GEOLOGICAL SURVEY CIRCULAR 253

THE INDUSTRIAL UTILITY OF PUBLIC WATER SUPPLIES IN THE EAST NORTH-CENTRAL STATES, 1952

By E. W. Lohr, P. N. Brown, and W. L. Lamar

UNITED STATES DEPARTMENT OF THE INTERIOR
Douglas McKay, Secretary

GEOLOGICAL SURVEY
W. E. Wrather, Director

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THE INDUSTRIAL UTILITY OF PUBLIC WATER SUPPLIES IN THE EAST NORTH CENTRAL STATES, 1952

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INTRODUCTION

The location of industrial plants is dependent on an ample water supply of suitable quality. Information relating to the chemical characteristics of the water supplies is not only essential to the location of many plants but also is an aid in the manufacture and distribution of many commodities.

Public water supplies are utilized extensively as a source of supply for many industrial plants, used either as delivered for domestic consumption or with further treatment if necessary to meet specific needs of the plant, such as water for processing, cooling, and steam generation. The industrial use of water in the United States in 1950 was estimated to be more then 75 billion gallons per day from private sources. In addition, about 6 billion gallons per day was estimated to be taken from public water supplies.

U. S. Geological Survey Water-Supply Paper 658, "The industrial utility of public water supplies in the United States, 1932" contains information pertaining to the public water supplies of 670 of the larger cities throughout the United States. This report, which is still in print and being distributed, has filled an important need in the field of water-supply engineering. The demand for more up-to-date information and more extended coverage has led to studies by the Geological Survey for revision of the information contained in the 1932 report. The revised report, which will include data pertaining to public water supplies of more than 1,200 cities in the United States, will eventually be published as a Geological Survey Water-Supply Paper. However, in order that the information might be available at the earliest possible time, nine preliminary reports are being issued which give data on the larger cities in each state. These nine reports are being released as Geological Survey Circulars, each covering a group of states as delineated by the Bureau of Census in taking the census of the population of the country. (See fig. 1). The reports give descriptive information and analytical data for approximately three-fourths of the cities that will be included in the final report for each of the states.

This circular is the sixth of the series and includes data for the States of Illinois, Indiana, Michigan, Ohio, and Wisconsin. (See fig. 1). The report gives the population (1950) of the city, the population supplied, ownership, sources and treatment of supplies, capacity of treatment plants, storage facilities for both raw and finished waters, and chemical analyses of the water for a total of 151 of the larger cities of Illinois, Indiana, Michigan, Ohio, and Wisconsin. The data for each city are essentially the same as will appear in the complete report for the whole country.

Data for the supplies in Illinois, Indiana, Michigan, Ohio, and Wisconsin were compiled by Paul N. Brown and others under the general supervision of W. L. Lamar, district chemist, Columbus, Ohio. Review and final assembly of the data were made by E. W. Lohr in the Washington office under the direction of S. K. Love, Chief, Quality of Water Branch.

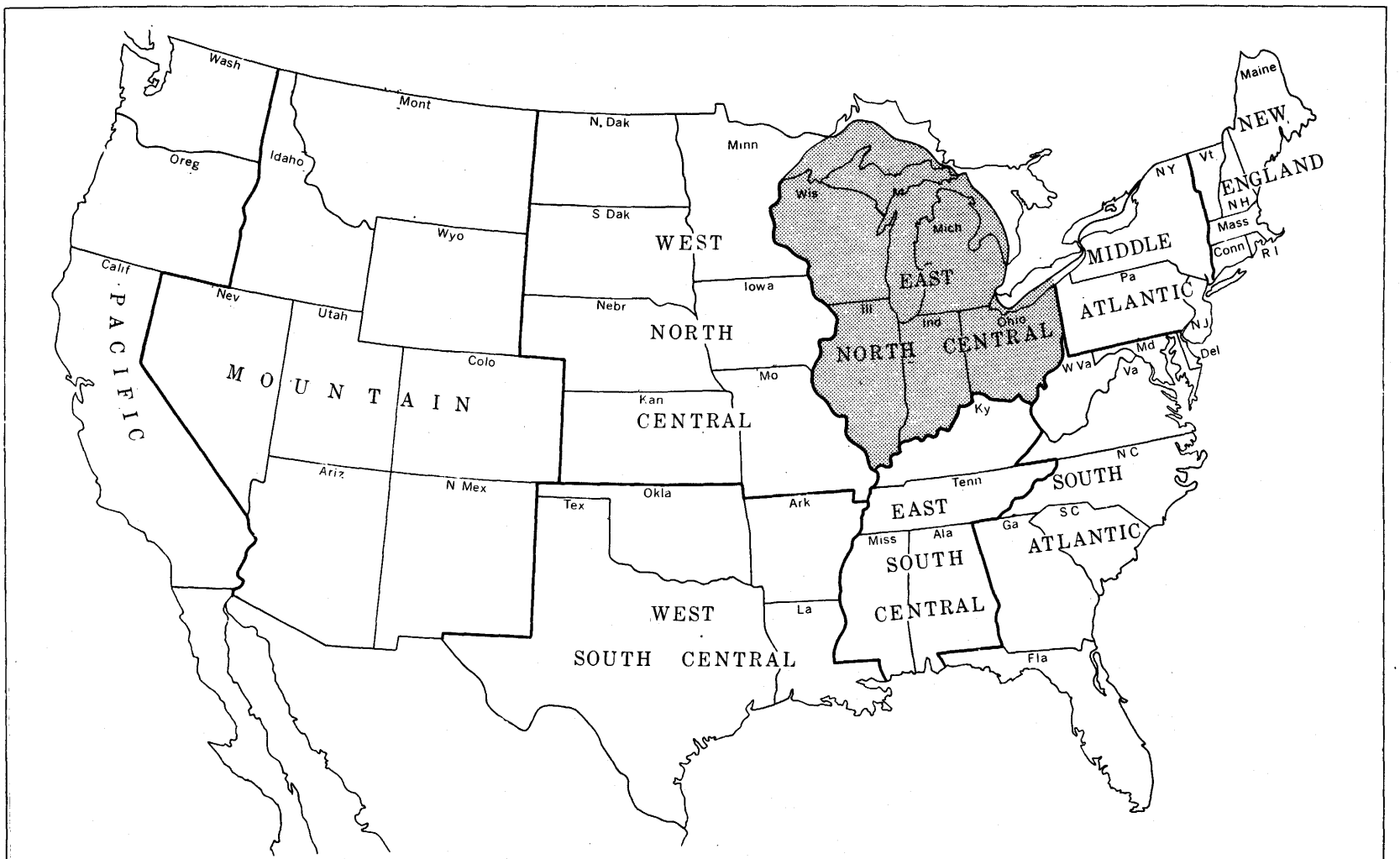

Figure 1. -Map of the United States showing sections covered by the nine circulars on the Industrial Utility of Public Water Supplies of the United States, 1952. The shaded portion represents the section of the country covered by this circular.

ALTON
(Population, 32,550)

Ownership: Alton Water Company (controlled by American Water Works Company); supplies also about 1,450 people outside Alton. Total population supplied, about 34,000.
Source: Mississippi River.
Treatment: Coagulation with alum, softening with lime and soda ash, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 7,600,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,045,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.2	3.6	Hardness as $CaCO_3$:		
Iron (Fe)	[a].02	.12	Total	184	106
Manganese (Mn)	.18	.00	Noncarbonate	43	54
Calcium (Ca)	45	23			
Magnesium (Mg)	17	12	Color	20	5
Sodium (Na)	10	7.6	pH	7.7	7.7
Potassium (K)	1.6	2.4	Specific conductance (micromhos at 25 C.)	410	275
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	170	65			
Sulfate (SO_4)	49	55	Turbidity	--	--
Chloride (Cl)	10	10	Temperature (F.)	76	76
Fluoride (F)	.4	.3	Date of collection	Sept. 16, 1952	Sept. 16, 1952
Nitrate (NO_3)	.3	2.3			
Dissolved solids	251	166			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	151	191	97	7.7	7.4	7.9	205	252	127	218	1,228	25
Finished water	52	90	29	9.3	10.2	7.9	117	150	90	0	0	0

[a] Iron in solution when analysed. Sample turbid when collected.

AURORA
(Population, 50,576)

Ownership: Municipal.
Source: 10 drilled wells (5 to 12, 12a, 14), 2,185 to 2,460 ft deep.
Treatment: Aeration for iron removal, chlorination of part of supply, filtration of part of supply.
Rated capacity of treatment plant: --
Raw-water storage: None.
Finished-water storage: 7,200,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 7	Wells (finished water) [a]		Well 7	Wells (finished water) [a]
Silica (SiO_2)	--	7.8	Hardness as $CaCO_3$:		
Iron (Fe)	1.2	.13	Total	329	350
Manganese (Mn)	--	.00	Noncarbonate	85	93
Calcium (Ca)	83	93			
Magnesium (Mg)	29	29	Color	0	2
Sodium (Na)	204	129	pH	--	6.8
Potassium (K)		16	Specific conductance (micromhos at 25 C.)	--	1,370
Carbonate (CO_3)	--	0	Turbidity	10	--
Bicarbonate (HCO_3)	[b] 297	315	Temperature (F.)	--	--
Sulfate (SO_4)	45	37	Date of collection	Oct. 19, 1946	Sept., 1952
Chloride (Cl)	340	248			
Fluoride (F)	--	1.0			
Nitrate (NO_3)	.2	.2			
Dissolved solids	838	730			

Depth (feet)	2,262	--
Diameter (inches)	18	--
Date drilled	1915	--
Percent of supply	--	--

[a] Analysis by U. S. Geological Survey.
[b] Total alkalinity as bicarbonate (HCO_3).

BELLEVILLE
(Population, 32,721)

Ownership: East St. Louis and Interurban Water Company.
Source: Supplied by East St. Louis. (See East St. Louis.)

BERWYN
(Population, 51,280)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)
Finished-water storage: 2,650,000 gal.

BLOOMINGTON
(Population, 34,163)

Ownership: Municipal.
Source: Money Creek, impounded.
Treatment: Coagulation with alum, softening with lime, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: 2,250,000,000 gal.
Finished-water storage: 8,160,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Dept. of Public Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	7.0	--	Hardness as $CaCO_3$:		
Iron (Fe)	--	--	Total	221	98
Manganese (Mn)	.1	.08	Noncarbonate	57	36
Calcium (Ca)	49	22			
Magnesium (Mg)	24	10	Color	--	--
Sodium (Na)	.0	.0	pH	7.9	7.2
Potassium (K)			Specific conductance (micromhos at 25 C.)	404	--
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	200	76	Temperature (F.)	--	--
Sulfate (SO_4)	49	22	Date of collection	Apr. 9, 1945	Mar. 12, 1951
Chloride (Cl)	1.0	.0			
Fluoride (F)	.1	--			
Nitrate (NO_3)	.3	11			
Dissolved solids	216	264			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	150	171	100	8.2	9.0	7.6	206	252	150	65	800	10
Finished water	28	47	20	9.3	9.5	9.0	88	112	74	0	0	0

BLUE ISLAND
(Population, 17,622)

Ownership: Municipal; supplies also about 8,000 people outside Blue Island. Total population supplied, about 25,600.
Source: Supplied by Chicago. (See Chicago.)

BROOKFIELD
(Population, 15,472)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)

CALUMET CITY
(Population, 15,799)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)

CHAMPAIGN
(Population, 39,563)

Ownership: Northern Illinois Water Corporation.
Source: 40 drilled wells, 154 to 299 ft deep.
Treatment: Aeration for iron removal, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: --
Raw-water storage: None.
Finished-water storage: 3,050,000 gal.

ANALYSES

(Analyses, in parts per million, by Ill. Dept. of Health and by State Water Survey)

	Well 48	Well 50	Finished water
Silica (SiO_2)	24	19	18
Iron (Fe)	3.2	.8	.03
Manganese (Mn)	.0	--	.1
Calcium (Ca)	61	50	55
Magnesium (Mg)	23	27	34
Sodium (Na) / Potassium (K)	63	26	38
Carbonate (CO_3)	--	--	0
Bicarbonate (HCO_3)	[a] 473	[a] 356	417
Sulfate (SO_4)	1.0	.0	12
Chloride (Cl)	3.0	2.0	3.0
Fluoride (F)	.5	.1	.3
Nitrate (NO_3)	.4	.2	.1
Dissolved solids	403	288	360
Hardness as $CaCO_3$:			
Total	248	237	277
Noncarbonate	0	0	0
Color	0	0	--
pH	--	--	7.7
Specific conductance (micromhos at 25 C.)	--	--	638
Turbidity	22	--	--
Temperature (F.)	--	--	--
Date of collection	Mar. 15, 1949	Jan. 19, 1949	Apr. 10, 1951
Depth (feet)	231	299	
Diameter (inches)	38-17	38-17	
Date drilled	1947	1947	
Percent of supply	--	--	

[a] Total alkalinity as bicarbonate (HCO_3).

CHICAGO
(Population, 3,620,962)

Ownership: Municipal; supplies also Berwyn, Blue Island, Brookfield, Calumet City, Cicero, Elmwood Park, Harvey, Maywood, Oak Park, Park Ridge, and a number of other cities and towns, of a total population of about 487,000. Total population supplied, about 4,108,000.
Source: Lake Michigan.
Treatment: North and Central Districts (about 67 percent of supply): chlorination. South District (about 33 percent of supply): prechlorination, coagulation with alum (and acid treated sodium silicate during winter months), activated carbon, addition of lime for corrosion control, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 320,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 8 basins, 14,600,000 gal; 2 reservoirs, 32,300,000 gal.

The city is divided into three water districts: North District, Central District, and South District, served by 4 intakes in the Lake. Wilson Avenue Crib intake, 2.1 miles offshore at Wilson Avenue, supplies the North District; Wm. E. Dever Crib intake, 2.7 miles offshore at Chicago Avenue, and Four Mile Crib intake, 3.2 miles offshore at 14th Street, supply the Central District; Dunne Crib intake, 2 miles offshore at 68th Street, supplies the South District Filtration Plant and the South District. The water supply system includes 15 pumping stations. The treatment plant is on 79th Street at the Lake on the southeast side of the City. The plant serves a total population of about 1,510,000.

