--	--	--	--	--	--	--	--	--
	70-04-28	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	75-05-30	--	--	--	--	--	--	--	--	--	--
	76-08-06	--	--	0	--	0	--	--	--	0	--
	76-08-06	--	--	0	--	0	--	--	--	0	--
	77-09-02	10	10	0	0	0	0	--	--	2	0
	80-03-04	--	--	--	--	--	--	--	--	--	--
283357081272201	77-09-07	10	30	1	--	0	0	--	--	0	3
283408081184801	77-09-03	10	10	0	0	0	0	--	--	0	0
283412081163401	77-09-03	10	0	1	0	0	0	--	--	0	0
283548081181401	77-09-02	20	10	0	0	0	0	--	--	0	0
283555081115201	77-09-01	20	20	1	1	0	0	--	--	0	0
283607081211301	65-05-19	--	--	--	--	--	--	--	--	--	--
	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	CHROMIUM, DISSOLVED (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)
283054081042601	70-04-21	--	--	--	--	--	--	--	--	--	--
	71-06-07	--	--	--	--	--	--	--	--	--	--
	77-09-04	<10	3	0	2	2	0	60	40	0	3
283054081295901	77-09-04	10	0	0	0	0	0	10	40	2	0
283103081221101	77-09-02	<10	0	0	0	0	0	50	10	12	0
283111081224201	77-09-02	<10	0	0	0	6	0	70	10	5	4
283121081202901	77-09-03	10	0	0	0	0	0	30	20	9	2
283135081155201	77-09-03	<10	7	0	0	0	0	20	10	10	3
283135081234301	77-09-06	<10	0	0	0	45	0	460	40	6	6
283202081172501	77-09-07	10	0	0	0	14	0	30	50	0	0
283225081205101	77-09-02	<10	0	0	0	18	4	50	10	15	7
283228081204201	77-09-02	10	0	0	0	3	0	60	40	0	7
283303081444801	68-05-09	--	--	--	--	--	--	--	--	--	--
	77-09-02	<10	0	0	0	3	0	90	50	0	0
283314081455501	77-09-06	10	0	0	0	2	6	0	0	0	0
283327081223201	77-09-02	10	0	0	0	0	0	20	50	17	5
283331081255701	77-09-03	<10	0	0	0	0	0	20	40	12	0
283333081233502	79-04-27	10	1	1	2	1	1	640	300	4	4
	79-04-27	30	1	1	1	9	1	17000	60	13	4
283348081351201	75-05-19	--	--	--	--	--	--	--	0	--	--
	77-09-02	<10	0	0	0	0	0	0	0	3	0
283350081154301	77-09-03	10	0	0	0	3	0	70	30	2	0
283353081222401	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-14	--	--	--	--	--	--	--	--	--	--
	70-04-28	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	75-05-30	--	--	--	--	--	--	--	20	--	--
	76-08-06	30	--	--	--	--	--	--	--	7	--
	76-08-06	30	--	--	--	--	--	--	--	0	--
	77-09-02	10	0	0	0	2	0	30	10	26	3
	80-03-04	--	--	--	--	--	--	--	--	--	--
283357081272201	77-09-07	10	0	0	0	3	31	110	10	5	10
283408081184801	77-09-03	<10	0	0	0	0	0	70	30	2	3
283412081163401	77-09-03	<10	0	0	0	0	0	1100	930	4	2
283548081181401	77-09-02	<10	0	0	0	3	3	0	10	12	0
283555081115201	77-09-01	10	0	0	0	6	5	50	0	5	3
283607081211301	65-05-19	--	--	--	--	--	--	--	--	--	--
	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS—Continued

Trace Elements—Continued

STATION NUMBER	DATE OF SAMPLE	LITHIUM TOTAL RECOV- ERABLE (UG/L AS LI)	LITHIUM DIS- SOLVED (UG/L AS LI)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	MOLYB- DENUM, TOTAL RECOV- ERABLE (UG/L AS MO)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI)	NICKEL, DIS- SOLVED (UG/L AS NI)	SELE- NIUM, TOTAL (UG/L AS SE)
283054081042601	70-04-21	--	--	--	--	--	--	--	--	--	--
	71-06-07	--	--	--	--	--	--	--	--	--	--
	77-09-04	--	--	10	0	.4	.4	--	6	6	0
283054081295901	77-09-04	--	--	0	0	.1	.0	--	4	0	0
283103081221101	77-09-02	--	--	0	0	.1	.1	--	2	0	0
283111081224201	77-09-02	--	--	0	0	.3	.0	--	7	0	0
283121081202901	77-09-03	--	--	10	10	.1	.1	--	4	2	0
283135081155201	77-09-03	--	--	0	0	.2	.0	--	6	3	0
283135081234301	77-09-06	--	--	10	10	<.5	<.5	--	2	0	0
283202081172501	77-09-07	--	--	0	0	<.5	<.5	--	0	0	0
283225081205101	77-09-02	--	--	10	10	.0	.0	--	4	0	0
283228081204201	77-09-02	--	--	10	0	.3	.0	--	5	2	0
283303081444801	68-05-09	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	20	10	.2	.0	--	6	3	0
283314081455501	77-09-06	--	--	10	10	<.5	<.5	--	2	0	0
283327081223201	77-09-02	--	--	0	0	.1	.1	--	10	0	0
283331081255701	77-09-03	--	--	0	0	.0	.0	--	6	0	0
283333081233502	79-04-27	0	0	10	10	.5	.5	4	29	--	0
	79-04-27	10	0	30	10	<.5	<.5	27	36	--	0
283348081351201	75-05-19	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	0	0	.1	.1	--	6	4	0
283350081154301	77-09-03	--	--	0	0	.2	.0	--	2	0	0
283353081222401	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-14	--	--	--	--	--	--	--	--	--	--
	70-04-28	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	75-05-30	--	--	--	--	--	--	--	--	--	--
	76-08-06	--	--	--	--	.0	--	--	--	--	0
	76-08-06	--	--	--	--	.0	--	--	--	--	0
	77-09-02	--	--	0	0	.0	.0	--	20	0	0
	80-03-04	--	--	--	--	--	--	--	--	--	--
283357081272201	77-09-07	--	--	10	0	.0	.0	--	12	0	0
283408081184801	77-09-03	--	--	0	0	.1	.0	--	0	3	0
283412081163401	77-09-03	--	--	20	10	.0	.0	--	0	4	0
283548081181401	77-09-02	--	--	0	0	.2	.0	--	5	0	0
283555081115201	77-09-01	--	--	10	0	.0	.0	--	5	2	0
283607081211301	65-05-19	--	--	--	--	--	--	--	--	--	--
	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	STRON-TIUM, TOTAL RECOV-ERABLE (UG/L AS SR)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, DIS-SOLVED (UG/L AS ZN)
283054081042601	70-04-21	--	--	6	--	--
	71-06-07	--	--	6	--	--
	77-09-04	0	--	680	10	0
283054081295901	77-09-04	0	--	60	0	0
283103081221101	77-09-02	0	--	340	10	0
283111081224201	77-09-02	0	--	340	0	0
283121081202901	77-09-03	0	--	80	10	0
283135081155201	77-09-03	0	--	510	20	0
283135081234301	77-09-06	0	--	220	20	10
283202081172501	77-09-07	0	--	190	30	0
283225081205101	77-09-02	0	--	160	10	0
283228081204201	77-09-02	0	--	200	10	0
283303081444801	68-05-09	--	--	0	--	--
	77-09-02	0	--	50	10	0
283314081455501	77-09-06	0	--	70	0	0
283327081223201	77-09-02	0	--	240	10	0
283331081255701	77-09-03	0	--	60	10	10
283333081233502	79-04-27	0	200	140	30	0
	79-04-27	0	220	140	70	10
283348081351201	75-05-19	--	--	200	--	--
	77-09-02	0	--	70	10	10
283350081154301	77-09-03	0	--	270	10	10
283353081222401	67-05-05	--	--	2	--	--
	68-05-21	--	--	0	--	--
	69-05-14	--	--	0	--	--
	70-04-28	--	--	2	--	--
	71-05-25	--	--	2	--	--
	75-05-30	--	--	390	--	--
	76-08-06	--	--	190	--	--
	76-08-06	--	--	--	--	--
	77-09-02	0	--	240	10	0
	80-03-04	--	--	230	--	--
283357081272201	77-09-07	0	--	90	20	90
283408081184801	77-09-03	0	--	170	0	0
283412081163401	77-09-03	0	--	320	20	10
283548081181401	77-09-02	0	--	180	10	0
283555081115201	77-09-01	0	--	310	40	20
283607081211301	65-05-19	--	--	0	--	--
	67-05-05	--	--	1	--	--
	68-05-21	--	--	0	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, TOTAL RECOVERABLE (UG/L AS B)	BORON, DISSOLVED (UG/L AS B)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM DISSOLVED (UG/L AS CD)
283607081211301	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	20	20	1	0	0	0	--	--	0	0
283608081211601	80-03-04	--	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	20	10	0	0	0	0	--	--	0	0
283656081264501	77-09-03	70	10	0	0	0	0	--	--	0	0
283658081254801	77-09-03	40	10	1	1	0	0	--	--	0	0
283702081265801	77-09-03	10	10	1	1	0	0	--	--	0	0
283703081225001	77-09-01	20	20	1	0	0	0	--	--	0	0
283707081250901	77-09-03	460	0	0	0	0	0	--	--	0	0
283717081193101	73-06-26	--	--	--	--	--	--	--	--	--	--
	77-09-02	20	10	0	0	0	0	--	--	0	0
283729081273701	77-09-03	20	0	1	0	0	0	--	--	0	0
283743081214501	75-05-30	--	--	--	--	--	--	--	--	--	--
	80-03-05	--	--	--	--	--	--	--	--	--	--
283809081251802	73-06-26	--	--	--	--	--	--	--	--	--	--
	77-09-07	0	0	0	0	0	0	--	--	0	0
283823081195001	77-11-14	--	--	1	--	0	--	--	--	1	--
283855081192801	80-03-06	--	--	--	--	--	--	--	--	--	--
283925081123301	73-06-06	--	--	--	--	--	--	--	--	--	--
	77-09-01	20	10	0	0	0	0	--	--	0	0
283943081250201	77-09-06	0	0	0	0	0	0	--	--	0	0
284014081264901	73-06-13	--	--	--	--	--	--	--	--	--	--
	77-09-06	0	0	1	1	0	0	--	--	0	0
284014081304601	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-01	10	10	0	0	0	0	--	--	0	0
284017081202401	71-02-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	30	20	0	0	0	0	--	--	0	0
284020081224501	77-09-01	10	0	0	0	0	0	--	--	2	0
284134081303801	77-09-01	0	0	0	0	0	0	--	--	0	0
284202081204401	73-06-07	--	--	--	--	--	--	--	--	--	--
	77-11-02	--	--	0	--	0	--	--	--	0	--
284217081320201	77-09-06	0	0	1	0	0	0	--	--	0	0
284221081223401	73-06-07	--	--	--	--	--	--	--	--	--	--
	77-09-06	0	0	0	0	0	0	--	--	0	0
284227081223501	77-09-06	0	0	0	0	0	0	--	--	0	0

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	CHROMIUM, TOTAL RECOV-ERABLE (UG/L AS CR)	CHROMIUM, DIS-SOLVED (UG/L AS CR)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB)	LEAD, DIS-SOLVED (UG/L AS PB)
283607081211301	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	<10	0	0	0	0	0	0	10	14	3
283608081211601	80-03-04	--	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	<10	0	0	0	0	2	40	10	5	0
283656081264501	77-09-03	<10	3	0	0	19	4	760	20	10	4
283658081254801	77-09-03	<10	0	0	0	5	2	280	0	0	0
283702081265801	77-09-03	<10	0	2	0	15	0	90	60	9	0
283703081225001	77-09-01	<10	0	0	0	2	8	440	270	4	0
283707081250901	77-09-03	<10	0	0	0	8	2	20	50	7	0
283717081193101	73-06-26	--	--	--	--	--	--	--	0	--	--
	77-09-02	10	0	0	0	12	0	180	0	7	2
283729081273701	77-09-03	10	0	0	0	3	2	270	40	0	0
283743081214501	75-05-30	--	--	--	--	--	--	--	20	--	--
	80-03-05	--	--	--	--	--	--	--	--	--	--
283809081251802	73-06-26	--	--	--	--	--	--	--	10	--	--
	77-09-07	<10	0	0	0	0	0	230	20	0	0
283823081195001	77-11-14	<10	--	--	--	4	--	260	--	8	--
283855081192801	80-03-06	--	--	--	--	--	--	--	--	--	--
283925081123301	73-06-06	--	--	--	--	--	--	--	20	--	--
	77-09-01	<10	0	2	0	2	0	30	10	5	0
283943081250201	77-09-06	<10	0	0	0	2	2	0	10	0	0
284014081264901	73-06-13	--	--	--	--	--	--	--	40	--	--
	77-09-06	10	0	0	0	2	0	80	80	4	0
284014081304601	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-01	--	0	0	0	0	0	0	20	2	0
284017081202401	71-02-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	<10	0	2	0	170	0	90	10	23	0
284020081224501	77-09-01	<10	0	0	0	3	0	2000	60	25	8
284134081303801	77-09-01	<10	0	0	0	5	0	10	20	0	0
284202081204401	73-06-07	--	--	--	--	--	--	--	60	--	--
	77-11-02	<10	--	--	--	4	--	40	--	1	--
284217081320201	77-09-06	10	0	0	0	0	8	10	10	0	0
284221081223401	73-06-07	--	--	--	--	--	--	--	30	--	--
	77-09-06	<10	1	0	0	32	0	780	50	0	0
284227081223501	77-09-06	10	0	0	0	0	0	0	10	0	0

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)
283607081211301	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	10	0	.1	.0	--	4	0	0
283608081211601	80-03-04	--	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	--	--	0	0	.0	.0	--	7	4	0
283656081264501	77-09-03	--	--	10	0	.1	.1	--	6	3	0
283658081254801	77-09-03	--	--	0	0	.0	.0	--	8	0	0
283702081265801	77-09-03	--	--	0	0	.0	.0	--	8	0	0
283703081225001	77-09-01	--	--	20	10	.0	.0	--	17	4	0
283707081250901	77-09-03	--	--	10	0	.1	.0	--	9	2	0
283717081193101	73-06-26	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	0	0	.0	.0	--	5	0	0
283729081273701	77-09-03	--	--	10	0	.0	.0	--	4	2	0
283743081214501	75-05-30	--	--	--	--	--	--	--	--	--	--
	80-03-05	--	--	--	--	--	--	--	--	--	--
283809081251802	73-06-26	--	--	--	--	--	--	--	--	--	--
	77-09-07	--	--	10	0	<.5	<.5	--	0	0	0
283823081195001	77-11-14	--	--	10	--	<.5	--	--	--	--	0
283855081192801	80-03-06	--	--	--	--	--	--	--	--	--	--
283925081123301	73-06-06	--	--	--	--	--	--	--	--	--	--
	77-09-01	--	--	10	0	.1	.0	--	4	3	0
283943081250201	77-09-06	--	--	0	0	<.5	<.5	--	0	2	0
284014081264901	73-06-13	--	--	--	--	--	--	--	--	--	--
	77-09-06	--	--	10	0	<.5	<.5	--	0	0	0
284014081304601	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	77-09-01	--	--	0	0	.0	.0	--	5	0	0
284017081202401	71-02-25	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	10	10	.0	.0	--	11	4	0
284020081224501	77-09-01	--	--	10	10	.1	.1	--	0	0	0
284134081303801	77-09-01	--	--	0	0	<.5	<.5	--	2	0	0
284202081204401	73-06-07	--	--	--	--	--	--	--	--	--	--
	77-11-02	--	--	10	--	<.5	--	--	--	--	0
284217081320201	77-09-06	--	--	0	0	<.5	<.5	--	2	2	0
284221081223401	73-06-07	--	--	--	--	--	--	--	--	--	--
	77-09-06	--	--	20	10	<.5	<.5	--	0	0	0
284227081223501	77-09-06	--	--	10	0	<.5	<.5	--	0	0	0

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	SELENIUM, DIS-SOLVED (UG/L AS SE)	STRONTIUM, TOTAL RECOV-ERABLE (UG/L AS SR)	STRONTIUM, DIS-SOLVED (UG/L AS SR)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN)	ZINC, DIS-SOLVED (UG/L AS ZN)
283607081211301	69-05-13	--	--	0	--	--
	70-04-24	--	--	0	--	--
	71-05-25	--	--	0	--	--
	77-09-02	0	--	80	0	0
283608081211601	80-03-04	--	--	100	--	--
283623081230501	77-09-05	0	--	90	10	0
283656081264501	77-09-03	0	--	50	10	10
283658081254801	77-09-03	0	--	40	10	0
283702081265801	77-09-03	0	--	50	20	0
283703081225001	77-09-01	0	--	110	10	10
283707081250901	77-09-03	0	--	50	0	0
283717081193101	73-06-26	--	--	250	--	--
	77-09-02	0	--	210	160	0
283729081273701	77-09-03	0	--	50	20	0
283743081214501	75-05-30	--	--	320	--	--
	80-03-05	--	--	140	--	--
283809081251602	73-06-26	--	--	60	--	--
	77-09-07	0	--	50	10	0
283823081195001	77-11-14	--	--	120	0	--
283855081192801	80-03-06	--	--	160	--	--
283925081123301	73-06-06	--	--	200	--	--
	77-09-01	0	--	220	0	0
283943081250201	77-09-06	0	--	70	10	10
284014081264901	73-06-13	--	--	80	--	--
	77-09-06	0	--	60	10	10
284014081304601	67-05-05	--	--	3	--	--
	68-05-21	--	--	0	--	--
	69-05-13	--	--	0	--	--
	71-05-25	--	--	3	--	--
	77-09-01	0	--	360	0	0
284017081202401	71-02-25	--	--	0	--	--
	77-09-02	0	--	110	120	10
284020081224501	77-09-01	0	--	110	10	10
284134081303801	77-09-01	0	--	650	10	10
284202081204401	73-06-07	--	--	150	--	--
	77-11-02	--	--	150	40	--
284217081320201	77-09-06	0	--	90	40	40
284221081223401	73-06-07	--	--	200	--	--
	77-09-06	0	--	440	10	0
284226081223501	77-09-06	0	--	120	0	0