CHICAGO--Continued

ANALYSES

(Analyses, in parts per million, by Chicago Department of Public Works)

	Raw water [a]	Finished water [a]	Finished water [b]	Finished water [c]
Silica (SiO_2)	2.3	1.8	2.1	2.2
Iron (Fe)	.09	.09	.21	.19
Manganese (Mn)	.00	.00	.00	.00
Calcium (Ca)	32	39	36	36
Magnesium (Mg)	10	10	10	10
Sodium (Na)	3.5	3.3	3.4	3.9
Potassium (K)	1.0	.7	.7	.6
Carbonate (CO_3)	0	0	0	0
Bicarbonate (HCO_3)	138	132	135	138
Sulfate (SO_4)	17	23	17	18
Chloride (Cl)	6.5	7.2	6.3	6.4
Fluoride (F)	.1	.1	.1	.1
Nitrate (NO_3)	--	--	--	--
Dissolved solids	171	168	150	148
Hardness as $CaCO_3$:				
Total	121	138	131	131
Noncarbonate	8	30	20	18
Color	3	1	3	3
pH	8.2	7.9	8.2	8.2
Specific conductance (micromhos at 25 C.)	263	273	225	240
Turbidity	12	0	14	13
Temperature (F.)	40	39	37	38
Date of collection	Apr. 9, 1952	Apr. 9, 1952	Apr. 9, 1952	Apr. 9, 1952

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	--	117	104	8.3	8.4	7.8	110	117	104	8.6	99	1
Finished water	--	112	90	7.9	8.1	7.7	105	112	90	0	0	0

[a] South District Filtration Plant.
[b] Chicago Ave. Pumping Station.
[c] Jefferson Ave. Pumping Station.

CHICAGO HEIGHTS
(Population, 24,551)

Ownership: Municipal.
Source: 8 drilled wells (15 to 19, 21 to 23), 200, 235, 1,832, 251, 330, 203, 270, and 260 ft deep. Auxiliary supply, 1 well (14), 174 ft deep.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 2,065,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 21	Wells (finished water) [a]		Well 21	Wells (finished water) [a]
Silica (SiO_2)	19	19	Hardness as $CaCO_3$:		
Iron (Fe)	.4	.29	Total	466	565
Manganese (Mn)	--	.00	Noncarbonate	102	163
Calcium (Ca)	112	130			
Magnesium (Mg)	45	58	Color	0	4
Sodium (Na)	33	21	pH	7.0	7.1
Potassium (K)		5.2	Specific conductance (micromhos at 25 C.)	--	1,040
Carbonate (CO_3)	--	0	Turbidity	10	--
Bicarbonate (HCO_3)	444	488	Temperature (F.)	51.6	--
Sulfate (SO_4)	159	200	Date of collection	Oct. 20, 1945	Sept. 27, 1952
Chloride (Cl)	4.0	3.5			
Fluoride (F)	--	.3			
Nitrate (NO_3)	4.1	1.5			
Dissolved solids	618	687			

Depth (feet)	203
Diameter (inches)	24
Date drilled	1945
Percent of supply	--

[a] Analysis by U. S. Geological Survey.

CICERO
(Population, 67,544)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)
Finished-water storage: 1,000,000 gal.

DANVILLE
(Population, 37,864)

Ownership: Interstate Water Company; supplies also about 5,400 people outside Danville. Total population supplied, about 43,300.
Source: North Fork Vermilion River, impounded.
Treatment: Prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, postchlorination to breakpoint.
Rated capacity of treatment plant: 7,000,000 gpd.
Raw-water storage: 2,500,000,000 gal.
Finished-water storage: 900,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water[a]		Raw water	Finished water[a]
Silica (SiO_2)	10	2.0	Hardness as $CaCO_3$:		
Iron (Fe)	--	1.2	Total	238	232
Manganese (Mn)	.2	.00	Noncarbonate	70	52
Calcium (Ca)	56	47			
Magnesium (Mg)	24	28	Color	--	3
Sodium (Na)	1	4.8	pH	7.9	7.3
Potassium (K)		1.6	Specific conductance (micromhos at 25 C.)	567	465
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	205	220	Temperature (F.)	--	--
Sulfate (SO_4)	59	46	Date of collection	June 11, 1945	Sept. 17, 1952
Chloride (Cl)	5	11			
Fluoride (F)	.3	.2			
Nitrate (NO_3)	5	.4			
Dissolved solids	270	265			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	157	240	20	7.7	8.4	6.2	--	--	--	133	2,000	6.5
Finished water	144	238	12	7.3	8.2	6.0	183	324	159	2.4	35	0

[a] Analysis by U. S. Geological Survey.

DECATUR
(Population, 66,269)

Ownership: Municipal.
Source: Sangamon River, impounded in Lake Decatur.
Treatment: Coagulation with alum, softening with lime, recarbonation, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 18,000,000 gpd.
Raw-water storage: 8,000,000,000 gal.
Finished-water storage: 4,300,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Dept. of Public Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	--	5.0	Hardness as $CaCO_3$:		
Iron (Fe)	--	.01	Total	268	100
Manganese (Mn)	.1	.0	Noncarbonate	52	56
Calcium (Ca)	61	14			
Magnesium (Mg)	28	16	Color	--	--
Sodium (Na) / Potassium (K)	2.0	8.0	pH	8.0	9.6
Carbonate (CO_3)	0	--	Specific conductance (micromhos at 25 C.)	590	301
Bicarbonate (HCO_3)	263	[a] 54	Turbidity	--	--
Sulfate (SO_4)	44	62	Temperature (F.)	--	--
Chloride (Cl)	3.0	4.0	Date of collection	July 10, 1945	July 10, 1945
Fluoride (F)	--	.4			
Nitrate (NO_3)	6.0	5.0			
Dissolved solids	280	132			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	182	252	96	8.0	8.4	7.3	225	284	132	107	650	40
Finished water	73	134	32	9.6	10.2	8.9	116	172	76	.6	1.9	.2

[a] Total alkalinity as bicarbonate (HCO_3).

EAST ST. LOUIS
(Population, 82,295)

Ownership: East St. Louis and Interurban Water Company; supplies also about 68,200 people outside East St. Louis. Total population supplied, about 150,500.
Source: Mississippi River.
Treatment: Coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, chlorination, and chlorine dioxide for taste and odor control.
Rated capacity of treatment plant: 28,500,000 gpd.
Raw-water storage: None.
Finished-water storage: 7,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	7.5	4.7	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.13	Total	166	182
Manganese (Mn)	.00	.00	Noncarbonate	30	52
Calcium (Ca)	40	47			
Magnesium (Mg)	16	16	Color	35	8
Sodium (Na)	7.6	6.8	pH	7.5	7.1
Potassium (K)	2.3	1.7	Specific conductance (micromhos at 25 C.)	363	395
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	166	160	Temperature (F.)	--	--
Sulfate (SO_4)	32	53	Date of collection	Sept. 16, 1952	Sept. 16, 1952
Chloride (Cl)	7.0	9.2			
Fluoride (F)	.1	.2			
Nitrate (NO_3)	2.0	2.1			
Dissolved solids	216	237			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	144	190	90	7.7	8.0	7.2	189	226	138	457	3,400	25
Finished water	142	192	100	7.6	8.1	7.2	196	246	154	.3	2.5	.1

ELGIN
(Population, 44,223)

Ownership: Municipal.
Source: 10 drilled wells. Wells (1 to 4) 2,000, 1,300, 1,300, and 1,300 ft deep are on Slade Avenue. The location and depth of the remaining wells are as follows: Slade Avenue, 53 ft; St. Charles Street, 105 ft; North State Street, 43 ft; Creighton Avenue, 53 ft; Lavoie Avenue, 650 ft; Shuler Street, 1,940 ft.
Treatment: (1) Aeration, coagulation with alum and iron salts, softening with lime, recarbonation, sedimentation, rapid sand filtration, and chlorination.
(2) Aeration, rapid sand filtration, softening with cation exchange, and chlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 3,000,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 1	Well Slade Ave.	Well Lavoie Ave.	Finished water
Silica (SiO_2)	12	16	14	9.0
Iron (Fe)	.1	.5	.1	.2
Manganese (Mn)	.0	.0	.0	.0
Calcium (Ca)	68	80	62	15
Magnesium (Mg)	24	32	25	13
Sodium (Na) + Potassium (K)	22	9.0	36	16
Carbonate (CO_3)	--	--	--	--
Bicarbonate (HCO_3)	[a]356	[a]302	[a]380	[a]98
Sulfate (SO_4)	13	85	13	30
Chloride (Cl)	7.0	11	9.0	11
Fluoride (F)	.4	.1	.7	.4
Nitrate (NO_3)	.2	.8	.1	.7
Dissolved solids	332	386	360	145
Hardness as $CaCO_3$:				
Total	267	332	258	91
Noncarbonate	0	84	0	11
Color	0	0	0	--
pH	--	--	--	--
Specific conductance (micromhos at 25 C.)	--	--	--	--
Turbidity	--	5	--	--
Temperature (F.)	57	54	55	--
Date of collection	June 29, 1948	June 28, 1948	June 28, 1948	June, 1948
Depth (feet)	2,000	53	650	
Diameter (inches)	12	12	16	
Date drilled	1904	1934	1931	
Percent of supply	--	--	--	

[a] Total alkalinity as bicarbonate (HCO_3).

ELGIN--Continued

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	292	302	278	7.3	7.3	7.3	280	288	256	--	--	--
Finished water...	95	132	72	9.1	9.7	8.7	80	112	54	0	0	0

ELMHURST
(Population, 21,273)

Ownership: Municipal.
Source: 5 drilled wells (1, 2, 3a, 4, 5), 1,480, 2,227, 1,502, 1,400, and 1,480 ft deep, respectively.
Treatment: None.
Storage: 1,450,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 4	Well 5		Well 4	Well 5
Silica (SiO_2)	14	16	Hardness as $CaCO_3$:		
Iron (Fe)	.4	.0	Total	312	243
Manganese (Mn)	.0	.0	Noncarbonate.....	56	13
Calcium (Ca)	90	61			
Magnesium (Mg).....	21	22	Color.....	0	0
Sodium (Na)	77	43	pH	--	--
Potassium (K)			Specific conductance (micromhos at		
Carbonate (CO_3)	--	--	25 C.).....	--	--
Bicarbonate (HCO_3)	[a]312	[a]280	Turbidity	2	--
Sulfate (SO_4)	84	80	Temperature (F.)...	60	60
Chloride (Cl)	98	15	Date of collection...	June 9, 1949	Feb. 9, 1943
Fluoride (F)	1.1	--			
Nitrate (NO_3)	--	3.6			
Dissolved solids.....	540	380			

Depth (feet)	1,400	1,480
Diameter (inches)	10	16
Date drilled	1927	1940
Percent of supply	--	--

[a] Total alkalinity as bicarbonate (HCO_3).

ELMWOOD PARK
(Population, 18,801)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)

EVANSTON
(Population, 73,641)

Ownership: Municipal.
Source: Lake Michigan.
Treatment: Coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 24,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 9,900,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water[a]		Raw water	Finished water[a]
Silica (SiO_2)	2.0	.9	Hardness as $CaCO_3$:		
Iron (Fe)	--	.10	Total	114	126
Manganese (Mn)	.1	.00	Noncarbonate	4	24
Calcium (Ca)	26	34			
Magnesium (Mg)	12	10	Color	--	2
Sodium (Na)	6.0	2.8	pH	8.2	7.3
Potassium (K)		.5	Specific conductance (micromhos at 25 C.)	--	273
Carbonate (CO_3)	--	0	Turbidity	--	--
Bicarbonate (HCO_3)	[b]134	124	Temperature (F.)	--	--
Sulfate (SO_4)	12	22	Date of collection	July, 1944	Sept. 17, 1952
Chloride (Cl)	2.0	6.5			
Fluoride (F)	.1	1.0			
Nitrate (NO_3)	5.0	.5			
Dissolved solids	129	150			

[a] Analysis by U. S. Geological Survey.
[b] Total alkalinity as bicarbonate (HCO_3).

FREEPORT
(Population, 22,467)

Ownership: Municipal.
Source: 3 drilled wells (2 to 4), 303, 446, and 500 ft deep.
Treatment: Aeration, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 3,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 8,450,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 2	Well 4	Wells [a] (finished water)
Silica (SiO_2)	22	7.6	8.7
Iron (Fe)	.6	.6	.20
Manganese (Mn)	.1	--	.00
Calcium (Ca)	108	62	76
Magnesium (Mg)	53	36	46
Sodium (Na)	13	6.0	4.7
Potassium (K)			2.5
Carbonate (CO_3)	--	--	0
Bicarbonate (HCO_3)	[b] 400	[b] 371	392
Sulfate (SO_4)	104	10	48
Chloride (Cl)	45	1.0	7.8
Fluoride (F)	.1	.0	.1
Nitrate (NO_3)	21	.2	.2
Dissolved solids	556	310	390
Hardness as $CaCO_3$:			
Total	489	303	380
Noncarbonate	161	0	58
Color	0	0	0
pH	--	--	7.4
Specific conductance (micromhos at 25 C.)	--	--	694
Turbidity	10	--	--
Temperature (F.)	50.5	--	--
Date of collection	Nov. 14, 1947	Nov. 13, 1947	Sept. 18, 1952
Depth (feet)	303	446	--
Diameter (inches)	16	16	--
Date drilled	1914	1928	--
Percent of supply	--	--	--

[a] Analysis by U. S. Geological Survey.
[b] Total alkalinity as bicarbonate (HCO_3).

GALESBURG
(Population, 31,425)

Ownership: Municipal.
Source: 5 drilled wells: Bradley 1 and 2, 1,252 and 2,450 ft deep; Henderson Street 1 and 2, 2,414 and 2,408 ft deep; Florence Avenue, 2,473 ft deep.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 6,375,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Bradley		Henderson St.		Florence Avenue Well
	Well 1	Well 2	Well 1	Well 2	
Silica (SiO_2)	10	12	10	13	10
Iron (Fe)	.6	2.1	.3	.1	.5
Manganese (Mn)	.0	.0	0	.0	.0
Calcium (Ca)	113	72	56	56	68
Magnesium (Mg)	53	33	22	21	26
Sodium (Na) + Potassium (K)	432	358	282	298	382
Carbonate (CO_3)	0	--	--	--	--
Bicarbonate (HCO_3)	263	[a] 293	[a] 280	[a] 281	[a] 278
Sulfate (SO_4)	930	560	333	364	560
Chloride (Cl)	184	195	185	190	215
Fluoride (F)	--	2.5	2.0	2.0	3.0
Nitrate (NO_3)	1.6	1.1	5.4	.5	1.2
Dissolved solids	[b] 1,850	[b] 1,380	[b] 1,030	[b] 1,080	[b] 1,400
Hardness as $CaCO_3$:					
Total	501	316	229	227	279
Noncarbonate	285	76	0	0	51
Color	0	0	0	0	--
pH	7.8	--	--	--	--
Specific conductance (micromhos at 25 C.)	--	--	--	--	--
Turbidity	--	10	0	0	--
Temperature (F.)	63	68	69	70	68
Date of collection	Feb. 11, 1944	Jan. 9, 1946	Jan. 9, 1946	Jan. 9, 1946	Jan. 9, 1946
Depth (feet)	1,252	2,450	2,414	2,408	2,473
Diameter (inches)	24	12	22	22	24
Date drilled	1917	1919	1919	1928	1944
Percent of supply	--	--	--	--	--

[a] Total alkalinity as bicarbonate (HCO_3).
[b] Sum of determined constituents.

GRANITE CITY
(Population, 29,465)

Ownership: East St. Louis and Interurban Water Company.
Source: Mississippi River; from East St. Louis.
Treatment: Coagulation, filtration, chlorination. (See also East St. Louis.)
Rated capacity of treatment plant: 5,000,000 gpd.
Raw water storage: None.
Finished water storage: 900,000 gal.

JACKSONVILLE
(Population, 20,387)

Ownership: Municipal; supplies also about 1,200 people outside Jacksonville. Total population supplied, about 21,600.
Source: Mauvisterre Creek, impounded in Lake Mauvisterre; Sandy Creek, impounded in Lake Jacksonville.
Treatment: Coagulation with alum, softening with lime, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 4,000,000 gpd.
Raw-water storage: 2,875,000,000 gal.
Finished-water storage: 815,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	--	8.0	Hardness as $CaCO_3$:		
Iron (Fe)	--	.1	Total	169	90
Manganese (Mn)	--	.1	Noncarbonate	55	64
Calcium (Ca)	38	16			
Magnesium (Mg)	18	12	Color	--	--
Sodium (Na)	1.0	4.0	pH	7.4	9.5
Potassium (K)			Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	--	Turbidity	--	--
Bicarbonate (HCO_3)	139	[a]32	Temperature (F.)	--	--
Sulfate (SO_4)	45	51	Date of collection	March, 1951	March, 1951
Chloride (Cl)	2.0	6.0			
Fluoride (F)	--	.3			
Nitrate (NO_3)	10	13			
Dissolved solids	295	164			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	168	206	50	7.8	8.0	7.4	194	240	170	111	3000	15
Finished water	48	90	15	9.6	10.3	8.5	102	160	80	0.5	2	0

[a] Total alkalinity as bicarbonate (HCO_3).

JOLIET
(Population, 51,601)

Ownership: Municipal.
Source: 5 drilled wells (1, Ottawa St., Williamson Ave., Jasper St., and Ruby St.), 1,677, 1,621, 1,610, 1,565, and 1,544 ft deep, respectively.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 6,200,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 1	Well Ottawa St.	Well Williamson Ave.	Well Ruby St.
Silica (SiO_2)	12	12	12	12
Iron (Fe)	.2	.2	.1	.5
Manganese (Mn)	.0	--	--	--
Calcium (Ca)	82	80	130	70
Magnesium (Mg)	25	25	59	22
Sodium (Na) / Potassium (K)	58	79	29	68
Carbonate (CO_3)	0	0	0	0
Bicarbonate (HCO_3)	322	336	400	317
Sulfate (SO_4)	122	136	289	105
Chloride (Cl)	30	42	3.0	31
Fluoride (F)	1.0	1.1	.6	1.1
Nitrate (NO_3)	.9	.4	.9	.3
Dissolved solids	505	534	735	475
Hardness as $CaCO_3$:				
Total	307	303	569	263
Noncarbonate	43	27	241	3
Color	0	0	0	0
pH	7.1	7.2	7.1	7.1
Specific conductance (micromhos at 25 C.)	--	--	--	--
Turbidity	0	0	0	10
Temperature (F.)	61	61	57	62
Date of collection	Oct. 30, 1946	Oct. 30, 1946	Oct. 30, 1946	Oct. 31, 1946
Depth (feet)	1,677	1,621	1,610	1,544
Diameter (inches)	--	16	16	12
Date drilled	1937	1907	1924	1915
Percent of supply	--	--	--	--

KANKAKEE
(Population, 25,856)

Ownership: Kankakee Water Company.
Source: Kankakee River.
Treatment: Coagulation with alum, softening with lime, sedimentation, recarbonation, rapid sand filtration, ammoniation, and chlorination.
Rated capacity of treatment plant: 6,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,300,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.0	9.0	Hardness as $CaCO_3$:		
Iron (Fe)	--	--	Total	263	75
Manganese (Mn)	.1	0	Noncarbonate	71	47
Calcium (Ca)	66	17			
Magnesium (Mg)	24	8.0	Color	--	--
Sodium (Na)	16	26	pH	7.9	9.4
Potassium (K)			Specific conductance (micromhos at 25 C.)	566	310
Carbonate (CO_3)	.0	--	Turbidity	--	--
Bicarbonate (HCO_3)	234	[a] 34	Temperature (F.)	--	--
Sulfate (SO_4)	96	91	Date of collection	June, 1944	June, 1944
Chloride (Cl)	4.0	6.0			
Fluoride (F)	.3	.2			
Nitrate (NO_3)	5.0	5.0			
Dissolved solids	338	185			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	170	216	84	7.9	8.3	7.5	276	373	150	90	2,000	5
Finished water	33	56	25	9.4	10.1	8.7	89	116	74	--	--	--

[a] Total alkalinity as bicarbonate (HCO_3).

MAYWOOD
(Population, 27,473)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)
Finished-water storage: 3,925,000 gal.

MOLINE
(Population, 37,397)

Ownership: Municipal.
Source: Mississippi River.
Treatment: Aeration, coagulation with alum and lime, ammoniation, chlorination, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 3,700,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water[a]		Raw water	Finished water[a]
Silica (SiO_2)	3.0	5.3	Hardness as $CaCO_3$:		
Iron (Fe)	.3	.13	Total	122	59
Manganese (Mn)	.00	.00	Noncarbonate	18	34
Calcium (Ca)	30	22			
Magnesium (Mg)	11	1.0	Color	--	2
Sodium (Na)	1.0	4.0	pH	7.7	7.2
Potassium (K)		1.9	Specific conductance (micromhos at 25 C.)	--	166
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	127	30	Temperature (F.)	--	--
Sulfate (SO_4)	14	29	Date of collection	May, 1940	Sept. 15, 1952
Chloride (Cl)	3.0	8.0			
Fluoride (F)	--	.2			
Nitrate (NO_3)	--	.3			
Dissolved solids	164	104			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	115	150	66	7.7	8.4	7.4	139	176	82	142	800	2
Finished water	84	128	25	7.6	10.9	6.9	150	198	69	.13	.35	0

[a] Analysis by U. S. Geological Survey.

OAK PARK
(Population, 63,529)

Ownership: Municipal.
Source: Supplied by Chicago. (See Chicago.)
Treatment: (See Chicago.) Rechlorination at Oak Park.
Finished-water storage: 5,000,000 gal.

PEKIN
(Population, 21,858)

Ownership: Pekin Water Works Company.
Source: Drilled wells.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 2,690,000 gal.

ANALYSIS

(Analysis, in parts per million, by Illinois State Water Survey)

	Well 4		Well 4
Silica (SiO_2)	23	Hardness as $CaCO_3$:	
Iron (Fe)	.1	Total	345
Manganese (Mn)	.0	Noncarbonate	113
Calcium (Ca)	82		
Magnesium (Mg)	34	Color	0
Sodium (Na)	9.2	pH	--
Potassium (K)		Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	--		
Bicarbonate (HCO_3)	[a] 283	Turbidity	0
Sulfate (SO_4)	99	Temperature (F.)	--
Chloride (Cl)	10	Date of collection	Aug. 11, 1947
Fluoride (F)	.1		
Nitrate (NO_3)	19		
Dissolved solids	425		

Depth (feet)	119
Diameter (inches)	42
Date drilled	1946
Percent of supply	--

[a] Total alkalinity as bicarbonate (HCO_3).

PEORIA
(Population, 111,856)

Ownership: American Waterworks Service Co., Inc.
Source: 11 drilled wells, 89 to 140 ft deep (data reported for 8 wells).
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 19,350,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Well 10	Wells[a] 1 and 2		Well 10	Wells[a] 1 and 2
Silica (SiO_2)	22	27	Hardness as $CaCO_3$:		
Iron (Fe)	--	.7	Total	394	455
Manganese (Mn)	.4	.1	Noncarbonate	46	163
Calcium (Ca)	91	110			
Magnesium (Mg)	40	44	Color	0	0
Sodium (Na)	14	17	pH	--	--
Potassium (K)			Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	--	--			
Bicarbonate (HCO_3)	[b]424	[b]356	Turbidity	0	10
Sulfate (SO_4)	51	144	Temperature (F.)	54	--
Chloride (Cl)	16	24	Date of collection	Jan. 31, 1949	Nov. 15, 1946
Fluoride (F)	.3	--			
Nitrate (NO_3)	.3	19			
Dissolved solids	448	583			

Depth (feet)	--	$118\frac{1}{2}$, $113\frac{2}{3}$
Diameter (inches)	--	17, 17
Date drilled	--	1944,1946
Percent of supply	--	-- --

[a] Dodge St.
[b] Total alkalinity as bicarbonate (HCO_3).

QUINCY
(Population, 41,450)

Ownership: Municipal.
Source: Mississippi River.
Treatment: Coagulation and softening with alum and lime, activated carbon, sedimentation, recarbonation, ammoniation, chlorination, and rapid sand filtration.
Rated capacity of treatment plant: 6,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 20,900,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water[a]		Raw water	Finished water[a]
Silica (SiO_2)	3	6.5	Hardness as $CaCO_3$:		
Iron (Fe)	--	.08	Total	141	75
Manganese (Mn)	--	.00	Noncarbonate	21	39
Calcium (Ca)	35	26			
Magnesium (Mg)	13	2.5	Color	--	3
Sodium (Na)	5.7	5.2	pH	7.7	7.6
Potassium (K)		2.3	Specific conductance (micromhos at 25 C.)	--	207
Carbonate (CO_3)	--	0	Turbidity	--	--
Bicarbonate (HCO_3)	146	44	Temperature (F.)	--	--
Sulfate (SO_4)	25	39	Date of collection	May, 1940	Sept. 13, 1952
Chloride (Cl)	5.0	9.0			
Fluoride (F)	.2	.1			
Nitrate (NO_3)	--	1.0			
Dissolved solids	157	126			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	120	165	57	7.6	8.3	6.5	152	194	90	280	3,400	15
Finished water	38	70	22	9.4	9.7	8.4	106	194	77	.95	2.9	.18

[a] Analysis by U. S. Geological Survey.

ROCKFORD
(Population, 92,927)

Ownership: Municipal.
Source: 17 drilled wells, 200 to 1,631 ft deep. Eleven of the wells are unit wells and six are group wells located at the steam plant. The unit wells are located throughout the city so that the water supplied to any section of the city depends on which wells are being pumped at the time.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 10,885,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois State Water Survey)

	Group Well 6	Unit Well 7	Unit Well 1	Finished water [a]
Silica (SiO_2)	--	--	--	13
Iron (Fe)	.6	2.7	.2	1.1
Manganese (Mn)	--	--	--	.17
Calcium (Ca)	--	--	--	78
Magnesium (Mg)	--	--	--	38
Sodium (Na)	--	--	--	3.8
Potassium (K)	--	--	--	1.2
Carbonate (CO_3)	--	--	--	0
Bicarbonate (HCO_3)	[b]366	[b]390	[b]366	376
Sulfate (SO_4)	84	56	36	40
Chloride (Cl)	17	9.0	11	7.0
Fluoride (F)	--	--	--	.0
Nitrate (NO_3)	14	12	3.3	3.2
Dissolved solids	446	402	364	381
Hardness as $CaCO_3$:				
Total	389	400	353	352
Noncarbonate	89	80	53	43
Color	0	0	0	2
pH	--	--	--	7.3
Specific conductance (micromhos at 25 C.)	--	--	--	675
Turbidity	--	20	--	--
Temperature (F.)	53	53	55	--
Date of collection	Mar. 5, 1948	June 10, 1948	Jan. 17, 1948	Sept. 13, 1952
Depth (feet)	1,608	1,503	--	--
Diameter (inches)	16	--	18	--
Date drilled	1926	1913	--	--
Percent of supply	--	--	--	--

[a] Analysis by U. S. Geological Survey.
[b] Total alkalinity as bicarbonate (HCO_3).

ROCK ISLAND
(Population, 48,710)

Ownership: Municipal.
Source: Mississippi River.
Treatment: Coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, ammoniation, and chlorination.
Rated capacity of treatment plant: 11,700,000 gpd.
Raw-water storage: None.
Finished-water storage: 11,200,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.8	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	215
Manganese (Mn)	.00	Noncarbonate	109
Calcium (Ca)	58		
Magnesium (Mg)	17	Color	4
Sodium (Na)	6.0	pH	7.1
Potassium (K)	2.4	Specific conductance (micromhos at 25 C.)	437
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	129	Temperature (F.)	--
Sulfate (SO_4)	93	Date of collection	June 17, 1952
Chloride (Cl)	16		
Fluoride (F)	.2		
Nitrate (NO_3)	1.7		
Dissolved solids	287		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	117	156	66	7.7	8.5	7.1	156	212	88	143	1,200	2
Finished water	100	154	46	7.2	8.1	6.4	190	240	120	.43	35	.01

SPRINGFIELD
(Population, 81,628)

Ownership: Municipal; supplies also about 13,600 people in other places and outside of the city limits. Total population supplied, about 95,200.
Source: Sugar Creek, impounded.
Treatment: Ammoniation, prechlorination, coagulation and softening with alum and lime, activated carbon, sedimentation, rapid sand filtration.
Rated capacity of treatment plant: 12,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 7,000,000 gal.