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, TOTAL RECOVERABLE (UG/L AS B)	BORON, DISSOLVED (UG/L AS B)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM DISSOLVED (UG/L AS CD)
284337081354601	77-09-04	20	0	1	1	0	0	--	--	0	0
284352081361701	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	80-03-06	--	--	--	--	--	--	--	--	--	--
284437081075601	74-03-08	--	--	--	--	--	--	--	--	--	--
	77-09-06	0	0	0	0	0	0	--	--	0	0
284705081192001	73-11-08	--	--	--	--	--	--	--	--	--	--
	75-05-20	--	--	--	--	--	--	--	--	--	--
	76-08-05	--	--	1	--	0	--	--	--	1	--
	76-08-05	--	--	1	--	0	--	--	--	0	--
	77-09-01	20	10	1	1	0	0	--	--	0	0
	80-03-05	--	--	--	--	--	--	--	--	--	--
284827081522901	77-09-06	0	0	0	0	0	0	--	--	0	0
284827081523501	77-09-02	20	10	0	0	0	0	--	--	0	0
285104081404701	71-06-07	--	--	--	--	--	--	--	--	--	--
	75-05-13	--	--	--	--	--	--	--	--	--	--
	77-09-02	20	20	1	0	0	0	--	--	0	0

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	CHROMIUM, DISSOLVED (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)
284337081354601	77-09-04	<10	0	0	0	2	0	130	30	0	0
284352081361701	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	80-03-06	--	--	--	--	--	--	--	--	--	--
284437081075601	74-03-08	--	--	--	--	--	--	--	10	--	--
	77-09-06	<10	0	0	0	4	0	170	150	2	0
284705081192001	73-11-08	--	--	--	--	--	--	--	100	--	--
	75-05-20	--	--	--	--	--	--	--	0	--	--
	76-08-05	20	--	--	--	--	--	--	--	22	--
	76-08-05	20	--	--	--	--	--	--	--	13	--
	77-09-01	10	0	0	0	0	5	170	170	4	2
	80-03-05	--	--	--	--	--	--	--	--	--	--
284827081522901	77-09-06	<10	0	0	0	25	4	30	10	0	0
284827081523501	77-09-02	<10	0	0	0	0	0	90	90	14	2
285104081404701	71-06-07	--	--	--	--	--	--	--	--	--	--
	75-05-13	--	--	--	--	--	--	--	10	--	--
	77-09-02	<10	0	0	0	2	0	80	0	40	2

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)
284337081354601	77-09-04	--	--	10	10	.0	.0	--	4	2	0
284352081361701	67-05-05	--	--	--	--	--	--	--	--	--	--
	68-05-21	--	--	--	--	--	--	--	--	--	--
	69-05-13	--	--	--	--	--	--	--	--	--	--
	70-04-24	--	--	--	--	--	--	--	--	--	--
	71-05-25	--	--	--	--	--	--	--	--	--	--
	80-03-06	--	--	--	--	--	--	--	--	--	--
284437081075601	74-03-08	--	--	--	--	--	--	--	--	--	--
	77-09-06	--	--	10	10	<.5	<.5	--	9	0	0
284705081192001	73-11-08	--	--	--	--	--	--	--	--	--	--
	75-05-20	--	--	--	--	--	--	--	--	--	--
	76-08-05	--	--	--	--	.0	--	--	--	--	0
	76-08-05	--	--	--	--	.0	--	--	--	--	0
	77-09-01	--	--	10	0	.0	.0	--	5	2	0
	80-03-05	--	--	--	--	--	--	--	--	--	--
284827081522901	77-09-06	--	--	10	10	<.5	<.5	--	0	0	0
284827081523501	77-09-02	--	--	20	20	.1	.0	--	9	0	0
285104081404701	71-06-07	--	--	--	--	--	--	--	--	--	--
	75-05-13	--	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	10	0	.0	.0	--	8	0	0

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	SELENIUM, DISSOLVED (UG/L AS SE)	STRONTIUM, TOTAL RECOVERABLE (UG/L AS SR)	STRONTIUM, DISSOLVED (UG/L AS SR)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)
284337081354601	77-09-04	0	--	100	20	0
284352081361701	67-05-05	--	--	1	--	--
	68-05-21	--	--	0	--	--
	69-05-13	--	--	0	--	--
	70-04-24	--	--	0	--	--
	71-05-25	--	--	1	--	--
	80-03-06	--	--	100	--	--
284437081075601	74-03-08	--	--	920	--	--
	77-09-06	0	--	890	0	0
284705081192001	73-11-08	--	--	10	--	--
	75-05-20	--	--	7	--	--
	76-08-05	--	--	100	--	--
	76-08-05	--	--	--	--	--
	77-09-01	0	--	90	10	10
	80-03-05	--	--	80	--	--
284827081522901	77-09-06	0	--	70	20	20
284827081523501	77-09-02	0	--	80	10	10
285104081404701	71-06-07	--	--	0	--	--
	75-05-13	--	--	100	--	--
	77-09-02	0	--	50	10	0

Organic Compounds

STATION NUMBER	DATE OF SAMPLE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)	OIL AND GREASE (MG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)
281937081250101	76-08-17	--	--	--	--	--	.00	.00	.00	.00	.00
	76-08-17	--	--	--	--	--	.00	.00	.00	.00	.00
	77-09-04	3.0	--	.00	0	--	.00	.00	.00	.00	.00
282529081343001	77-09-04	5.0	--	.00	2	--	.00	.00	.00	.00	.00
282530081094001	77-09-04	6.0	--	.00	0	--	.00	.00	.00	.00	.00
282558081215401	77-09-04	9.0	--	.00	0	--	.00	.00	.00	.00	.00
282654081265701	77-09-06	5.0	--	.00	--	--	.00	.00	.00	.00	.00
282705081204601	77-09-04	9.0	--	.00	7	--	.00	.00	.00	.00	.00
282732081293001	77-09-05	6.0	--	.00	1	--	.00	.00	.00	.00	.00
282912081181501	77-11-14	--	--	--	--	--	.00	.00	.00	.00	.00
283006081273701	76-06-23	3.0	--	.00	--	--	.00	.00	.00	.00	.00
	77-09-02	.0	--	.00	6	--	.00	.00	.00	.00	.00
283013081203401	77-09-03	14	--	.10	5	--	.00	.00	.00	.00	.00
283051081195101	77-09-02	4.0	--	.00	6	--	.00	.00	.00	.00	.00
283054081042601	77-09-04	16	--	.10	0	--	.00	.00	.00	.00	.00
283054081295901	77-09-04	4.0	--	.00	2	--	.00	.00	.00	.00	.00
283103081221101	77-09-02	2.0	--	.00	4	--	.00	.00	.00	.00	.00
283111081224201	77-09-02	5.0	--	.00	0	--	.00	.00	.00	.00	.00
283121081202901	77-09-03	4.0	--	.10	4	--	.00	.00	.00	.00	.00
283135081155201	77-09-03	6.0	--	.10	--	--	.00	.00	.00	.00	.00
283135081234301	77-09-06	8.0	--	.10	--	--	.00	.00	.00	.00	.00
283202081172501	77-09-07	8.0	--	.00	0	--	.00	.00	.00	.00	.00
283225081205101	77-09-02	4.0	--	.00	--	--	.00	.00	.00	.00	.00
283228081204201	77-09-02	2.0	--	.00	0	--	.00	.00	.00	.00	.00
283303081444801	77-09-02	2.0	--	.00	0	--	.00	.00	.00	.00	.00
283314081455501	77-09-06	--	--	.00	0	--	.00	.00	.00	.00	.00
283327081223201	77-09-02	8.0	--	.00	7	--	.00	.00	.00	.00	.00
283331081255701	77-09-03	--	--	.00	5	--	.00	.00	.00	.00	.00
283333081233502	79-04-27	4.0	7.2	.10	--	0	.00	.00	.00	.00	.00
	79-04-27	4.0	3.4	.10	--	1	.00	.00	.00	.00	.00
283348081351201	75-05-19	.0	--	--	--	--	--	--	--	--	--
	77-09-02	.0	--	.00	0	--	.00	.00	.00	.00	.00
283350081154301	77-09-03	5.0	--	.00	--	--	.00	.00	.00	.00	.00
283353081222401	75-05-30	2.0	--	--	--	--	--	--	--	--	--
	76-08-06	--	--	--	--	--	.00	.00	.00	.00	.00
	76-08-06	--	--	--	--	--	.00	.00	.00	.00	.00
	77-09-02	1.0	--	.10	7	--	.00	.00	.00	.00	.00
283357081272201	77-09-07	.0	--	.00	--	--	.00	.00	.00	.00	.00
283408081184801	77-09-03	4.0	--	.00	2	--	.00	.00	.00	.00	.00
283412081163401	77-09-03	.0	--	.00	0	--	--	--	--	--	--