ANALYSES

(Analyses, in parts per million, by Illinois Department of Public Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	1.0	1.0	Hardness as $CaCO_3$:		
Iron (Fe)	--	--	Total	142	69
Manganese (Mn)	0	0	Noncarbonate	40	39
Calcium (Ca)	34	12			
Magnesium (Mg)	14	9.8	Color	--	--
Sodium (Na)	2	14	pH	8.0	9.9
Potassium (K)			Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	--	Turbidity	--	--
Bicarbonate (HCO_3)	124	[a] 37	Temperature (F.)	--	--
Sulfate (SO_4)	39	55	Date of collection	1944	1944
Chloride (Cl)	2.0	4			
Fluoride (F)	.2	.2			
Nitrate (NO_3)	2.6	2.0			
Dissolved solids	159	[b] 116			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	111	139	85	8.4	9.0	8.0	170	202	131	40	152	7
Finished water	36	74	26	10.5	10.9	9.5	94	103	79	.2	12	0

[a] Total alkalinity as bicarbonate (HCO_3).
[b] Sum of determined constituents.

WAUKEGAN
(Population, 38,946)

Ownership: Municipal.
Source: Lake Michigan.
Treatment: Aeration, coagulation with alum, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 10,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 4,736,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	2.8	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	126
Manganese (Mn)	.00	Noncarbonate	29
Calcium (Ca)	33		
Magnesium (Mg)	11	Color	0
Sodium (Na)	3.5	pH	7.3
Potassium (K)	1.4	Specific conductance (micromhos at 25 C.)	271
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	120	Turbidity	--
Sulfate (SO_4)	25	Temperature (F.)	--
Chloride (Cl)	5.0	Date of collection	Sept. 17, 1952
Fluoride (F)	1.0		
Nitrate (NO_3)	.9		
Dissolved solids	149		

ANDERSON
(Population, 46,820)

Ownership: Municipal; supplies also about 10,000 people outside the city limits. Total population supplied, about 57,000.
Source: 6 drilled wells (Ranney wells, 85 percent of supply); White River (15 percent of supply).
Treatment: Well supply: chlorination, filtration; White River supply: prechlorination, coagulation with alum and lime, ammoniation, sedimentation, and rapid sand filtration.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	7.9	Hardness as $CaCO_3$:	
Iron (Fe)	2.0	Total	316
Manganese (Mn)	.00	Noncarbonate	102
Calcium (Ca)	55		
Magnesium (Mg)	43	Color	4
Sodium (Na)	5.0	pH	7.4
Potassium (K)	1.2	Specific conductance (micromhos at 25 C.)	578
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	259	Temperature (F.)	--
Sulfate (SO_4)	94	Date of collection	Jan. 22, 1952
Chloride (Cl)	8.0		
Fluoride (F)	.0		
Nitrate (NO_3)	8.8		
Dissolved solids	379		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	239	275	185	7.5	7.8	7.2	--	--	--	4	30	4
Finished water	230	275	165	7.4	7.7	7.2	--	--	--	3	3	3

BLOOMINGTON
(Population, 28,163)

Ownership: Municipal.
Source: Griffey Creek, impounded. Auxiliary supply from Bean Blossom Creek.
Treatment: Prechlorination, aeration, coagulation with alum and lime, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 3,000,000 gpd.
Raw-water storage: 750,000,000 gal.
Finished-water storage: 1,726,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	6.1	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	111
Manganese (Mn)	.00	Noncarbonate	28
Calcium (Ca)	36		
Magnesium (Mg)	5.3	Color	0
Sodium (Na)	2.4	pH	7.8
Potassium (K)	.2	Specific conductance (micromhos at 25 C.)	229
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	102	Temperature (F.)	--
Sulfate (SO_4)	27	Date of collection	Jan. 24, 1952
Chloride (Cl)	4.2		
Fluoride (F)	.1		
Nitrate (NO_3)	2.3		
Dissolved solids	139		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	100	110	83	7.5	8.3	7.3	--	--	--	10	25	5
Finished water	105	120	85	8.0	8.2	7.9	--	--	--	1	2	0

COLUMBUS
(Population, 18,370)

Ownership: Municipal.
Source: Drilled wells.
Treatment: Aeration and filtration for iron removal, chlorination, and fluoridation.
Rated capacity of treatment plant: --
Raw-water storage: --
Finished-water storage: --

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	11	13	Hardness as $CaCO_3$:		
Iron (Fe)	1.8	.46	Total	299	311
Manganese (Mn)	.14	.11	Noncarbonate	47	56
Calcium (Ca)	76	80			
Magnesium (Mg)	26	27	Color	7	0
Sodium (Na)	2.1	2.7	pH	7.6	7.8
Potassium (K)	.5	1.1	Specific conductance (micromhos at 25 C.)	519	549
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	304	311			
Sulfate (SO_4)	50	53	Turbidity	--	--
Chloride (Cl)	3.2	4.1	Temperature (F.)	--	--
Fluoride (F)	.0	1.4	Date of collection	Jan. 22, 1952	Feb. 6, 1952
Nitrate (NO_3)	.6	.0			
Dissolved solids	319	328			

CONNERSVILLE
(Population, 15,550)

Ownership: Municipal; supplies also about 500 people outside the city limits. Total population supplied, about 16,000.
Source: 14 drilled wells, about 80 ft deep. The yield of the wells is reported to be 500 gpm each.
Treatment: Chlorination of part of supply.
Raw-water storage: 3,500,000 gal.
Finished-water storage: --

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Raw water		Raw water
Silica (SiO_2)	12	Hardness as $CaCO_3$:	
Iron (Fe)	1.3	Total	360
Manganese (Mn)	.16	Noncarbonate	56
Calcium (Ca)	94		
Magnesium (Mg)	31	Color	5
Sodium (Na)	10	pH	7.5
Potassium (K)	2.3	Specific conductance (micromhos at 25 C.)	697
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	374	Temperature (F.)	62
Sulfate (SO_4)	66	Date of collection	Apr. 14, 1952
Chloride (Cl)	9.0		
Fluoride (F)	.0		
Nitrate (NO_3)	6.0		
Dissolved solids	423		

Depth (feet)	80
Diameter (inches)	12
Date drilled	1949
Percent of supply	--

EAST CHICAGO
(Population, 54,263)

Ownership: Municipal.
Source: Lake Michigan.
Treatment: Ammoniation, chlorine dioxide at times, prechlorination, coagulation, activated carbon, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 18,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 5,200,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.1	Hardness as $CaCO_3$:	
Iron (Fe)	.08	Total	133
Manganese (Mn)	.03	Noncarbonate	29
Calcium (Ca)	35		
Magnesium (Mg)	11	Color	2
Sodium (Na)	4.4	pH	7.9
Potassium (K)	1.5	Specific conductance (micromhos at 25 C.)	273
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	126	Temperature (F.)	--
Sulfate (SO_4)	30	Date of collection	Jan. 15, 1952
Chloride (Cl)	8.5		
Fluoride (F)	.0		
Nitrate (NO_3)	.5		
Dissolved solids	159		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	--	--	--	8.1	8.3	8.0	--	--	--	55	940	14
Finished water	--	--	--	7.1	7.5	6.9	--	--	--	.35	.4	.3

ELKHART
(Population, 35,646)

Ownership: Municipal; supplies also about 50 people outside the city limits. Total population supplied, about 35,700.
Source: 9 drilled wells, 44 to 60 ft deep, yield reported to be 800 gpm each; 3 dug wells, interconnected, 35 ft deep, combined yield reported to be 2,400 gpm. Auxiliary supply, 2 drilled wells, 43 ft deep.
Treatment: Chlorination.
Raw-water storage: 3,400,000 gal.
Finished-water storage: 500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	8.2	Hardness as $CaCO_3$:	
Iron (Fe)	.20	Total	203
Manganese (Mn)	--	Noncarbonate	18
Calcium (Ca)	50		
Magnesium (Mg)	19	Color	10
Sodium (Na)	3.8	pH	7.9
Potassium (K)	1.4	Specific conductance (micromhos at 25 C.)	386
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	226	Turbidity	--
Sulfate (SO_4)	23	Temperature (F.)	--
Chloride (Cl)	7.0	Date of collection	Jan. 15, 1952
Fluoride (F)	.0		
Nitrate (NO_3)	.8		
Dissolved solids	212		

EVANSVILLE
(Population, 128,636)

Ownership: Municipal; supplies also about 30,000 people outside the city limits. Total population supplied, about 158,600.
Source: Ohio River.
Treatment: Breakpoint chlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, final adjustment of pH by addition of lime, and postchlorination. Activated carbon and sodium chlorite when needed.
Rated capacity of treatment plant: 36,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 24,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	5.2	Hardness as $CaCO_3$:	
Iron (Fe)	.12	Total	100
Manganese (Mn)	.00	Noncarbonate	55
Calcium (Ca)	30		
Magnesium (Mg)	6.1	Color	2
Sodium (Na)	4.8	pH	8.0
Potassium (K)	1.7	Specific conductance (micromhos at 25 C.)	229
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	55	Temperature (F.)	--
Sulfate (SO_4)	52	Date of collection	Jan. 14, 1952
Chloride (Cl)	10		
Fluoride (F)	.0		
Nitrate (NO_3)	3.5		
Dissolved solids	137		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	62	72	51	7.5	7.9	7.3	112	132	94	160	283	55
Finished water	64	74	55	8.1	8.5	7.8	132	152	114	--	--	--

FORT WAYNE
(Population, 133,607)

Ownership: Municipal; supplies also about 1,800 people outside the city limits. Total population supplied, about 135,400.
Source: St. Joseph River, impounded.
Treatment: Coagulation with alum, activated carbon, softening with lime and soda ash, chlorine dioxide, carbonation, chlorination, sedimentation, rapid sand filtration, ammoniation, stabilization with polyphosphates, and fluoridation. The water is softened to a hardness of about 76 ppm.
Rated capacity of treatment plant: 24,000,000 gpd.
Raw-water storage: 210,000,000 gal.
Finished-water storage: 23,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.0	4.3	Hardness as $CaCO_3$:		
Iron (Fe)	.16	.07	Total	133	76
Manganese (Mn)	.00	.00	Noncarbonate	43	58
Calcium (Ca)	40	26			
Magnesium (Mg)	8.3	2.4	Color	35	0
Sodium (Na)	2.5	3.2	pH	7.4	8.6
Potassium (K)	1.7	1.7	Specific conductance (micromhos at		
Carbonate (CO_3)	0	2			
Bicarbonate (HCO_3)	111	17	25 C.)	267	180
Sulfate (SO_4)	35	47	Turbidity	--	--
Chloride (Cl)	3.5	5.8	Temperature (F.)	--	--
Fluoride (F)	.0	1.0	Date of collection	Jan. 21, 1952	Jan. 21, 1952
Nitrate (NO_3)	9.0	6.4			
Dissolved solids	174	115			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	180	292	69	8.1	8.4	7.6	234	348	98	113	975	10
Finished water	30	51	19	9.8	10.4	9.2	76	91	69	--	--	--

GARY
(Population, 133,911)

Ownership: Gary-Hobart Water Company.
Source: Lake Michigan.
Treatment: Chlorination, chlorine dioxide.
Rated capacity of treatment plant: --
Raw-water storage: None.
Finished-water storage: 2,750,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.2	Hardness as $CaCO_3$:	
Iron (Fe)	.01	Total	136
Manganese (Mn)	.02	Noncarbonate	24
Calcium (Ca)	35		
Magnesium (Mg)	12	Color	15
Sodium (Na)	3.7	pH	7.7
Potassium (K)	.6	Specific conductance (micromhos at 25 C.)	277
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	137	Turbidity	--
Sulfate (SO_4)	24	Temperature (F.)	--
Chloride (Cl)	9.0	Date of collection	Jan. 15, 1952
Fluoride (F)	.1		
Nitrate (NO_3)	.8		
Dissolved solids	159		

HAMMOND
(Population, 87,594)

Ownership: Municipal; supplies also Highland, Munster, about 500 people outside the city limits, and Lansing (Ill.). Total population supplied, about 104,100.
Source: Lake Michigan.
Treatment: Ammoniation, prechlorination, carbon, coagulation with alum, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 20,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 6,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	2.1	Hardness as $CaCO_3$:	
Iron (Fe)	.05	Total	136
Manganese (Mn)	.00	Noncarbonate	26
Calcium (Ca)	35		
Magnesium (Mg)	12	Color	2
Sodium (Na)	4.3	pH	7.9
Potassium (K)	1.0	Specific conductance (micromhos at 25 C.)	280
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	135	Turbidity	--
Sulfate (SO_4)	29	Temperature (F.)	--
Chloride (Cl)	7.0	Date of collection	Jan. 15, 1952
Fluoride (F)	.1		
Nitrate (NO_3)	.7		
Dissolved solids	160		

INDIANAPOLIS
(Population, 427,173)

Ownership: Indianapolis Water Company; supplies also Beech Grove, Ben Davis, Mars Hill, Meridian Hills, Southport, and Woodruff Place. Total population supplied, about 439,800.
Source: West Fork White River (66 percent of supply); Fall Creek (34 percent of supply). Emergency supply from 60 tubular wells.
Treatment: Prechlorination, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, auxiliary slow sand filtration at times, ammoniation, and postchlorination.
Rated capacity of treatment plants: White River Plant: 48,000,000 gpd (normal operation), 60,000,000 gpd (with 3 slow sand filters in operation). Fall Creek Plant: 32,000,000 gpd.
Raw-water storage: 7,000,000,000 gal (Geist Reservoir).
Finished-water storage: Ground reservoir, 23,500,000 gal; elevated storage, 3,000,000 gal.

ANALYSES

Analyses, in parts per million, by Ind. Water Co.

	White River (finished water)	Fall Creek (finished water)	White River (finished water)[a]	Fall Creek (finished water)[a]
Silica (SiO_2)	7.0	4.7	--	--
Iron (Fe)	.11	.12	.05	.03
Manganese (Mn)	.00	.00	--	--
Calcium (Ca)	67	50	76	58
Magnesium (Mg)	20	23	26	22
Sodium (Na)	6.2	10	22	13
Potassium (K)	1.6	1.7		
Carbonate (CO_3)	0	0	--	--
Bicarbonate (HCO_3)	206	201	[b] 277	[b] 189
Sulfate (SO_4)	67	56	71	51
Chloride (Cl)	10	8.0	21	11
Fluoride (F)	1.0	1.0	.8	.8
Nitrate (NO_3)	12	11	--	--
Dissolved solids	295	266	--	--
Hardness as $CaCO_3$:				
Total	251	222	294	236
Noncarbonate	81	55	--	--
Color	6	3	--	--
pH	7.4	7.6	7.6	7.4
Specific conductance (micromhos at 25 C.)	486	442	--	--
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection	Mar. 28, 1952	Mar. 28, 1952	1951	1951

[a] Averages obtained from analyses made during 1951 by Indianapolis Water Co. Results for alkalinity, fluoride, total hardness, and pH are from one or more daily determinations.
[b] Total alkalinity as bicarbonate (HCO_3).