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)
281937081250101	76-08-17	.00	.00	--	.00	--	.00	--	.00	.00	.00
	76-08-17	.00	.00	--	.00	--	.00	--	.00	.00	.00
	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282529081343001	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282530081094001	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282558081215401	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282654081265701	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282705081204601	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282732081293001	77-09-05	.00	.00	--	.00	.00	.00	--	.00	.00	.00
282912081181501	77-11-14	.00	.00	--	.00	--	.00	--	.00	.00	.00
283006081273701	76-06-23	.00	.00	--	.00	--	.00	--	.00	.00	.00
	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283013081203401	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283051081195101	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283054081042601	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283054081295901	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283103081221101	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283111081224201	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283121081202901	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283135081155201	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283135081234301	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283202081172501	77-09-07	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283225081205101	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283228081204201	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283303081444801	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283314081455501	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283327081223201	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283331081255701	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283333081233502	79-04-27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	79-04-27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283348081351201	75-05-19	--	--	--	--	--	--	--	--	--	--
	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283350081154301	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283353081222401	75-05-30	--	--	--	--	--	--	--	--	--	--
	76-08-06	.00	.00	--	.00	--	.00	--	.00	.00	.00
	76-08-06	.00	.00	--	.00	--	.00	--	.00	.00	.00
	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283357081272201	77-09-07	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283408081184801	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283412081163401	77-09-03	--	--	--	--	--	--	--	--	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)
281937081250101	76-08-17	--	.00	--	--	--	--	--	0	--
	76-08-17	--	.00	--	--	--	--	--	0	--
	77-09-04	--	--	--	--	--	--	.00	0	--
282529081343001	77-09-04	--	--	--	--	--	--	.00	0	--
282530081094001	77-09-04	--	--	--	--	--	--	.00	0	--
282558081215401	77-09-04	--	--	--	--	--	--	.00	0	--
282654081265701	77-09-06	--	--	--	--	--	--	.0C	0	--
282705081204601	77-09-04	--	--	--	--	--	--	.00	0	--
282732081293001	77-09-05	--	--	--	--	--	--	.00	0	--
282912081181501	77-11-14	--	.00	--	--	.00	--	--	0	--
283006081273701	76-06-23	--	--	--	--	--	--	--	0	--
	77-09-02	--	--	--	--	--	--	.00	0	--
283013081203401	77-09-03	--	--	--	--	--	--	.00	0	--
283051081195101	77-09-02	--	--	--	--	--	--	.00	0	--
283054081042601	77-09-04	--	--	--	--	--	--	.00	0	--
283054081295901	77-09-04	--	--	--	--	--	--	.00	0	--
283103081221101	77-09-02	--	--	--	--	--	--	.00	0	--
283111081224201	77-09-02	--	--	--	--	--	--	.00	0	--
283121081202901	77-09-03	--	--	--	--	--	--	.00	0	--
283135081155201	77-09-03	--	--	--	--	--	--	.00	0	--
283135081234301	77-09-06	--	--	--	--	--	--	.00	0	--
283202081172501	77-09-07	--	--	--	--	--	--	.00	0	--
283225081205101	77-09-02	--	--	--	--	--	--	.00	0	--
283228081204201	77-09-02	--	--	--	--	--	--	.00	0	--
283303081444801	77-09-02	--	--	--	--	--	--	.00	0	--
283314081455501	77-09-06	--	--	--	--	--	--	.00	0	--
283327081223201	77-09-02	--	--	--	--	--	--	.00	0	--
283331081255701	77-09-03	--	--	--	--	--	--	.00	0	--
283333081233502	79-04-27	.00	.00	.00	.00	.00	.00	.00	0	.00
	79-04-27	.00	.00	.00	.00	.00	.00	.00	0	.00
283348081351201	75-05-19	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	--	--	--	--	.00	0	--
283350081154301	77-09-03	--	--	--	--	--	--	.00	0	--
283353081222401	75-05-30	--	--	--	--	--	--	--	--	--
	76-08-06	--	.00	--	--	--	--	--	0	--
	76-08-06	--	.00	--	--	--	--	--	0	--
	77-09-02	--	--	--	--	--	--	.00	0	--
283357081272201	77-09-07	--	--	--	--	--	--	.00	0	--
283408081184801	77-09-03	--	--	--	--	--	--	.00	0	--
283412081163401	77-09-03	--	--	--	--	--	--	.00	--	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
281937081250101	76-08-17	.00	.00	.00
	76-08-17	.00	.00	.00
	77-09-04	.00	.00	.00
282529081343001	77-09-04	.00	.00	.00
282530081094001	77-09-04	.00	.00	.00
282558081215401	77-09-04	.00	.00	.00
282654081265701	77-09-06	.00	.00	.00
282705081204601	77-09-04	.00	.00	.00
282732081293001	77-09-05	.00	.00	.00
282912081181501	77-11-14	.00	.00	.00
283006081273701	76-06-23	.00	.00	.00
	77-09-02	.00	.00	.00
283013081203401	77-09-03	--	--	--
283051081195101	77-09-02	.00	.00	.00
283054081042601	77-09-04	.00	.00	.00
283054081295901	77-09-04	.00	.00	.00
283103081221101	77-09-02	.00	.00	.00
283111081224201	77-09-02	.00	.00	.00
283121081202901	77-09-03	.00	.00	.00
283135081155201	77-09-03	.00	.00	.00
283135081234301	77-09-06	.00	.00	.00
283202081172501	77-09-07	.00	.00	.00
283225081205101	77-09-02	.00	.00	.00
283228081204201	77-09-02	.00	.00	.00
283303081444801	77-09-02	.00	.00	.00
283314081455501	77-09-06	.00	.00	.00
283327081223201	77-09-02	.00	.00	.00
283331081255701	77-09-03	.00	.00	.00
283333081233502	79-04-27	.00	.00	.04
	79-04-27	.00	.00	.04
283348081351201	75-05-19	--	--	--
	77-09-02	.00	.00	.00
283350081154301	77-09-03	.00	.00	.00
283353081222401	75-05-30	--	--	--
	76-08-06	.00	.00	.00
	76-08-06	.00	.00	.00
	77-09-02	.00	.00	.00
283357081272201	77-09-07	.00	.00	.00
283408081184801	77-09-03	.00	.00	.00
283412081163401	77-09-03	.00	.00	.00

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)	OIL AND GREASE (MG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)
283548081181401	77-09-02	1.0	--	.00	4	--	.00	.00	.00	.00	.00
283555081115201	77-09-01	.0	--	.00	10	--	.00	.00	.00	.00	.00
283607081211301	77-09-02	4.0	--	.00	4	--	.00	.00	.00	.00	.00
	78-06-23	--	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	4.0	--	.00	3	--	.00	.00	.00	.00	.00
283656081264501	77-09-03	3.0	--	.00	6	--	.00	.00	.00	.00	.00
283658081254801	77-09-03	4.0	--	.00	0	--	.00	.00	.00	.00	.00
283702081265801	77-09-03	6.0	--	--	4	--	.00	.00	.00	.00	.00
283703081225001	77-09-01	3.0	--	.00	2	--	.00	.00	.00	.00	.00
283707081250901	77-09-03	4.0	--	.00	0	--	.00	.00	.00	.00	.00
283717081193101	77-09-02	1.0	--	.00	--	--	.00	.00	.00	.00	.00
283729081273701	77-09-03	15	--	.00	0	--	.00	.00	.00	.00	.00
283743081214501	75-05-30	.0	--	--	--	--	--	--	--	--	--
283809081251802	77-09-07	4.0	--	.00	0	--	.00	.00	.00	.00	.00
283823081195001	77-11-14	--	--	--	--	--	.00	.00	.00	.00	.00
283925081123301	77-09-01	3.0	--	.00	0	--	.00	.00	.00	.00	.00
283943081250201	77-09-06	4.0	--	.00	0	--	.00	.00	.00	.00	.00
284014081264901	77-09-06	.0	--	.00	0	--	.00	.00	.00	.00	.00
284014081304601	77-09-01	2.0	--	.00	--	--	.00	.00	.00	.00	.00
284017081202401	77-09-02	1.0	--	.00	1	--	.00	.00	.00	.00	.00
284020081224501	77-09-01	4.0	--	.00	1	--	.00	.00	.00	.00	.00
284134081303801	77-09-01	6.0	--	.00	0	--	.00	.00	.00	.00	.00
284202081204401	77-11-02	--	--	--	--	--	.00	.00	.00	.00	.00
284217081320201	77-09-06	5.0	--	.00	--	--	.00	.00	.00	.00	.00
	78-06-26	--	--	--	--	--	.00	.00	.00	.00	.00
284221081223401	77-09-06	4.0	--	.00	1	--	.00	.00	.00	.00	.00
284227081223501	77-09-06	1.0	--	.00	--	--	.00	.00	.00	.00	.00
284337081354601	77-09-04	.0	--	.10	0	--	.00	.00	.00	.00	.00
284437081075601	77-09-06	3.0	--	.00	0	--	.00	.00	.00	.00	.00
284705081192001	75-05-20	.0	--	--	--	--	--	--	--	--	--
	76-08-05	--	--	--	--	--	.00	.00	.00	.00	.00
	76-08-05	--	--	--	--	--	.00	.00	.00	.00	.00
	77-09-01	35	--	.00	1	--	.00	.00	.00	.00	.00
284827081522901	77-09-06	.0	--	.00	14	--	--	--	--	--	--
284827081523501	77-09-02	17	--	.00	3	--	.00	.00	.00	.00	.00
285104081404701	75-05-13	2.0	--	--	--	--	--	--	--	--	--
	77-09-02	13	--	.00	1	--	.00	.00	.00	.00	.00

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)
283548081181401	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283555081115201	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283607081211301	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
	78-06-23	--	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283656081264501	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283658081254801	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283702081265801	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283703081225001	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283707081250901	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283717081193101	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283729081273701	77-09-03	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283743081214501	75-05-30	--	--	--	--	--	--	--	--	--	--
283809081251802	77-09-07	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283823081195001	77-11-14	.00	.00	--	.00	--	.00	--	.00	.00	.00
283925081123301	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
283943081250201	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284014081264901	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284014081304601	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284017081202401	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284020081224501	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284134081303801	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284202081204401	77-11-02	.00	.00	--	.00	--	.00	--	.00	.00	.00
284217081320201	77-09-06	.00	.00	--	.02	.00	.00	--	.00	.00	.00
	78-06-26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
284221081223401	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284227081223501	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284337081354601	77-09-04	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284437081075601	77-09-06	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284705081192001	75-05-20	--	--	--	--	--	--	--	--	--	--
	76-08-05	.00	.00	--	.00	--	.00	--	.00	.00	.00
	76-08-05	.00	.00	--	.00	--	.00	--	.00	.00	.00
	77-09-01	.00	.00	--	.00	.00	.00	--	.00	.00	.00
284827081522901	77-09-06	--	--	--	--	--	--	--	--	--	--
284827081523501	77-09-02	.00	.00	--	.00	.09	.00	--	.00	.00	.00
285104081404701	75-05-13	--	--	--	--	--	--	--	--	--	--
	77-09-02	.00	.00	--	.00	.00	.00	--	.00	.00	.00