KOKOMO
(Population, 38,672)

Ownership: Kokomo Water Works Company; supplies about 1,500 people outside the city limits. Total population supplied, about 40,200.
Source: 12 drilled wells, 287 to 500 ft deep. Auxiliary supply, Wild Cat Creek. During 1950 97.9 percent of the supply was taken from the wells.
Treatment: Aeration, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: --
Finished-water storage: 2,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Wells (finished water)		Wells (finished water)
Silica (SiO_2)	16	Hardness as $CaCO_3$:	
Iron (Fe)	.16	Total	402
Manganese (Mn)	.07	Noncarbonate	115
Calcium (Ca)	112		
Magnesium (Mg)	30	Color	2
Sodium (Na)	35	pH	7.6
Potassium (K)	1.8	Specific conductance (micromhos at 25 C.)	848
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	351	Temperature (F.)	--
Sulfate (SO_4)	167	Date of collection	April 1952
Chloride (Cl)	23		
Fluoride (F)	.4		
Nitrate (NO_3)	1.0		
Dissolved solids	568		

LAFAYETTE
(Population, 35,568)

Ownership: Municipal.
Source: 11 drilled wells, 105 to 114 ft deep, in Wabash River flood plain.
Emergency supply, 2 drilled wells.
Treatment: Ammoniation, and chlorination.
Rated capacity of treatment plant: --
Raw-water storage: 150,000 gal.
Finished-water storage: 5,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	12	Hardness as $CaCO_3$:	
Iron (Fe)	.05	Total	402
Manganese (Mn)	.18	Noncarbonate	94
Calcium (Ca)	102		
Magnesium (Mg)	36	Color	0
Sodium (Na)	13	pH	7.1
Potassium (K)	3.6	Specific conductance (micromhos at 25 C.)	778
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	376	Temperature (F.)	53
Sulfate (SO_4)	96	Date of collection	Mar. 31, 1952
Chloride (Cl)	20		
Fluoride (F)	.2		
Nitrate (NO_3)	11		
Dissolved solids	496		

LA PORTE
(Population, 17,882)

Ownership: Municipal; supplies also about 150 people outside the city limits. Total population supplied, about 18,000.
Source: 3 wells (Wernecke, Lake St., Brighton St.) 128, 134, and 135 ft deep. The yield of the wells is reported to be 700, 1,400 and 2,100 gpm. Auxiliary supply, 3 dug wells, 28 ft deep, reported to yield 550, 1,100, and 1,400 gpm.
Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 4,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	15	Hardness as $CaCO_3$:	
Iron (Fe)	.14	Total	308
Manganese (Mn)	.14	Noncarbonate	44
Calcium (Ca)	81		
Magnesium (Mg)	26	Color	2
Sodium (Na)	15	pH	7.9
Potassium (K)	1.4	Specific conductance (micromhos at 25 C.)	615
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	324	Temperature (F.)	--
Sulfate (SO_4)	60	Date of collection	Jan. 15, 1952
Chloride (Cl)	23		
Fluoride (F)	.1		
Nitrate (NO_3)	.3		
Dissolved solids	388		

Regular determinations at treatment plant, 1950-51

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm) a			Turbidity a		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	330	360	260	7.0	7.4	6.8	310	369	274	25	50	5
Finished water	310	350	260	7.1	7.4	6.9	316	--	--	--	--	--

[a] From analyses by Indiana State Board of Health.

LOGANSPORT
(Population, 21,031)

Ownership: Municipal; supplies also about 100 people outside the city limits. Total population supplied, about 21,100.
Source: Eel River.
Treatment: Prechlorination, coagulation with alum, ammoniation, sedimentation, chlorination, and rapid sand filtration.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 260,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	5.5	Hardness as $CaCO_3$:	
Iron (Fe)	.17	Total	246
Manganese (Mn)	.00	Noncarbonate	126
Calcium (Ca)	71		
Magnesium (Mg)	17	Color	3
Sodium (Na)	5.1	pH	6.8
Potassium (K)	1.1	Specific conductance (micromhos at 25 C.)	494
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	148	Temperature (F.)	--
Sulfate (SO_4)	118	Date of collection	Mar. 26, 1952
Chloride (Cl)	12		
Fluoride (F)	.2		
Nitrate (NO_3)	8.5		
Dissolved solids	320		

Regular determinations at treatment plant, 1950-51

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	175	292	86	8.2	8.6	7.8	--	--	--	--	--	--
Finished water	160	266	60	7.1	7.3	7.0	--	--	--	--	--	--

MARION
(Population, 30,081)

Ownership: Municipal; supplies also about 320 people outside the city limits. Total population supplied, about 30,400.

Source: 6 drilled wells. West 8th St. Field: 4 wells (5, 6, 7, 8) 135, 138, 138, and 136 ft deep, yield reported to be 1,500, 1,500, 1,500 and 1,800 gpm; Shunk St. Field: 2 wells (9, 10) 147, and 150 ft deep, yield reported to be 1,500 and 1,400 gpm.

Treatment: Softening with lime and soda ash, coagulation with alum and lime, sedimentation, recarbonation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: --

Raw-water storage: None.

Finished-water storage: 2 reservoirs, 1,750,000 and 650,000 gal; 2 elevated tanks, each 50,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well 5 (raw water)	Well 10 (raw water)	Finished water
Silica (SiO_2)	13	20	15
Iron (Fe)	2.7	2.7	.06
Manganese (Mn)	.00	.01	.00
Calcium (Ca)	148	112	17
Magnesium (Mg)	41	53	23
Sodium (Na)	20	22	48
Potassium (K)	2.1	1.8	3.9
Carbonate (CO_3)	0	0	9
Bicarbonate (HCO_3)	442	437	67
Sulfate (SO_4)	188	158	141
Chloride (Cl)	29	19	19
Fluoride (F)	.4	.7	.3
Nitrate (NO_3)	.4	.3	.0
Dissolved solids	683	618	314
Hardness as $CaCO_3$:			
Total	538	500	138
Noncarbonate	176	139	67
Color	5	3	3
pH	7.0	7.3	8.9
Specific conductance (micromhos at 25 C.)	990	922	496
Turbidity	--	--	--
Temperature (F.)	51	--	51
Date of collection	Apr. 17, 1952	Jan. 4, 1952	Apr. 17, 1952
Depth (feet)	135	150	
Diameter (inches)	26	26	
Date drilled	1946	1948	
Percent of supply	30.6	19.8	

MICHIGAN CITY
(Population, 28,395)

Ownership: Municipal; supplies also Long Beach, Indiana State Prison, and about 400 people outside the city limits. Total population supplied, about 33,400.
Source: Lake Michigan.
Treatment: Prechlorination, aeration, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, ammoniation, and postchlorination.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,250,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.1	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	133
Manganese (Mn)	.00	Noncarbonate	27
Calcium (Ca)	35		
Magnesium (Mg)	11	Color	2
Sodium (Na)	4.1	pH	8.1
Potassium (K)	1.4	Specific conductance (micromhos at 25 C.)	273
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	129	Turbidity	--
Sulfate (SO_4)	27	Temperature (F.)	--
Chloride (Cl)	8.0	Date of collection	Jan. 11, 1952
Fluoride (F)	.1		
Nitrate (NO_3)	.6		
Dissolved solids	158		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	114	117	112	8.0	8.1	7.9	--	--	--	13	450	5
Finished water	108	111	105	7.2	7.3	7.2	138	143	135	0	0	0

MISHAWAKA
(Population, 32,913)

Ownership: Municipal; supplies also about 100 people outside the city limits. Total population supplied, about 33,000.
Source: 8 drilled wells (1 to 8) 106, 97, 98, 92, 120, 112, 92, and 330 ft deep. The yield of the wells is reported to range from 400 to 1,500 gpm (yield not reported for well 8).
Treatment: Aeration of part, and chlorination.
Raw-water storage: 1,500,000 gal.
Finished-water storage: 3,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water (city tap)		Finished water (city tap)
Silica (SiO_2)	12	Hardness as $CaCO_3$:	
Iron (Fe)	.65	Total	296
Manganese (Mn)	.12	Noncarbonate	72
Calcium (Ca)	78		
Magnesium (Mg)	25	Color	3
Sodium (Na)	7.3	pH	7.7
Potassium (K)	1.4	Specific conductance (micromhos at 25 C.)	564
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	275	Temperature (F.)	53
Sulfate (SO_4)	86	Date of collection	Jan. 15, 1952
Chloride (Cl)	8.0		
Fluoride (F)	.1		
Nitrate (NO_3)	2.3		
Dissolved solids	369		

MUNCIE
(Population, 58,479)

Ownership: Muncie Water Works Corp.
Source: White River. Auxiliary supply, 18 tubular wells and Buck Creek. During 1950 99.4 percent of the supply was taken from surface source.
Treatment: Prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 8,500,000 gpd.
Raw-water storage: None.
Finished-water storage: 1,200,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	5.0	Hardness as $CaCO_3$:	
Iron (Fe)	.11	Total	286
Manganese (Mn)	.00	Noncarbonate	62
Calcium (Ca)	73		
Magnesium (Mg)	25	Color	3
Sodium (Na)	4.2	pH	7.5
Potassium (K)	1.8	Specific conductance (micromhos at 25 C.)	546
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	272	Temperature (F.)	--
Sulfate (SO_4)	58	Date of collection	Mar. 29, 1952
Chloride (Cl)	9.5		
Fluoride (F)	.2		
Nitrate (NO_3)	9.9		
Dissolved solids	331		

NEW ALBANY
(Population, 29,346)

Ownership: Indiana Gas and Water Company, Inc.; supplies also about 1,275 people outside the city limits. Total population supplied, about 30,600.
Source: Ohio River.
Treatment: Prechlorination, activated carbon, coagulation with alum, sedimentation, rapid sand filtration, postchlorination, and final adjustment of pH by addition of soda ash.
Rated capacity of treatment plant: 4,000,000 gpd.
Raw-water storage: 16,500,000 gal.
Finished-water storage: 1,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	5.5	Hardness as $CaCO_3$:	
Iron (Fe)	.12	Total	96
Manganese (Mn)	.00	Noncarbonate	42
Calcium (Ca)	28		
Magnesium (Mg)	6.6	Color	3
Sodium (Na)	19	pH	7.3
Potassium (K)	1.8	Specific conductance (micromhos at 25 C.)	296
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	67	Temperature (F.)	--
Sulfate (SO_4)	64	Date of collection	Jan. 30, 1952
Chloride (Cl)	13		
Fluoride (F)	.1		
Nitrate (NO_3)	3.0		
Dissolved solids	176		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	70	300	30	7.2	8.0	6.1	--	--	--	318	2000	35
Finished water	80	164	52	7.3	7.8	7.0	--	--	--	.06	.06	.05

NEW CASTLE
(Population, 18,271)

Ownership: Municipal.
Source: 8 tubular wells: 7 wells at pumping station (90 percent of supply); Baker Park well (10 percent of supply). The wells are 111 to 291 ft deep, and the yield is reported to be from 135 to 500 gpm each.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: Ground reservoir, 1,100,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	16	Hardness as $CaCO_3$:	
Iron (Fe)	2.0	Total	368
Manganese (Mn)	.00	Noncarbonate	25
Calcium (Ca)	94		
Magnesium (Mg)	32	Color	0
Sodium (Na)	23	pH	7.6
Potassium (K)	1.2	Specific conductance (micromhos at 25 C.)	767
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	416	Turbidity	--
Sulfate (SO_4)	37	Temperature (F.)	55
Chloride (Cl)	37	Date of collection	Mar. 31, 1952
Fluoride (F)	.4		
Nitrate (NO_3)	1.6		
Dissolved solids	456		

RICHMOND
(Population, 39,539)

Ownership: Richmond Water Works Corp; supplies also Spring Grove, and about 1,000 people outside the city limits. Total population supplied, about 40,900.
Source: 4 wells (Foster 1 to 4) each 28 ft deep, 7 percent of supply; 3 dug wells (Cooper 1 to 3) 30, 30, and 18 ft deep, 4 infiltration galleries, and 1 spring, 58.5 percent of supply; 2 wells (N. W. 7 and 8) 91 and 152 ft deep, 22 percent of supply; East Fork Whitewater River, 12.5 percent of supply.
Treatment: East Plant: (Surface water and part of ground water) coagulation with alum and lime, sedimentation, rapid sand filtration, and chlorination. Part of ground water , chlorination. West Plant: (Wells N. W. 7 and 8) iron removal, pressure filtration, and chlorination.
Rated capacity of treatment plants: 4,000,000 gpd.
Raw-water storage: --
Finished-water storage: Hill reservoir, 10,500,000 gal; clear well, 300,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well N. W. 7 [a]	Finished water [b]		Well N. W. 7 [a]	Finished water [b]
Silica (SiO_2)	10	6.8	Hardness as $CaCO_3$:		
Iron (Fe)	.18	.23	Total	453	274
Manganese (Mn)	.23	.00	Noncarbonate	106	17
Calcium (Ca)	114	62			
Magnesium (Mg)	41	29	Color	0	0
Sodium (Na)	9.6	18	pH	7.4	7.5
Potassium (K)	1.8	1.6	Specific conductance (micromhos at 25 C.)	813	569
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	424	313			
Sulfate (SO_4)	109	50	Turbidity	--	--
Chloride (Cl)	12	7.0	Temperature (F.)	--	--
Fluoride (F)	.4	.2	Date of collection	Apr. 3, 1952	Mar. 31, 1952
Nitrate (NO_3)	1.0	7.4			
Dissolved solids	522	338			

[a] Raw water.
[b] Ground water 88 percent, surface water 12 percent.

SOUTH BEND
(Population, 115,911)

Ownership: Municipal; supplies also about 200 people outside the city limits. Total population supplied, about 116,100.

Source: 41 wells. North Station: 6 wells, 102 to 110½ ft deep, yield reported to be 1,500 to 2,220 gpm (29 percent of supply); Oliver Station: 26 wells, 121 to 170 ft deep, yield reported to be 328 to 2,300 gpm (31 percent of supply); South Station: 5 wells, 81 to 108½ ft deep, yield reported to be 425 to 1,400 gpm (12 percent of supply); Coquillard Station: 2 wells, 200 and 206 ft deep, yield reported to be 1,500 and 2,200 gpm (16 percent of supply); Central Station: 1 well, 105 ft deep, yield reported to be 2,100 gpm (11 percent of supply); Airport Station: 1 well, 102½ ft deep, yield reported to be 1,750 gpm (1 percent of supply).

Treatment: Chlorination. Raw water stored at North Station prechlorinated and rechlorinated when pumped to mains.

Raw-water storage: 6,000,000 gal (at North Station).

Finished-water storage: 7,250,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well 1 South Station [a]	Well 2 North Station [a]	Wells, Oliver Station [b]
Silica (SiO_2)	15	12	15
Iron (Fe)	.15	.80	.11
Manganese (Mn)	.00	.13	.03
Calcium (Ca)	73	72	141
Magnesium (Mg)	28	28	46
Sodium (Na)	4.4	5.5	7.1
Potassium (K)	1.5	1.0	1.2
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	324	294	357
Sulfate (SO_4)	23	65	242
Chloride (Cl)	4.5	8.0	7.8
Fluoride (F)	.0	.1	.0
Nitrate (NO_3)	20	.7	21
Dissolved solids	318	340	681
Hardness as $CaCO_3$:			
Total	298	295	544
Noncarbonate	32	54	248
Color	3	2	3
pH	7.6	7.6	7.4
Specific conductance (micromhos at 25 C.)	529	565	895
Turbidity	--	--	--
Temperature (F.)	--	52	--
Date of collection	Jan. 17, 1952	Jan. 17, 1952	Jan. 17, 1952
Depth (feet)	92¼	108	--
Diameter (inches)	18	50 by 38	--
Date drilled	1927	1940	--
Percent of supply	--	--	31

[a] Raw water.
[b] Finished water.

TERRE HAUTE
(Population, 64,214)

Ownership: Terre Haute Water Company; supplies also Allendale, Seelyville, Youngstown, and about 4,650 people outside the city limits. Total population supplied, about 70,500.
Source: Wabash River.
Treatment: Prechlorination, coagulation with alum and lime, activated carbon, sedimentation, and rapid sand filtration.
Rated capacity of treatment plant: 10,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 843,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.5	Hardness as $CaCO_3$:	
Iron (Fe)	.09	Total	208
Manganese (Mn)	.00	Noncarbonate	98
Calcium (Ca)	56		
Magnesium (Mg)	17	Color	5
Sodium (Na)	3.6	pH	7.4
Potassium (K)	.7	Specific conductance (micromhos at 25 C.)	421
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	136	Temperature (F.)	44
Sulfate (SO_4)	89	Date of collection	Feb. 5, 1952
Chloride (Cl)	6.1		
Fluoride (F)	.1		
Nitrate (NO_3)	10		
Dissolved solids	257		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness[a] as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	174	272	60	7.8	8.3	7.5	--	--	--	282	1500	30
Finished water	154	250	48	7.1	7.7	6.7	278	313	243	0	3	0

[a] From analyses made by Indiana State Board of Health.

VINCENNES
(Population, 18,831)

Ownership: Municipal; supplies also about 1,800 people outside the city limits. Total poulation supplied, about 20,600.
Source: 5 wells (1 to 5) 90 to 91.5 ft deep. The yield of the wells is reported to be 800, 1,400, 1,050, 1,400, and 1,050 gpm, respectively. Auxiliary or emergency supply, Wabash River.
Treatment: Well supply: chlorination. Surface supply: aeration, breakpoint chlorination, copper sulfate, coagulation with alum, lime for pH control, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 3,200,000 gpd.
Raw-water storage: None.
Finished-water storage: Clear well, 480,000 gal; standpipe, 580,000 gal; elevated storage, 1,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Wells (finished water)		Wells (finished water)
Silica (SiO_2)	13	Hardness as $CaCO_3$:	
Iron (Fe)	.62	Total	305
Manganese (Mn)	.09	Noncarbonate	80
Calcium (Ca)	86		
Magnesium (Mg)	22	Color	5
Sodium (Na)	6.4	pH	7.5
Potassium (K)	1.2	Specific conductance (micromhos at 25 C.)	563
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	274	Turbidity	--
Sulfate (SO_4)	69	Temperature (F.)	57
Chloride (Cl)	7.2	Date of collection	Mar. 17, 1952
Fluoride (F)	.2		
Nitrate (NO_3)	10		
Dissolved solids	351		

ADRIAN
(Population, 18,393)

Ownership: Municipal; supplies also about 3,000 people outside the city limits. Total population supplied, about 21,400.
Source: Wolf Creek. Auxiliary supply from one well, 89 ft. deep.
Treatment: Coagulation with alum, softening with lime and soda ash, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: 300,000,000 gal.
Finished-water storage: 1,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	10	14	Hardness as $CaCO_3$:		
Iron (Fe)	.07	.19	Total	280	96
Manganese (Mn)	.00	.00	Noncarbonate	44	47
Calcium (Ca)	80	22			
Magnesium (Mg)	19	9.7	Color	25	4
Sodium (Na)	5.9	9.5	pH	7.4	8.9
Potassium (K)	4.6	4.7	Specific conductance (micromhos at 25 C.)	523	254
Carbonate (CO_3)	0	26	Turbidity	--	--
Bicarbonate (HCO_3)	285	6	Temperature (F.)	--	--
Sulfate (SO_4)	49	54	Date of collection	June 27, 1951	June 27, 1951
Chloride (Cl)	4.8	9.0			
Fluoride (F)	.1	.3			
Nitrate (NO_3)	5.3	1.0			
Dissolved solids	364	153			

Regular determinations at treatment plant Jan. 1 to May 24, 1951

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	162	239	71	--	--	--	210	333	109	64	319	12
Finished water	56	172	20	9.9	10.6	9.6	115	270	88	0	3	0

ANN ARBOR
(Population, 48,251)

Ownership: Municipal; supplies also about 500 people outside the city limits. Total population supplied, about 48,600.
Source: Huron River, 32 per cent of supply; 10 wells, 30 to 170 ft deep, 68 per cent of supply. Eight of the ten wells are flowing wells.
Treatment: Prechlorination, activated carbon, coagulation with lime, softening with lime and soda ash, sedimentation, and rapid sand filtration. The water is softened to a hardness of about 85 ppm.
Rated capacity of treatment plant: 18,000,000 gpd.
Raw-water storage: 600,000,000 gal.
Finished-water storage: 6,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Huron River (raw water)	Well [a] (raw water)	Huron River and wells (finished water)
Silica (SiO_2)	6.8	13	9.4
Iron (Fe)	.05	.05	.11
Manganese (Mn)	.00	.00	.00
Calcium (Ca)	61	104	17
Magnesium (Mg)	19	35	9.2
Sodium (Na)	4.8	7.1	12
Potassium (K)	1.7	2.3	2.2
Carbonate (CO_3)	0	0	5
Bicarbonate (HCO_3)	240	335	16
Sulfate (SO_4)	33	132	71
Chloride (Cl)	6.2	7.8	10
Fluoride (F)	.2	.2	.2
Nitrate (NO_3)	.7	.5	.4
Dissolved solids	271	491	153
Hardness as $CaCO_3$:			
Total	232	404	80
Noncarbonate	34	129	59
Color	10	2	2
pH	8.2	7.5	9.4
Specific conductance (micromhos at 25 C.)	430	718	246
Turbidity	--	--	--
Temperature (F.)	--	48	--
Date of collection	Nov. 2, 1951	Nov. 2, 1951	Nov. 2, 1951

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	252	280	227	--	--	--	356	404	335	--	--	--
Finished water	36	48	23	--	--	--	97	121	85	55	63	44

[a] Steere Farm, flowing well.

BATTLE CREEK
(Population, 48,666)

Ownership: Municipal.
Source: 18 wells (18 to 35), 110 to 151 ft deep. The yield of well 18 is reported to be 500 gpm; of wells 19 to 30, 300 gpm each; and of wells 31 to 35, 1,000 gpm each.
Treatment: Chlorination, and fluoridation.
Raw-water storage: 2,700,000 gal.
Finished-water storage: 4,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	13	Hardness as $CaCO_3$:	
Iron (Fe)	.26	Total	254
Manganese (Mn)	.09	Noncarbonate	28
Calcium (Ca)	70		
Magnesium (Mg)	19	Color	2
Sodium (Na)	5.1	pH	7.8
Potassium (K)	1.7	Specific conductance (micromhos at 25 C.)	504
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	274	Temperature (F.)	--
Sulfate (SO_4)	46	Date of collection	July 3, 1951
Chloride (Cl)	5.8		
Fluoride (F)	1.1		
Nitrate (NO_3)	.3		
Dissolved solids	316		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	--	--	--	--	--	--	--	--	--	--	--	--
Finished water	222	242	203	7.0	7.1	6.8	201	207	195	50	50	50

BAY CITY
(Population, 52,523)

Ownership: Municipal; supplies also Essexville, and about 2,900 people outside the city limits. Total population supplied, about 58,600.
Source: Lake Huron (Saginaw Bay).
Treatment: Prechlorination, coagulation with alum, softening with lime and soda ash, activated carbon, sedimentation, rapid sand filtration, postchlorination, and chlorine dioxide.
Rated capacity of treatment plant: 20,000,000 gpd.
Raw-water storage: 30,000,000 gal.
Finished-water storage: 5,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	3.1	2.6	Hardness as $CaCO_3$:		
Iron (Fe)	.06	.13	Total	226	71
Manganese (Mn)	.00	.00	Noncarbonate	94	43
Calcium (Ca)	65	16			
Magnesium (Mg)	15	7.5	Color	9	3
Sodium (Na)	35	50	pH	7.9	9.6
Potassium (K)	6.5	5.8	Specific conductance (micromhos at 25 C.)	623	414
Carbonate (CO_3)	0	11			
Bicarbonate (HCO_3)	158	12			
Sulfate (SO_4)	42	43	Turbidity	--	--
Chloride (Cl)	94	76	Temperature (F.)	--	--
Fluoride (F)	.1	.1	Date of collection	June 28, 1951	June 28, 1951
Nitrate (NO_3)	2.3	.2			
Dissolved solids	396	224			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	100	166	83	8.0	8.2	7.3	159	382	126	28	600	5
Finished water	36	59	28	9.2	9.6	8.9	79	100	68	0	0	0

BENTON HARBOR
(Population, 18,769)

Ownership: Municipal; supplies about 2,000 people outside the city limits. Total population supplied, about 20,800.
Source: Lake Michigan. Emergency supply can be obtained from the city of St. Joseph.
Treatment: Coagulation with alum and lime, sedimentation, rapid sand filtration, and chlorination.
Rated capacity of treatment plant: 12,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,600,000 gal.

Prior to March 5, 1951, wells were the source of supply.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	1.8	Hardness as $CaCO_3$:	
Iron (Fe)	.11	Total	142
Manganese (Mn)	.00	Noncarbonate	31
Calcium (Ca)	39		
Magnesium (Mg)	11	Color	3
Sodium (Na)	4.1	pH	8.1
Potassium (K)	1.0	Specific conductance (micromhos at 25 C.)	299
Carbonate (CO_3)	8	Turbidity	--
Bicarbonate (HCO_3)	120	Temperature (F.)	--
Sulfate (SO_4)	29	Date of collection	Aug. 24, 1951
Chloride (Cl)	7.0		
Fluoride (F)	.0		
Nitrate (NO_3)	.6		
Dissolved solids	177		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	114	120	103	8.0	8.3	7.9	154	175	135	6	100	2.5
Finished water	115	117	105	8.4	8.6	7.8	156	180	140	.25	.25	0

DEARBORN
(Population, 94,994)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

DETROIT
(Population, 1,849,568)

Ownership: Municipal; supplies also cities of Dearborn, East Detroit, Ecorse, Ferndale, Garden City, Hamtramck, Huntington Woods, Lincoln Park, Melvindale, Livonia, Oak Park, Pleasant Ridge, River Rouge, Royal Oak (part); villages of Allen Park, Grosse Pointe Park, Grosse Pointe Shores, Grosse Pointe Woods, Inkster, Riverview, Roseville, St. Clair Shores, Trenton, Wayne; townships of Brownstown, Dearborn, Ecorse, Erin, Farmington, Gratiot, Grosse Ile, Nankin, Redford, Romulus, Royal Oak, Southfield, Lathrup Townsite, Taylor, Warren and Wayne; County General Hospital (Eloise); Detroit House of Correction; and Wayne County Training School. Total population supplied, about 2,508,000.
Source: Detroit River.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plants: Water Works Park Plant, 320,000,000 gpd; Springwells Plant, 272,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 136,000,000 gal (at both filter plants and in all elevated tanks).

ANALYSES

(Analyses, in parts per million, by Department of Water Supply, City of Detroit)

	Raw water [a]	Finished water [a]		Raw water [a]	Finished water [a]
Silica (SiO_2)	.4	.2	Hardness as $CaCO_3$:		
Iron (Fe)	.05	.02	Total	98	98
Manganese (Mn)	--	--	Noncarbonate	16	22
Calcium (Ca)	27	27			
Magnesium (Mg)	7	7	Color	--	--
Sodium (Na)	3	3	pH	8.1	7.6
Potassium (K)			Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	1	0	Turbidity	8	.1
Bicarbonate (HCO_3)	99	93	Temperature (F.)	--	--
Sulfate (SO_4)	13	19	Date of collection	June, 1951	June, 1950
Chloride (Cl)	7	7			
Fluoride (F)	--	--			
Nitrate (NO_3)	.2	.2			
Dissolved solids	130	132			

Regular determinations at treatment plant, 7-1-49 to 6-30-50

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	82	86	80	8.1	8.3	7.9	98	100	95	20	130	3
Finished water	76	80	64	7.6	7.8	7.1	98	100	95	.1	.8	0

[a] Composite sample.