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)
283548081181401	77-09-02	--	--	--	--	--	--	.00	0	--
283555081115201	77-09-01	--	--	--	--	--	--	--	0	--
283607081211301	77-09-02	--	--	--	--	--	--	.00	0	--
	78-06-23	--	--	--	--	--	--	--	--	--
283623081230501	77-09-05	--	--	--	--	--	--	.00	0	--
283656081264501	77-09-03	--	--	--	--	--	--	.00	0	--
283658081254801	77-09-03	--	--	--	--	--	--	.00	0	--
283702081265801	77-09-03	--	--	--	--	--	--	.00	0	--
283703081225001	77-09-01	--	--	--	--	--	--	--	0	--
283707081250901	77-09-03	--	--	--	--	--	--	.00	0	--
283717081193101	77-09-02	--	--	--	--	--	--	.00	0	--
283729081273701	77-09-03	--	--	--	--	--	--	.00	0	--
283743081214501	75-05-30	--	--	--	--	--	--	--	--	--
283809081251802	77-09-07	--	--	--	--	--	--	.00	0	--
283823081195001	77-11-14	--	.00	--	--	.00	--	--	0	--
283925081123301	77-09-01	--	--	--	--	--	--	.00	0	--
283943081250201	77-09-06	--	--	--	--	--	--	.00	0	--
284014081264901	77-09-06	--	--	--	--	--	--	.00	0	--
284014081304601	77-09-01	--	--	--	--	--	--	--	0	--
284017081202401	77-09-02	--	--	--	--	--	--	.00	0	--
284020081224501	77-09-01	--	--	--	--	--	--	.00	0	--
284134081303801	77-09-01	--	--	--	--	--	--	.00	0	--
284202081204401	77-11-02	--	.00	--	--	.00	--	--	0	--
284217081320201	77-09-06	--	--	--	--	--	--	.00	0	--
	78-06-26	.00	.00	.00	.00	.00	.00	--	0	.00
284221081223401	77-09-06	--	--	--	--	--	--	.00	0	--
284227081223501	77-09-06	--	--	--	--	--	--	.00	0	--
284337081354601	77-09-04	--	--	--	--	--	--	.00	0	--
284437081075601	77-09-06	--	--	--	--	--	--	.00	0	--
284705081192001	75-05-20	--	--	--	--	--	--	--	--	--
	76-08-05	--	.00	--	--	--	--	--	0	--
	76-08-05	--	.00	--	--	--	--	--	0	--
	77-09-01	--	--	--	--	--	--	.00	0	--
284827081522901	77-09-06	--	--	--	--	--	--	.00	--	--
284827081523501	77-09-02	--	--	--	--	--	--	.00	0	--
285104081404701	75-05-13	--	--	--	--	--	--	--	--	--
	77-09-02	--	--	--	--	--	--	.00	0	--

QUALITY OF WATER ANALYSES FOR SUPPLY WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
283548081181401	77-09-02	.00	.00	.00
283555081115201	77-09-01	.00	.00	.00
283607081211301	77-09-02	.00	.00	.02
	78-06-23	.00	.00	.60
283623081230501	77-09-05	.00	.00	.00
283656081264501	77-09-03	.00	.00	.00
283658081254801	77-09-03	.00	.00	.00
283702081265801	77-09-03	.00	.00	.00
283703081225001	77-09-01	.00	.00	.00
283707081250901	77-09-03	.00	.00	.00
283717081193101	77-09-02	.00	.00	.00
283729081273701	77-09-03	.00	.00	.00
283743081214501	75-05-30	--	--	--
283809081251802	77-09-07	.00	.00	.00
283823081195001	77-11-14	.00	.00	.00
283925081123301	77-09-01	.00	.00	.00
283943081250201	77-09-06	.00	.00	.00
284014081264901	77-09-06	.00	.00	.00
284014081304601	77-09-01	.00	.00	.00
284017081202401	77-09-02	.00	.00	.00
284020081224501	77-09-01	.00	.00	.00
284134081303801	77-09-01	.00	.00	.00
284202081204401	77-11-02	.00	.00	.00
284217081320201	77-09-06	.00	.00	.00
	78-06-26	--	--	--
284221081223401	77-09-06	.00	.00	.00
284227081223501	77-09-06	.00	.00	.00
284337081354601	77-09-04	.00	.00	.00
284437081075601	77-09-06	.00	.00	.00
284705081192001	75-05-20	--	--	--
	76-08-05	.00	.00	.00
	76-08-05	.00	.00	.00
	77-09-01	.00	.00	.00
284827081522901	77-09-06	.00	.00	.00
284827081523501	77-09-02	.00	.00	.00
285104081404701	75-05-13	--	--	--
	77-09-02	.00	.00	.00

SUPPLEMENTARY DATA II--QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS

The following table lists the quality-of-water data used in this report for drainage wells. The data are categorized as follows:

(1) Major inorganic chemical constituents and physical properties
(2) Nutrients
(3) Trace elements
(4) Organic compounds

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria

STATION NUMBER	DATE OF SAMPLE	SPECIFIC CONDUCTANCE (UMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	COLOR (PLATINUM-COBALT UNITS)	TURBIDITY (FTU)	OXYGEN DEMAND, CHEMICAL (HIGH LEVEL) (MG/L)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
282534081220601	79-06-25 1/	370	7.1	23.0	100	7.0	32	1800	690	2900	130
	79-06-25	375	6.9	23.0	80	5.0	25	690	500	1600	140
282636081300801	79-05-15	330	7.3	24.0	0	2.0	0	8	3	5	140
	79-05-15 1/	335	7.2	24.0	0	220	40	12	8	38	140
282753081232501	79-07-10	395	7.3	25.0	10	4.0	--	1500	800	220	180
283001081185301	79-06-26	370	7.3	23.0	10	1.0	50	5	<1	6	150
283002081234701	78-04-19	242	7.5	25.0	5	5.0	22	5600	940	300	78
283121081311601	79-07-09	360	7.5	24.0	5	2.0	0	<1	<1	3	150
283144081254201	79-04-12	315	7.2	23.5	0	2.0	8	4	2	0	130
283154081220701	61-02-17	280	7.6	25.0	10	--	--	--	--	--	104
	61-06-28	265	7.0	27.2	5	--	--	--	--	--	92
	78-04-17	321	6.8	24.0	10	2.0	6	1	0	1	140
283157081180401	78-04-18	241	7.0	23.0	10	2.0	10	410	210	420	110
283211081241001	78-04-27	328	7.0	23.0	20	1.0	14	330	34	35	150
283321081231801	78-04-10	313	7.7	25.0	10	5.0	8	190	4	7	140
	78-04-10 1/	308	7.7	25.0	10	6.0	14	54	4	3	130
	79-04-13 1/	375	7.6	25.0	50	4.0	11	160	>120	27	150
	79-04-13	375	7.3	25.0	0	6.0	8	380	170	52	150
283326081262101	79-05-10	400	7.2	24.0	0	.03	0	150	6	16	170
283337081232301	79-04-26	235	7.5	24.5	--	4.0	10	210	80	160	89
283416081295901	78-04-13 1/	311	7.3	25.0	5	5.0	2	0	0	0	140
	78-04-13	311	7.3	25.0	5	3.0	34	0	0	0	140
283449081335601	79-05-11	365	7.4	23.0	0	3.0	60	K3200 2/	1500	1200	120
283530081214301	78-04-26	290	7.0	23.0	10	3.0	26	2200	650	2	140
283654081260801	79-06-22	360	7.1	23.0	10	7.0	0	6	0	0	150
283655081283401	62-10-15	235	7.3	22.8	5	--	--	--	--	--	108
	78-04-12	266	7.5	23.0	10	16	8	16	0	4	120
	78-04-12 1/	261	7.5	23.0	20	20	14	40	1	6	110
283717081194202	78-04-25	345	7.4	23.0	5	1.0	1	14	10	140	160
283735081224001	78-04-20	258	7.1	23.0	10	1.0	0	39	8	5	110
284032081302401	79-05-17	375	7.0	25.0	10	2.0	10	>10000	4350	>10000	170
	79-05-17 1/	385	7.0	27.0	10	3.0	30	>10000	>10000	>10000	160