EAST DETROIT
(Population, 21,461)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

EAST LANSING
(Population, 20,325)

Ownership: Municipal; supplies also about 2,000 people outside the city limits. Total population supplied, about 22,300.
Source: 5 wells (1, and 3 to 6), 460, 407, 385, 380, and 385 ft deep; yield reported to be 750, 450, 750, 600, and 600 gpm. Auxiliary supply from Michigan State College. Well 1 furnishes 24 percent of supply; wells 3 and 4, 38 percent; and wells 5 and 6, 38 percent.
Treatment: Iron removal, softening by cation exchange, and addition of Calgon.
Rated capacity of treatment plant: 3,750,000 gpd.
Raw-water storage: None.
Finished-water storage: 550,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Well 4 (finished water)		Well 4 (finished water)
Silica (SiO_2)	16	Hardness as $CaCO_3$:	
Iron (Fe)	.14	Total	73
Manganese (Mn)	.00	Noncarbonate	0
Calcium (Ca)	18		
Magnesium (Mg)	7.0	Color	8
Sodium (Na)	179	pH	7.5
Potassium (K)	2.1	Specific conductance (micromhos at 25 C.)	857
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	413	Temperature (F.)	45
Sulfate (SO_4)	114	Date of collection	Nov. 9, 1951
Chloride (Cl)	8.0		
Fluoride (F)	.3		
Nitrate (NO_3)	.2		
Dissolved solids	549		

Depth (feet)	385
Diameter (inches)	14
Date drilled	May, 1942
Percent of supply	--

ECORSE
(Population , 17,948)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

FERNDALE
(Population, 29,675)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

FLINT
(Population, 163,143)

Ownership: Municipal; supplies also about 1,000 people outside the city limits. Total population supplied, about 164,100.
Source: Flint River.
Treatment: Prechlorination, activated carbon, chlorine dioxide, coagulation with alum, softening with lime and soda ash, sedimentation, recarbonation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 35,000,000 gpd.
Raw-water storage: 650,000,000 gal.
Finished-water storage: 23,000,000 gal.

ANALYSES.

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	10	8.9	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.17	Total	278	86
Manganese (Mn)	.00	.00	Noncarbonate	43	55
Calcium (Ca)	70	23			
Magnesium (Mg)	25	6.8	Color	22	0
Sodium (Na)	13	13	pH	8.1	10.2
Potassium (K)	4.3	3.8	Specific conductance (micromhos at		
Carbonate (CO_3)	0	18	25 C.)	555	270
Bicarbonate (HCO_3)	286	[a]0	Turbidity	--	--
Sulfate (SO_4)	42	47	Temperature (F.)	--	--
Chloride (Cl)	18	24	Date of collection	June 28, 1951	June 28, 1951
Fluoride (F)	.2	.2			
Nitrate (NO_3)	2.6	1.6			
Dissolved solids	344	160			

[a] Hydroxide (OH) 1 ppm.

GRAND RAPIDS
(Population, 176,515)

Ownership: Municipal; supplies also about 3,000 people outside the city limits. Total population supplied, about 179,500.
Source: Lake Michigan. Auxiliary supply, Grand River (less than 1 percent of total supply).
Treatment: Prechlorination, coagulation with alum, activated carbon, sodium fluoride, sedimentation, and rapid sand filtration. Auxiliary supply softened with lime.
Rated capacity of treatment plant: 52,000,000 gpd.
Raw-water storage: 8,000,000 gal.
Finished-water storage: 43,800,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water [a]		Finished water [a]
Silica (SiO_2)	2.1	Hardness as $CaCO_3$:	
Iron (Fe)	.15	Total	130
Manganese (Mn)	.00	Noncarbonate	17
Calcium (Ca)	35		
Magnesium (Mg)	10	Color	3
Sodium (Na)	5.3	pH	8.0
Potassium (K)	1.0	Specific conductance (micromhos at 25 C.)	280
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	136	Temperature (F.)	--
Sulfate (SO_4)	18	Date of collection	Aug. 27, 1951
Chloride (Cl)	6.2		
Fluoride (F)	1.0		
Nitrate (NO_3)	.5		
Dissolved solids	155		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	116	168	105	8.2	8.7	7.9	134	267	124	7.4	61	.5
Finished water	109	122	47	7.8	8.5	7.5	136	163	124	.1	1.8	0

[a] Lake Michigan

HAMTRAMCK
(Population, 43,355)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

HAZEL PARK
(Population, 17,770)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

HIGHLAND PARK
(Population, 46,393)

Ownership: Municipal.
Source: Lake St. Clair. The intake is located at the termination of Seven Mile Road.
Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, postchlorination, and chlorine dioxide.
Rated capacity of treatment plant: 16,000,000 gpd.
Raw-water storage: 45,000,000 gal.
Finished-water storage: 3,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.5	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	98
Manganese (Mn)	.00	Noncarbonate	22
Calcium (Ca)	26		
Magnesium (Mg)	8.0	Color	0
Sodium (Na)	4.2	pH	7.6
Potassium (K)	1.2	Specific conductance (micromhos at 25 C.)	215
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	92	Temperature (F.)	--
Sulfate (SO_4)	20	Date of collection	Nov. 5, 1951
Chloride (Cl)	8.0		
Fluoride (F)	.1		
Nitrate (NO_3)	.9		
Dissolved solids	126		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	84	99	77	8.2	8.7	7.9	107	128	97	15	190	2
Finished water	77	84	64	7.3	7.5	6.8	105	114	98	0	0	0

JACKSON
(Population, 51,088)

Ownership: Municipal; supplies also about 500 people outside the city limits. Total population supplied, about 51,600.
Source: 13 wells (1 to 10, Water Street, Hamburg Street, and Goodyear), 380 to 451 ft deep; yield reported to be 1,400 to 1,800 gpm for each well. All of the wells are under 400 ft in depth except Goodyear.
Treatment: Chlorination.
Raw-water storage: 3,000,000 gal.
Finished-water storage: None.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	13	Hardness as $CaCO_3$:	
Iron (Fe)	.25	Total	331
Manganese (Mn)	.00	Noncarbonate	58
Calcium (Ca)	90		
Magnesium (Mg)	26	Color	2
Sodium (Na)	50	pH	7.3
Potassium (K)	3.3	Specific conductance (micromhos at 25 C.)	791
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	334	Temperature (F.)	--
Sulfate (SO_4)	93	Date of collection	Aug. 21, 1951
Chloride (Cl)	48		
Fluoride (F)	.3		
Nitrate (NO_3)	.2		
Dissolved solids	498		

KALAMAZOO
(Population, 57,704)

Ownership: Municipal; supplies also about 13,022 people outside the city limits. Total population supplied, about 70,700.
Source: 33 wells, 127 to 189 ft deep; yield reported to be from 180 to 1,044 gpm, and to average 401 gpm.
Treatment: Chlorination, and fluoridation.
Raw-water storage: None.
Finished-water storage: 8,600,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Finished water [a]	Finished water [b]	Finished water [c]
Silica (SiO_2)	14	14	13
Iron (Fe)	.81	1.4	.49
Manganese (Mn)	.11	.09	.05
Calcium (Ca)	81	97	80
Magnesium (Mg)	30	34	28
Sodium (Na)	8.7	11	6.4
Potassium (K)	1.2	2.0	1.2
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	326	344	321
Sulfate (SO_4)	58	95	50
Chloride (Cl)	12	18	10
Fluoride (F)	.1	.8	.0
Nitrate (NO_3)	.9	3.6	4.0
Dissolved solids	373	460	357
Hardness as $CaCO_3$:			
Total	326	381	314
Noncarbonate	58	100	52
Color	7	2	3
pH	7.4	7.6	7.7
Specific conductance (micromhos at 25 C.)	607	711	581
Turbidity	--	--	--
Temperature (F.)	51	51	51
Date of collection	Nov. 20, 1951	Nov. 20, 1951	Nov. 20, 1951

[a] No. 7 pumping station.
[b] Central pumping station.
[c] Balch Street pumping station.

LANSING
(Population, 92,129)

Ownership: Municipal.
Source: 92 wells, 189 to 572 ft deep; yield reported to be 50 to 800 gpm. The average depth of the wells is 425 ft, and the average yield 225 gpm.
Treatment: Prechlorination, coagulation, softening with lime and soda ash, sedimentation, recarbonation, rapid sand filtration, Calgon, and postchlorination. The water is softened to a hardness of about 85 ppm.
Rated capacity of treatment plant: 60,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 17,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by Water Conditioning Plant, Lansing, Michigan)

	Finished water		Finished water
Silica (SiO_2)	9.9	Hardness as $CaCO_3$:	
Iron (Fe)	--	Total	86
Manganese (Mn)	--	Noncarbonate	57
Calcium (Ca)	19		
Magnesium (Mg)	9.3	Color	--
Sodium (Na)	} 24	pH	10.3
Potassium (K)	}	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	15	Turbidity	0
Bicarbonate (HCO_3)	4	Temperature (F.)	--
Sulfate (SO_4)	75	Date of collection	May, 1951
Chloride (Cl)	22		
Fluoride (F)	.2		
Nitrate (NO_3)	--		
Dissolved solids	177		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	315	320	312	7.0	7.1	6.9	387	406	367	0.69	1.50	0.23
Finished water	83	106	75	10.4	10.5	10.2	85	91	81	0	0	0

LINCOLN PARK
(Population, 29,310)

Ownership: Municipal; supplies also about 100 people outisde the city limits. Total population supplied, about 29,400.
Source: Supplied by Detroit. (See Detroit.) Emergency supply from Wyandotte.

LIVONIA
(Population, 17,534)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

MONROE
(Population, 21,467)

Ownership: Municipal.
Source: Lake Erie.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, postchlorination, and final adjustment of pH to about 8.0 by addition of lime.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 3,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	1.1	Hardness as $CaCO_3$:	
Iron (Fe)	.11	Total	137
Manganese (Mn)	.00	Noncarbonate	44
Calcium (Ca)	40		
Magnesium (Mg)	8.7	Color	5
Sodium (Na)	15	pH	7.9
Potassium (K)	1.8	Specific conductance (micromhos at 25 C.)	351
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	112	Temperature (F.)	--
Sulfate (SO_4)	32	Date of collection	Nov. 2, 1951
Chloride (Cl)	36		
Fluoride (F)	.1		
Nitrate (NO_3)	.9		
Dissolved solids	192		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	102	150	81	7.8	8.5	7.2	156	226	112	120	1,250	10
Finished water	97	123	76	7.8	8.5	7.1	169	220	126	--	--	--

MUSKEGON
(Population, 48,429)

Ownership: Municipal; supplies also North Muskegon and about 2,000 people outside the city limits. Total population supplied, about 52,900.
Source: Lake Michigan. Emergency supply from Muskegon Heights.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, postchlorination at times, and fluoridation.
Rated capacity of treatment plant: 16,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 5,300,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	2.6	Hardness as $CaCO_3$:	
Iron (Fe)	.12	Total	134
Manganese (Mn)	.00	Noncarbonate	25
Calcium (Ca)	34		
Magnesium (Mg)	12	Color	0
Sodium (Na)	3.8	pH	7.9
Potassium (K)	2.3	Specific conductance (micromhos at 25 C.)	270
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	133	Temperature (F.)	55
Sulfate (SO_4)	25	Date of collection	June 28, 1951
Chloride (Cl)	7.0		
Fluoride (F)	.0		
Nitrate (NO_3)	.7		
Dissolved solids	153		

MUSKEGON HEIGHTS
(Population, 18,828)

Ownership: Municipal; supplies also about 2,000 people outside the city limits. Total population supplied, about 20,800.
Source: Lake Michigan. Emergency supply from Muskegon.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 7,000,000 gpd.
Raw-water storage: 1,750,000 gal.
Finished-water storage: 3,385,000 gal.

ANALYSIS

(Analysis, in parts per million, by Michigan Department of Health)

	Finished water		Finished water
Silica (SiO_2)	2.8	Hardness as $CaCO_3$:	
Iron (Fe)	.08	Total	137
Manganese (Mn)	--	Noncarbonate	28
Calcium (Ca)	35		
Magnesium (Mg)	12	Color	--
Sodium (Na)	2.6	pH	--
Potassium (K)		Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	--	Turbidity	--
Bicarbonate (HCO_3)	133	Temperature (F.)	--
Sulfate (SO_4)	24	Date of collection	Oct., 1941
Chloride (Cl)	6.0		
Fluoride (F)	.0		
Nitrate (NO_3)	--		
Dissolved solids	156		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	119	130	114	8.2	8.4	7.9	134	150	126	8	45	1
Finished water	104	110	97	7.1	7.4	6.9	132	138	123	0	0	0

PONTIAC
(Population, 73,681)

Ownership: Municipal.
Source: 20 wells, 173 to 234 ft deep; yield reported to be from 548 to 1,330 gpm, and to average 855 gpm.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 3,000,000 gal.

There are 9 low-service wells and 11 high-service wells. The low-service wells pump directly into a reservoir and furnish about 67 percent of the supply. The high-service wells pump against a head varying from 30 to 75 pounds and furnish about 33 percent of the supply.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Mechanic well (raw water)	Featherstone well 2 (raw water)	Orchard Lake well 3 (raw water)	Finished water
Silica (SiO_2)	13	20	21	20
Iron (Fe)	1.3	1.4	.56	1.2
Manganese (Mn)	.00	.00	.00	.00
Calcium (Ca)	98	80	62	71
Magnesium (Mg)	32	30	25	28
Sodium (Na)	15	25	30	26
Potassium (K)	2.8	3.0	3.8	3.7
Carbonate (CO_3)	0	0	0	0
Bicarbonate (HCO_3)	347	390	330	340
Sulfate (SO_4)	92	32	7.8	28
Chloride (Cl)	17	22	31	28
Fluoride (F)	.4	.5	.6	.6
Nitrate (NO_3)	1.0	2.5	1.0	1.0
Dissolved solids	472	408	345	375
Hardness as $CaCO_3$:				
Total	374	324	260	292
Noncarbonate	92	3	0	14
Color	3	3	2	0
pH	7.4	7.4	7.6	7.7
Specific conductance (micromhos at 25 C.)	714	676	596	635
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection	June 26, 1951	June 26, 1951	June 26, 1951	June 26, 1951
Depth (feet)	200	195	232	--
Diameter (inches)	12	12	12	--
Date drilled	1925	1929	1949	--
Percent of supply	3	4.3	3	--

PORT HURON
(Population, 35,725)

Ownership: Municipal; supplies also about 700 people outside the city limits. Total population supplied, about 36,400.
Source: St. Clair River. Emergency supply from Port Huron Sulphite and Paper Co. water system.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 1,500,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	1.9	Hardness as $CaCO_3$:	
Iron (Fe)	.11	Total	94
Manganese (Mn)	.00	Noncarbonate	18
Calcium (Ca)	28		
Magnesium (Mg)	5.8	Color	5
Sodium (Na)	2.9	pH	7.3
Potassium (K)	.7	Specific conductance (micromhos at 25 C.)	206
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	92	Temperature (F.)	--
Sulfate (SO_4)	12	Date of collection	Sept. 24, 1952
Chloride (Cl)	7.0		
Fluoride (F)	.1		
Nitrate (NO_3)	.4		
Dissolved solids	110		

RIVER ROUGE
(Population, 20,549)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.) Emergency supply from industrial storage tanks.