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
282534081220601	79-06-25 1/	37	8.9	17	2.7	146	29	23	.2
	79-06-25	43	8.7	16	2.3	154	17	19	.2
282636081300801	79-05-15	48	5.3	5.0	.9	170	2.2	7.4	.1
	79-05-15 1/	47	5.4	5.2	.9	160	2.1	7.4	.1
282753081232501	79-07-10	52	11	10	2.0	200	9.7	12	.2
283001081185301	79-06-26	45	8.7	8.6	6.2	144	37	17	.1
283002081234701	78-04-19	23	5.0	15	3.7	71	22	19	.1
283121081311601	79-07-09	45	9.9	7.6	1.8	200	12	11	.2
283144081254201	79-04-12	38	8.3	8.5	.9	170	1.7	12	.1
283154081220701	61-02-17	34	4.6	13	2.2	112	12	19	.2
	61-06-28	27	6.0	17	3.8	68	34	22	.2
	78-04-17	47	5.0	8.8	1.6	170	5.9	14	.1
283157081180401	78-04-18	33	6.1	7.5	1.1	112	12	15	.1
283211081241001	78-04-27	45	9.1	9.5	1.6	178	9.0	13	.2
283321081231801	78-04-10	42	7.7	8.9	2.0	150	12	15	.2
	78-04-10 1/	41	7.7	7.7	1.6	150	8.4	14	.2
	79-04-13 1/	44	8.9	8.3	2.2	170	10	16	.1
	79-04-13	48	7.4	8.8	1.9	198	13	17	.1
283326081262101	79-05-10	45	14	6.1	1.0	170	39	10	.2
283337081232301	79-04-26	29	4.0	9.4	3.1	93	13	16	.2
283416081295901	78-04-13 1/	33	13	6.0	2.2	98	40	15	.1
	78-04-13	34	13	5.8	2.2	95	39	15	.1
283449081335601	79-05-11	32	9.4	14	5.1	100	47	22	.4
283530081214301	78-04-26	47	4.4	4.0	1.8	172	13	4.9	.1
283654081260801	79-06-22	50	7.1	5.6	.7	174	3.1	9.4	.1
283655081283401	62-10-15	34	5.6	5.4	1.0	126	6.8	9.5	.2
	78-04-12	35	8.0	5.6	1.3	124	20	10	.1
	78-04-12 1/	32	8.2	5.5	1.4	130	13	10	.1
283717081194202	78-04-25	50	8.2	8.7	.9	184	8.7	15	.1
283735081224001	78-04-20	34	5.7	8.0	1.6	112	13	15	.1
284032081302401	79-05-17	59	5.8	7.6	2.4	180	27	10	<.1
	79-05-17 1/	46	12	6.5	1.5	210	3.9	9.9	.1

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Major Inorganic Chemical Constituents, Physical Properties, and Bacteria--Continued

STATION NUMBER	DATE OF SAMPLE	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)
282534081220601	79-06-25 1/	7.5	243	194
	79-06-25	11	219	191
282636081300801	79-05-15	11	174	164
	79-05-15 1/	11	174	158
282753081232501	79-07-10	17	221	215
283001081185301	79-06-26	4.4	241	193
283002081234701	78-04-19	1.3	146	124
283121081311601	79-07-09	13	204	179
283144081254201	79-04-12	4.2	175	158
283154081220701	61-02-17	2.8	167	147
	61-06-28	1.0	180	145
	78-04-17	5.5	162	176
283157081180401	78-04-18	4.7	109	135
283211081241001	78-04-27	11	190	188
283321081231801	78-04-10	4.5	170	169
	78-04-10 1/	5.8	169	161
	79-04-13 1/	7.7	185	182
	79-04-13	7.7	198	189
283326081262101	79-05-10	11	217	211
283337081232301	79-04-26	1.1	147	123
283416081295901	78-04-13 1/	6.6	170	176
	78-04-13	6.7	221	163
283449081335601	79-05-11	10	222	190
283530081214301	78-04-26	3.5	164	168
283654081260801	79-06-22	7.9	192	169
283655081283401	62-10-15	5.6	133	130
	78-04-12	7.4	141	154
	78-04-12 1/	6.7	139	141
283717081194202	78-04-25	8.7	198	191
283735081224001	78-04-20	4.6	130	139
284032081302401	79-05-17	7.9	234	210
	79-05-17 1/	12	197	195

1/ Point sample.

2/ Non ideal count.

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Nutrients

STATION NUMBER	DATE OF SAMPLE	NITROGEN, NITRATE TOTAL (MG/L AS N)	NITROGEN, NITRATE DISSOLVED (MG/L AS N)	NITROGEN, NITRITE TOTAL (MG/L AS N)	NITROGEN, NITRITE DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA TOTAL (MG/L AS N)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC TOTAL (MG/L AS N)	NITROGEN, ORGANIC DISSOLVED (MG/L AS N)	NITROGEN, TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)
282534081220601	79-06-25 1/	.00	.00	.010	.010	.310	.320	.94	.83	1.2	.260
	79-06-25	.01	.01	.000	.000	.290	.290	.72	.62	1.0	.230
282636081300801	79-05-15	.00	.00	.000	.000	.270	.010	.19	.06	.46	.250
	79-05-15 1/	.00	.01	.020	.010	.270	.270	1.8	.28	2.0	.860
282753081232501	79-07-10	.00	.00	.010	.010	.360	.360	.50	.36	.87	.330
283001081185301	79-06-26	.00	.01	.000	.000	.480	.480	.22	.22	.70	.120
283002081234701	78-04-19	.41	.41	.020	.020	.300	.250	1.5	.56	2.2	.150
283121081311601	79-07-09	.09	.11	.010	.010	.260	.260	.22	.18	.58	.180
283144081254201	79-04-12	.01	.01	.000	.000	.230	.230	.19	.36	.43	.120
283154081220701	61-02-17	.93	--	--	--	--	--	--	--	--	--
	61-06-28	.02	--	--	--	--	--	--	--	--	--
	78-04-17	.00	.00	.000	.000	2.000	2.000	.19	.15	2.1	.300
283157081180401	78-04-18	.09	.08	.000	.000	.030	.020	.25	.23	.37	.040
283211081241001	78-04-27	.00	.00	.000	.000	.400	.390	.27	.20	.67	.360
283321081231801	78-04-10	.01	.02	.000	.000	.560	.520	.15	.15	.72	.120
	78-04-10 1/	.01	.01	.000	.000	.610	.600	.00	.00	.62	.140
	79-04-13 1/	.01	.01	.000	.000	1.000	1.000	.33	.50	1.3	.100
	79-04-13	.00	.00	.010	.010	.810	.630	.50	.16	1.3	.110
283326081262101	79-05-10	.00	.00	.000	.000	.240	.250	.15	.14	.39	.280
283337081232301	79-04-26	.00	.00	.020	.020	.730	.620	.67	.42	1.4	.130
283416081295901	78-04-13 1/	2.5	2.5	.140	.130	.050	.040	.05	.05	2.7	.120
	78-04-13	2.4	2.4	.140	.140	.050	.040	.10	.07	2.6	.100
283449081335601	79-05-11	.57	.58	.040	.010	.130	.030	1.3	1.3	2.0	.640
283530081214301	78-04-26	.00	.00	.000	.000	.900	.490	.25	.14	1.1	.660
283654081260801	79-06-22	1.5	1.7	.010	.010	.240	.200	.14	.18	1.8	.250
283655081283401	62-10-15	.00	.00	--	--	--	--	--	--	--	--
	78-04-12	.85	.85	.010	.010	.050	.050	.24	.10	1.1	.270
	78-04-12 1/	.65	.56	.010	.010	.100	.090	.31	.06	1.0	.280
283717081194202	78-04-25	.00	--	.000	--	.370	--	.14	--	.51	.420
283735081224001	78-04-20	.07	.07	.010	.010	.370	.360	.14	.10	.59	.120
284032081302401	79-05-17	.02	.02	.010	.010	.340	.400	.66	.52	1.0	.170
	79-05-17 1/	.01	.01	.010	.010	.140	1.800	.56	.40	.72	.370

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Nutrients--Continued

STATION NUMBER	DATE OF SAMPLE	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, TOTAL (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)
282534081220601	79-06-25 1/	.190	.200	.190
	79-06-25	.210	.210	.210
282636081300801	79-05-15	.250	.250	.250
	79-05-15 1/	.140	.140	.140
282753081232501	79-07-10	.290	.200	.200
283001081185301	79-06-26	.120	.110	.120
283002081234701	78-04-19	.020	.040	<.010
283121081311601	79-07-09	.150	.130	.120
283144081254201	79-04-12	.120	.110	.110
283154081220701	61-02-17	--	--	--
	61-06-28	--	--	--
	78-04-17	.300	.270	.270
283157081180401	78-04-18	.040	.020	.010
283211081241001	78-04-27	.340	.340	.330
283321081231801	78-04-10	.110	.080	.070
	78-04-10 1/	.080	.080	.040
	79-04-13 1/	.030	.090	.020
	79-04-13	.080	.080	.080
283326081262101	79-05-10	.270	.200	.200
283337081232301	79-04-26	.050	.060	.040
283416081295901	78-04-13 1/	.070	.040	.040
	78-04-13	.070	.040	.040
283449081335601	79-05-11	.240	.340	.230
283530081214301	78-04-26	.640	.550	.550
283654081260801	79-06-22	.100	.030	.040
283655081283401	62-10-15	--	--	--
	78-04-12	.210	.100	.090
	78-04-12 1/	.090	.080	.060
283717081194202	78-04-25	--	.230	--
283735081224001	78-04-20	.110	.100	.100
284032081302401	79-05-17	.130	.070	.070
	79-05-17 1/	.030	.040	.010

1/ Point sample.

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Trace Elements

STATION NUMBER	DATE OF SAMPLE	ALUMINUM, TOTAL RECOVERABLE (UG/L AS AL)	ALUMINUM, DISSOLVED (UG/L AS AL)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DISSOLVED (UG/L AS AS)	BARIUM, TOTAL RECOVERABLE (UG/L AS BA)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, TOTAL RECOVERABLE (UG/L AS B)	BORON, DISSOLVED (UG/L AS B)	CADMIUM TOTAL RECOVERABLE (UG/L AS CD)	CADMIUM DISSOLVED (UG/L AS CD)
282534081220601	79-06-25 1/	240	80	8	5	100	30	80	80	3	0
	79-06-25	180	60	6	5	0	30	70	60	1	0
282636081300801	79-05-15	40	10	1	1	0	0	760	40	1	1
	79-05-15 1/	700	20	7	3	200	0	73	0	6	1
282753081232501	79-07-10	60	30	1	1	0	10	40	30	0	1
283001081185301	79-06-26	80	30	1	1	0	10	20	20	1	0
283002081234701	78-04-19	290	100	7	6	0	0	100	110	0	1
283121081311601	79-07-09	60	20	1	0	0	10	20	20	0	1
283144081254201	79-04-12	70	40	0	0	0	0	30	30	0	0
283154081220701	78-04-17	80	40	1	1	0	0	40	40	1	0
283157081180401	78-04-18	190	50	1	1	0	0	20	30	0	1
283211081241001	78-04-27	40	20	2	1	0	0	40	40	0	0
283321081231801	78-04-10	60	40	3	3	0	0	30	30	3	4
	78-04-10 1/	60	30	2	2	0	0	20	10	1	0
	79-04-13 1/	30	20	3	2	0	0	20	30	0	0
	79-04-13	30	20	2	2	0	0	20	30	0	0
283326081262101	79-05-10	110	30	1	1	100	0	20	10	0	0
283337081232301	79-04-26	90	30	3	3	0	0	40	40	0	0
283416081295901	78-04-13 1/	90	20	3	2	0	0	20	20	1	0
	78-04-13	90	20	3	2	0	0	20	40	0	1
83449081335601	79-05-11	74000	110	4	3	100	0	40	90	0	1
83530081214301	78-04-26	40	20	2	2	0	0	70	40	2	0
283654081260801	79-06-22	70	30	3	1	0	7	30	20	1	0
283655081283401	78-04-12	500	40	2	1	0	0	30	30	0	2
	78-04-12 1/	700	30	1	1	0	0	10	20	1	0
283717081194202	78-04-25	80	20	2	1	0	0	40	40	1	0
283735081224001	78-04-20	80	20	2	2	0	0	20	30	0	0
284032081302401	79-05-17	110	30	1	1	0	0	20	20	1	3
	79-05-17 1/	700	20	1	1	0	0	20	20	2	1

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	CHROMIUM, TOTAL RECOVERABLE (UG/L AS CR)	CHROMIUM, DISSOLVED (UG/L AS CR)	COBALT, TOTAL RECOVERABLE (UG/L AS CO)	COBALT, DISSOLVED (UG/L AS CO)	COPPER, TOTAL RECOVERABLE (UG/L AS CU)	COPPER, DISSOLVED (UG/L AS CU)	IRON, TOTAL RECOVERABLE (UG/L AS FE)	IRON, DISSOLVED (UG/L AS FE)	LEAD, TOTAL RECOVERABLE (UG/L AS PB)	LEAD, DISSOLVED (UG/L AS PB)
282534081220601	79-06-25 1/	40	<10	0	2	28	5	2500	1700	5	1
	79-06-25	40	<10	1	3	12	2	1900	1500	3	0
282636081300801	79-05-15	10	10	2	0	4	3	340	80	8	0
	79-05-15 1/	50	20	5	2	110	0	11000	50	240	4
282753081232501	79-07-10	10	20	0	0	3	1	1400	1300	3	1
283001081185301	79-06-26	30	<10	0	1	9	1	330	100	2	0
283002081234701	78-04-19	<10	1	0	2	6	9	170	20	29	1
283121081311601	79-07-09	10	20	0	1	16	0	1800	320	2	0
283144081254201	79-04-12	10	0	0	0	4	2	450	130	6	7
283154081220701	78-04-17	<10	0	0	0	1	0	510	300	0	0
283157081180401	78-04-16	10	0	1	2	5	2	340	50	2	2
283211081241001	78-04-27	<10	1	0	0	3	3	630	550	3	3
283321081231801	78-04-10	10	1	0	3	--	3	1400	1400	--	70
	78-04-10 1/	10	1	2	0	8	9	2200	20	3	3
	79-04-13 1/	10	0	1	1	2	0	900	0	8	6
	79-04-13	10	0	0	0	2	0	1200	970	6	6
283326081262101	79-05-10	20	1	0	0	3	1	660	670	1	0
283337081232301	79-04-26	30	0	1	0	170	3	490	110	12	2
283416081295901	78-04-13 1/	10	0	0	0	1	0	1700	40	1	0
	78-04-13	20	0	2	0	3	0	1000	10	0	0
283449081335601	79-05-11	20	1	0	0	26	23	6600	230	13	4
283530081214301	78-04-26	<10	1	2	2	3	0	1200	1100	8	2
283654081260801	79-06-22	30	<10	0	1	3	2	1800	670	3	0
283655081283401	78-04-12	10	0	2	0	7	2	2300	1300	3	2
	78-04-12 1/	20	0	4	0	9	1	3600	0	7	0
283717081194202	78-04-25	<10	0	3	0	3	3	260	100	3	3
283735081224001	78-04-20	<10	0	0	0	0	0	320	200	1	0
284032081302401	79-05-17	10	10	0	0	17	9	1600	40	23	3
	79-05-17 1/	20	20	0	0	5	1	3500	50	36	4

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI)	SELE-NIUM, TOTAL (UG/L AS SE)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)
282534081220601	79-06-25 1/	0	2	70	70	<.5	<.5	1	14	0	0
	79-06-25	0	3	60	50	<.5	<.5	0	29	0	0
282636081300801	79-05-15	0	0	10	0	<.5	<.5	1	10	0	0
	79-05-15 1/	0	0	50	0	6.3	<.5	6	34	0	0
282753081232501	79-07-10	0	2	20	20	<.5	<.5	7	7	0	0
283001081185301	79-06-26	0	1	10	10	<.5	<.5	5	26	0	0
283002081234701	78-04-19	0	0	10	0	<.5	<.5	0	4	0	0
283121081311601	79-07-09	0	2	20	10	<.5	<.5	28	5	0	0
283144081254201	79-04-12	0	0	10	10	.5	.5	3	1	0	0
283154081220701	78-04-17	0	0	10	10	<.5	<.5	1	4	0	0
283157081180401	78-04-18	0	0	20	0	<.5	<.5	5	0	0	0
283211081241001	78-04-27	0	0	30	30	<.5	<.5	1	2	0	0
283321081231601	78-04-10	0	0	--	90	<.5	<.5	7	4	0	0
	78-04-10 1/	0	0	10	10	<.5	<.5	6	13	0	0
	79-04-13 1/	0	0	30	40	<.5	<.5	13	13	0	0
	79-04-13	0	0	40	50	.5	.5	14	8	0	0
283326081262101	79-05-10	0	0	10	30	<.5	<.5	14	17	0	0
283337081232301	79-04-26	0	0	40	30	.5	.5	2	11	0	0
283416081295901	78-04-13 1/	0	0	10	10	<.5	<.5	76	5	3	3
	78-04-13	0	0	10	0	<.5	<.5	80	13	3	3
283449081335601	79-05-11	0	0	30	20	.5	.5	6	35	1	0
283530081214301	78-04-26	0	0	30	30	<.5	<.5	8	3	0	0
283654081260801	79-06-22	0	2	20	10	<.5	<.5	0	34	0	0
283655081283401	78-04-12	0	0	20	10	<.5	<.5	3	2	1	0
	78-04-12 1/	0	0	20	10	<.5	<.5	3	15	0	0
283717081194202	78-04-25	0	0	10	10	<.5	<.5	3	1	0	0
283735081224001	78-04-20	0	0	10	10	<.5	<.5	5	2	0	0
284032081302401	79-05-17	0	0	20	0	<.5	<.5	4	10	0	0
	79-05-17 1/	0	0	40	30	<.5	<.5	12	19	0	0

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Trace Elements--Continued

STATION NUMBER	DATE OF SAMPLE	STRONTIUM, TOTAL RECOVERABLE (UG/L AS SR)	STRONTIUM, DISSOLVED (UG/L AS SR)	ZINC, TOTAL RECOVERABLE (UG/L AS ZN)	ZINC, DISSOLVED (UG/L AS ZN)
282534081220601	79-06-25 1/	130	90	60	30
	79-06-25	150	130	30	10
282636081300801	79-05-15	190	130	10	20
	79-05-15 1/	220	130	430	20
282753081232501	79-07-10	140	140	20	20
283001081185301	79-06-26	80	70	30	10
283002081234701	78-04-19	60	80	10	10
283121081311601	79-07-09	90	80	20	10
283144081254201	79-04-12	120	100	10	20
283154081220701	78-04-17	70	80	10	0
283157081180401	78-04-18	70	80	10	10
283211081241001	78-04-27	100	100	10	10
283321081231801	78-04-10	110	100	20	20
	78-04-10 1/	90	130	10	10
	79-04-13 1/	150	120	30	10
	79-04-13	130	40	20	30
283326081262101	79-05-10	140	70	10	10
283337081232301	79-04-26	70	70	250	10
283416081295901	78-04-13 1/	70	80	10	0
	78-04-13	60	80	10	10
283449081335601	79-05-11	180	90	50	10
283530081214301	78-04-26	80	90	10	0
283654081260801	79-06-22	40	60	20	7
283655081283401	78-04-12	90	80	10	10
	78-04-12 1/	70	80	30	20
283717081194202	78-04-25	80	90	10	0
283735081224001	78-04-20	80	90	10	0
284032081302401	79-05-17	250	190	30	20
	79-05-17 1/	280	230	50	30

1/ Point sample.

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS—Continued

Organic Compounds

STATION NUMBER	DATE OF SAMPLE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	METHY-LENE BLUE ACTIVE SUB-STANCE (MG/L)	OIL AND GREASE (MG/L)	OIL AND GREASE, TOTAL RECOV. GRAVI-METRIC (MG/L)	PCB, TOTAL (UG/L)	NAPH-THA-LENES, POLY-CHLOR. TOTAL (UG/L)	ALDRIN, TOTAL (UG/L)	CHLOR-DANE, TOTAL (UG/L)	DDD, TOTAL (UG/L)
282534081220601	79-06-25 1/	17	16	.10	--	0	.00	.00	.00	.00	.00
	79-06-25	18	17	.10	--	0	.00	.00	.00	.00	.00
282636081300801	79-05-15	6.0	4.8	.00	--	0	.00	.00	.00	.00	.00
	79-05-15 1/	16	5.5	.00	--	0	.00	.00	.00	1.0	.00
282753081232501	79-07-10	6.4	8.3	.00	--	0	.00	.00	.00	.00	.00
283001081185301	79-06-26	9.4	11	.00	--	0	.00	.00	.00	.00	.00
283002081234701	78-04-19	6.0	6.0	.10	1	--	.00	.00	.00	.00	.00
283121081311601	79-07-09	3.2	3.2	.00	--	0	.00	.00	.00	.00	.00
283144081254201	79-04-12	3.8	37	.00	--	0	.00	.00	.00	.00	.00
283154081220701	78-04-17	6.0	5.0	.00	--	--	.00	.00	.00	.00	.00
283157081180401	78-04-18	7.0	7.0	.10	0	--	.00	.00	.00	.00	.00
283211081241001	78-04-27	5.0	5.0	.10	0	--	.10	.00	.00	.00	.00
283321081231801	78-04-10	6.0	6.0	.10	0	--	.00	.00	.00	.00	.00
	78-04-10 1/	3.0	--	.10	1	--	.00	.00	.00	.00	.00
	79-04-13 1/	9.3	4.8	--	--	1	.00	.00	.00	.00	.00
	79-04-13	2.8	7.0	--	--	1	.00	.00	.00	.00	.00
283326081262101	79-05-10	8.3	16	.00	--	0	.00	.00	.00	.00	.00
283337081232301	79-04-26	10	8.9	.00	--	0	.00	.00	.00	.00	.00
283416081295901	78-04-13 1/	8.0	4.0	.00	--	--	.00	.00	.00	.00	.00
	78-04-13	4.0	2.0	.00	--	--	.00	.00	.00	.00	.00
283449081335601	79-05-11	28	25	.10	--	0	.00	.00	.00	.00	.00
283530081214301	78-04-26	6.0	6.0	.10	0	--	.20	.00	.00	.00	.00
283654081260801	79-06-22	2.5	3.4	.10	--	0	.00	.00	.00	.00	.00
283655081283401	78-04-12	8.0	3.0	.00	--	--	.00	.00	.00	.00	.00
	78-04-12 1/	8.0	8.0	.00	27	--	.00	.00	.00	.00	.00
283717081194202	78-04-25	4.0	4.0	--	0	--	.10	.00	.00	.00	.00
283735081224001	78-04-20	.0	.0	.10	--	--	.00	.00	.00	.00	.00
284032081302401	79-05-17	6.0	4.5	--	--	0	.00	.00	.00	.10	.00
	79-05-17 1/	29	15	.00	--	0	.00	.00	.00	.00	.00

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	DDE, TOTAL (UG/L)	DDT, TOTAL (UG/L)	DI-AZINON, TOTAL (UG/L)	DI-ELDRIN TOTAL (UG/L)	ENDO-SULFAN, TOTAL (UG/L)	ENDRIN, TOTAL (UG/L)	ETHION, TOTAL (UG/L)	HEPTA-CHLOR, TOTAL (UG/L)	HEPTA-CHLOR EPOXIDE TOTAL (UG/L)	LINDANE TOTAL (UG/L)
282534081220601	79-06-25 1/	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	79-06-25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
282636081300801	79-05-15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	79-05-15 1/	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
282753081232501	79-07-10	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00
283001081185301	79-06-26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283002081234701	78-04-19	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283121081311601	79-07-09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283144081254201	79-04-12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283154081220701	78-04-17	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283157081180401	78-04-18	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283211081241001	78-04-27	.00	.00	.01	.00	--	.00	.00	.00	.00	.00
283321081231801	78-04-10 1/	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
	78-04-10 1/	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
	79-04-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	79-04-13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283326081262101	79-05-10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283337081232301	79-04-26 1/	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00
283416081295901	78-04-13	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
	78-04-13	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283449081335601	79-05-11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283530081214301	78-04-26	.00	.00	.01	.01	--	.00	.00	.00	.00	.00
283654081260801	79-06-22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
283655081283401	78-04-12 1/	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
	78-04-12	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283717081194202	78-04-25	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
283735081224001	78-04-20	.00	.00	.00	.00	--	.00	.00	.00	.00	.00
284032081302401	79-05-17 1/	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	79-05-17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	MALA-THION, TOTAL (UG/L)	METH-OXY-CHLOR, TOTAL (UG/L)	METHYL PARA-THION, TOTAL (UG/L)	METHYL TRI-THION, TOTAL (UG/L)	MIREX, TOTAL (UG/L)	PARA-THION, TOTAL (UG/L)	PER-THANE TOTAL (UG/L)	TOX-APHENE, TOTAL (UG/L)	TOTAL TRI-THION (UG/L)
282534081220601	79-06-25 [1/]	.00	.00	.00	.00	.00	.00	.00	0	.00
	79-06-25	.00	.00	.00	.00	.00	.00	.00	0	.00
282636081300801	79-05-15	.00	.00	.00	.00	.00	.00	.00	0	.00
	79-05-15 [1/]	.00	.00	.00	.00	.00	.00	.00	0	.00
282753081232501	79-07-10	.00	.00	.00	.00	.00	.00	.00	0	.00
283001081185301	79-06-26	.00	.00	.00	.00	.00	.00	.00	0	.00
283002081234701	78-04-19	.00	.00	.00	.00	.00	.00	--	0	.00
283121081311601	79-07-09	.00	.00	.00	.00	.00	.00	.00	0	.00
283144081254201	79-04-12	.00	.00	.00	.00	.00	.00	.00	0	.00
283154081220701	78-04-17	.00	.00	.00	.00	.00	.00	--	0	.00
283157081180401	78-04-18	.00	.00	.00	.00	.00	.00	--	0	.00
283211081241001	78-04-27	.00	.00	.00	.00	.00	.00	--	0	.00
283321081231801	78-04-10	.00	.00	.00	.00	.00	.00	--	0	.00
	78-04-10 [1/]	.00	.00	.00	.00	.00	.00	--	0	.00
	79-04-13 [1/]	.00	.00	.00	.00	.00	.00	.00	0	.00
	79-04-13	.00	.00	.00	.00	.00	.00	.00	0	.00
283326081262101	79-05-10	.00	.00	.00	.00	.00	.00	.00	0	.00
283337081232301	79-04-26	.00	.00	.00	.00	.00	.00	.00	0	.00
283416081295901	78-04-13 [1/]	.00	.00	.00	.00	.00	.00	--	0	.00
	78-04-13	.00	.00	.00	.00	.00	.00	--	0	.00
283449081335601	79-05-11	.00	.00	.00	.00	.00	.00	.00	0	.00
283530081214301	78-04-26	.00	.00	.00	.00	.00	.00	--	0	.00
283654081260801	79-06-22	.00	.00	.00	.00	.00	.00	.00	0	.00
283655081283401	78-04-12	.00	.00	.00	.00	.00	.00	--	0	.00
	78-04-12 [1/]	.00	.00	.00	.00	.00	.00	--	0	.00
283717081194202	78-04-25	.00	.00	.00	.00	.00	.00	--	0	.00
283735081224001	78-04-20	.00	.00	.00	.00	.00	.00	--	0	.00
284032081302401	79-05-17	.00	.00	.00	.00	.00	.00	.00	0	.00
	79-05-17 [1/]	.00	.00	.00	.00	.00	.00	.00	0	.00

QUALITY OF WATER ANALYSES FOR DRAINAGE WELLS--Continued

Organic Compounds--Continued

STATION NUMBER	DATE OF SAMPLE	2,4-D, TOTAL (UG/L)	2,4,5-T TOTAL (UG/L)	SILVEX, TOTAL (UG/L)
282534081220601	79-06-25 1/	.00	.00	.00
	79-06-25	.00	.00	.00
282636081300801	79-05-15	.00	.00	.00
	79-05-15 1/	.00	.00	.00
282753081232501	79-07-10	.00	.00	.00
283001081185301	79-06-26	.02	.00	.00
283002081234701	78-04-19	.02	.00	.02
283121081311601	79-07-09	.00	.00	.00
283144081254201	79-04-12	.00	.00	.00
283154081220701	78-04-17	.00	.00	.00
283157081180401	78-04-18	.00	.00	.00
283211081241001	78-04-27	.02	.00	.00
283321081231801	78-04-10	.00	.00	.00
	78-04-10 1/	.00	.00	.00
	79-04-13 1/	.00	.00	.00
	79-04-13	.00	.00	.01
283326081262101	79-05-10	.00	.00	.00
283337081232301	79-04-26	.01	.00	.36
283416081295901	78-04-13 1/	.00	.00	.00
	78-04-13	.01	.00	.00
283449081335601	79-05-11	.00	.00	.00
283530081214301	78-04-26	.00	7.1	.00
283654081260801	79-06-22	.00	.00	.00
283655081283401	78-04-12	.01	.00	.00
	78-04-12 1/	.00	.00	.00
283717081194202	78-04-25	.00	.00	.00
283735081224001	78-04-20	.00	.00	.00
284032081302401	79-05-17	.00	.00	.00
	79-05-17 1/	.00	.00	.00

1/ Point Sample