ROSEVILLE
(Population, 15,816)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

ROYAL OAK
(Population, 46,898)

Ownership: Municipal.
Source: 3 wells, (Baptist Home, Buckingham, Northwood), 186.5, 180, 157.5 ft deep; yield reported to be 150, 800, 350 gpm (about 55 per cent of supply); about 45 per cent of supply from Detroit. Auxiliary supply one well, (Cooper), 200 ft deep; yield reported to be 800 gpm; used during summer months.
Treatment: Addition of Calgon, and chlorination.
Raw-water storage: None.
Finished-water storage: 1,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Baptist Home Well (raw water)	Buckingham Well (finished water)	Finished water [a]
Silica (SiO_2)	14	17	11
Iron (Fe)	.35	.43	.23
Manganese (Mn)	.00	.00	.00
Calcium (Ca)	34	52	36
Magnesium (Mg)	20	20	17
Sodium (Na)	106	66	150
Potassium (K)	3.2	2.0	2.6
Carbonate (CO_3)	8	0	12
Bicarbonate (HCO_3)	339	340	248
Sulfate (SO_4)	1.8	.9	.4
Chloride (Cl)	84	62	182
Fluoride (F)	1.0	.9	1.0
Nitrate (NO_3)	.2	.2	.2
Dissolved solids	440	389	537
Hardness as $CaCO_3$:			
Total	169	214	162
Noncarbonate	0	0	0
Color	3	1	3
pH	--	--	7.7
Specific conductance (micromhos at 25 C.)	789	698	1,000
Turbidity	--	--	--
Temperature (F.)	--	--	--
Date of collection	Aug. 23, 1951	Aug. 23, 1951	Aug. 23, 1951
Depth (feet)	186.5	180	--
Diameter (inches)	16-8	30-12	--
Date drilled	May, 1950	July, 1950	--
Percent of supply	10	25	--

[a] Mixed sample: Northwood well 30 percent; supply of City of Detroit 70 percent.

SAGINAW
(Population, 92,918)

Ownership: Municipal; supplies also about 2,000 people outside the city limits. Total population supplied, about 94,900.
Source: Lake Huron. The intake is located at Whitestone Point, about 60 miles north-northeast of Saginaw. Emergency supply, Lake Linton and Saginaw River.
Treatment: Prechlorination, coagulation with alum, softening with lime, sedimentation, rapid sand filtration, fluoridation with sodium silicofluoride, and final adjustment of pH to about 9.4 by addition of soda ash.
Rated capacity of treatment plant: 25,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 9,250,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.7	2.9	Hardness as $CaCO_3$:		
Iron (Fe)	.07	.14	Total	117	70
Manganese (Mn)	.00	.00	Noncarbonate	28	23
Calcium (Ca)	33	19			
Magnesium (Mg)	8.6	5.3	Color	3	3
Sodium (Na)	6.1	9.0	pH	8.1	9.1
Potassium (K)	3.1	2.2	Specific conductance (micromhos at		
Carbonate (CO_3)	0	8	25 C.)	259	194
Bicarbonate (HCO_3)	109	40	Turbidity	--	--
Sulfate (SO_4)	17	20	Temperature (F.)	--	--
Chloride (Cl)	16	16	Date of collection	June 27, 1951	June 27, 1951
Fluoride (F)	.1	.9			
Nitrate (NO_3)	.5	.6			
Dissolved solids	164	111			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	77	80	73	8.0	8.3	7.8	93	108	86	3	40	1
Finished water	33	35	29	9.4	9.8	8.7	49	55	46	0	0	0

ST. CLAIR SHORES
(Population, 19,823)

Ownership: Municipal.
Source: Supplied by Detroit. (See Detroit.)

WYANDOTTE
(Population, 36,846)

Ownership: Municipal.
Source: Detroit River. Emergency supply from Detroit.
Treatment: Prechlorination, coagulation with alum, sedimentation. rapid sand filtration, chlorine dioxide, and fluoridation (silicofluoride).
Rated capacity of treatment plant: 10,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 1,800,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	2.9	2.4	Hardness as $CaCO_3$:		
Iron (Fe)	.02	.10	Total	98	96
Manganese (Mn)	.00	.00	Noncarbonate	15	23
Calcium (Ca)	27	27			
Magnesium (Mg)	7.3	6.8	Color	3	2
Sodium (Na)	6.7	4.9	pH	8.3	7.5
Potassium (K)	2.2	1.1	Specific conductance (micromhos at 25 C.)	218	225
Carbonate (CO_3)	6	0			
Bicarbonate (HCO_3)	88	88			
Sulfate (SO_4)	14	17	Turbidity	12	--
Chloride (Cl)	9.0	10	Temperature (F.)	--	--
Fluoride (F)	.1	1.4	Date of collection	Aug. 17, 1951	Aug. 17, 1951
Nitrate (NO_3)	.6	.4			
Dissolved solids	120	126			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	86	93	82	7.9	8.2	7.8	115	137	102	29	68	14
Finished water	77	84	72	7.2	7.4	7.0	118	142	105	0	0	0

YPSILANTI
(Population, 18,302)

Ownership: Municipal.
Source: 3 wells, 102, 87, and 94 ft. deep.
Treatment: Coagulation and softening with lime and soda ash, sedimentation, rapid sand filtration, Calgon, and chlorination.
Rated capacity of treatment plant: 2,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by Michigan Department of Health)

	Finished water		Finished water
Silica (SiO_2)	7.2	Hardness as $CaCO_3$:	
Iron (Fe)	.0	Total	71
Manganese (Mn)	--	Noncarbonate	36
Calcium (Ca)	14		
Magnesium (Mg)	8.8	Color	--
Sodium (Na)	40	pH	--
Potassium (K)		Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	17	Turbidity	--
Bicarbonate (HCO_3)	8	Temperature (F.)	--
Sulfate (SO_4)	102	Date of collection	November, 1943
Chloride (Cl)	12		
Fluoride (F)	.3		
Nitrate (NO_3)	--		
Dissolved solids	212		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	280	286	272	7.3	7.3	7.3	378	396	359	52	52	52
Finished water	31	45	24	9.4	9.4	9.3	79	92	71	52	52	52

AKRON
(Population, 274,605)

Ownership: Municipal; supplies also part of Mogadore. Total population supplied, about 275,900.
Source: Cuyahoga River impounded, 3.5 miles north of Kent. Emergency supply, wells in Kenmore.
Treatment: Coagulation with alum and ferrous sulfate, activated carbon, sedimentation, rapid sand filtration, chlorination, and final adjustment of pH by addition of lime.
Rated capacity of treatment plant: 50,000,000 gpd.
Raw-water storage: 4,200,000,000 gal.
Finished-water storage: 34,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	1.8	1.5	Hardness as $CaCO_3$:		
Iron (Fe)	.01	.47	Total	90	106
Manganese (Mn)	.00	.00	Noncarbonate	38	47
Calcium (Ca)	25	33			
Magnesium (Mg)	6.8	5.8	Color	18	5
Sodium (Na)	2.7	2.8	pH	7.2	7.8
Potassium (K)	1.4	1.4	Specific conductance (micromhos at 25 C.)	190	225
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	64	72			
Sulfate (SO_4)	33	43	Turbidity	--	--
Chloride (Cl)	3.5	6.5	Temperature (F.)	--	--
Fluoride (F)	.0	.0	Date of collection	May 2, 1951	May 2, 1951
Nitrate (NO_3)	.5	.3			
Dissolved solids	116	136			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	66	106	17	8.0	9.0	7.2	98	138	48	8	50	1
Finished water	69	109	23	8.3	9.0	7.1	119	158	70	--	--	--

ALLIANCE
(Population, 26,161)

Ownership: Municipal; supplies also about 2,300 people outside the city limits. Total population supplied, about 28,500.
Source: Mahoning River impounded. Auxiliary supply, 3 wells (1 to 3), 100, 82, and 102 feet deep; yield reported to be 1,400, 530, and 600 gpm.
Treatment: Prechlorination, coagulation with alum, softening with lime, sedimentation, rapid sand filtration, zeolite softening, and postchlorination.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: 350,000,000 gal.
Finished-water storage: 4,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	2.9	4.7	Hardness as $CaCO_3$:		
Iron (Fe)	.42	.21	Total	156	83
Manganese (Mn)	.00	.00	Noncarbonate	78	50
Calcium (Ca)	44	26			
Magnesium (Mg)	11	4.1	Color	18	0
Sodium (Na)	8.5	22	pH	7.0	9.7
Potassium (K)	1.9	--	Specific conductance (micromhos at 25 C.)	343	303
Carbonate (CO_3)	0	16	Turbidity	--	--
Bicarbonate (HCO_3)	94	6	Temperature (F.)	--	--
Sulfate (SO_4)	77	84	Date of collection	May 3, 1951	May 3, 1951
Chloride (Cl)	10	13			
Fluoride (F)	.2	.2			
Nitrate (NO_3)	1.0	.5			
Dissolved solids	219	184			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	90	180	20	7.2	7.5	6.9	160	280	66	36	700	8
Finished water	43	109	24	10.0	10.5	7.0	88	160	30	--	--	--

BARBERTON
(Population, 27,820)

Ownership: Municipal; supplies also about 800 people outside the city limits. Total population supplied, about 28,600.
Source: Wolfe Creek impounded. Emergency supply can be obtained from Akron through 2 six-inch connections.
Treatment: Prechlorination, ammoniation, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: 760,000,000 gal.
Finished-water storage: 4,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	4.1	3.7	Hardness as $CaCO_3$:		
Iron (Fe)	.05	.11	Total	118	124
Manganese (Mn)	.00	.00	Noncarbonate	52	58
Calcium (Ca)	38	36			
Magnesium (Mg)	5.3	8.0	Color	9	3
Sodium (Na)	4.1	4.7	pH	7.5	7.7
Potassium (K)	1.7	1.0	Specific conductance (micromhos at 25 C.)	252	277
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	79	79			
Sulfate (SO_4)	47	59	Turbidity	--	--
Chloride (Cl)	6.0	6.5	Temperature (F.)	--	--
Fluoride (F)	.2	.1	Date of collection	May 1, 1951	May 1, 1951
Nitrate (NO_3)	3.0	2.4			
Dissolved solids	151	166			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	73	114	29	7.7	8.5	7.2	123	183	71	28	280	8
Finished water	74	117	23	7.6	8.4	6.9	135	191	91	--	--	--

CANTON
(Population, 116,912)

Ownership: Municipal; supplies also Meyers Lake and suburban districts. Total population supplied, about 130,900.

Source: 5 wells (9 to 13) at Northeast Station, 172, 161, 195, 184, and 151 ft deep, yield reported to be 1,000, 3,500, 3,500, 3,500, and 1,050 gpm (51 percent of supply). Ranney collector (with 2 recharge units) at Northwest Station, 129.5 ft deep, capacity reported to be 15,000,000 gpd (42 per cent of supply). Auxiliary supply, 2 wells (1 and 2) in the Grovemiller area, 176 and 188 ft deep, yield reported to be 700 and 1,390 gpm, and 1 well at Southwest Station, 140 ft deep, yield reported to be 3,500 gpm. The auxiliary wells are used during the summer months and provide 7 per cent of the total supply.

Treatment: Aeration over coke at times, and chlorination.

Raw-water storage: None.

Finished-water storage: 15,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Finished water [a]	Finished water [b]		Finished water [a]	Finished water [b]
Silica (SiO_2)	13	11	Hardness as $CaCO_3$:		
Iron (Fe)	[c] .73	.61	Total	454	364
Manganese (Mn)	.23	.15	Noncarbonate	167	147
Calcium (Ca)	134	111			
Magnesium (Mg)	29	21	Color	2	4
Sodium (Na)	5.5	5.8	pH	7.3	7.4
Potassium (K)	1.5	1.2	Specific conductance (micromhos at 25 C.)	826	682
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	350	264			
Sulfate (SO_4)	163	147	Turbidity	--	--
Chloride (Cl)	10	9.2	Temperature (F.)	--	--
Fluoride (F)	.0	.1	Date of collection	April 9, 1951	April 9, 1951
Nitrate (NO_3)	.5	.5			
Dissolved solids	550	450			

[a] N. E. Sta.

[b] N. W. Sta.

[c] Sample slightly turbid when collected.

CINCINNATI
(Population, 503,998)

Ownership: Municipal; supplies also Cheviot, Cleves, Deer Park, Elmwood Place, Greenhills, Indian Hill, Madeira, Mariemont, Montgomery, Mt. Healthy, Newtown, North Bend, North College Hill, St. Bernard, Sharonville, Silverton, Terrace Park, Woodlawn, and suburban districts. Total population supplied, about 634,000.
Source: Ohio River.
Treatment: Prechlorination, coagulation with iron salts and lime, activated carbon, sedimentation, chlorination, rapid sand filtration, and ammoniation.
Rated capacity of treatment plant: 200,000,000 gpd.
Raw-water storage: 400,000,000 gal.
Finished-water storage: 151,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	7.0	6.1	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.13	Total	110	115
Manganese (Mn)	.00	.00	Noncarbonate	73	71
Calcium (Ca)	31	34			
Magnesium (Mg)	8.0	7.5	Color	2	1
Sodium (Na)	12	14	pH	7.0	8.2
Potassium (K)	3.5	3.3	Specific conductance (micromhos at 25 C.)	304	324
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	46	55			
Sulfate (SO_4)	81	78	Turbidity	--	--
Chloride (Cl)	14	20	Temperature (F.)	--	--
Fluoride (F)	.2	.2	Date of collection	May 19, 1951	May 19, 1951
Nitrate (NO_3)	2.4	1.5			
Dissolved solids	185	195			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	36	60	18	7.2	8.3	6.7	96	152	46	167	1,500	4
Finished water	39	58	24	8.5	8.7	8.1	111	155	75	--	--	--

CLEVELAND
(Population, 914,808)

Ownership: Municipal; supplies also Bay, Beachwood, Bedford, Bratenahl, Brecksville, Broadview Heights, Brooklyn, Brooklyn Heights, Brook Park, Cleveland Heights, Cuyahoga Heights, Dover, East Cleveland, Euclid, Fairview, Garfield Heights, Gates Mills, Highland Heights, Hunting Valley, Independence, Lakewood, Linndale, Lyndhurst, Maple Heights, Mayfield, Mayfield Heights, Middleburgh Heights, Moreland Hills, Newburgh Heights, North Olmsted, North Randall, North Royalton, Olmsted Falls, Orange, Parkview, Parma, Parma Heights, Richmond Heights, Rocky River, Seven Hills, Shaker Heights, Solon, South Euclid, Strongsville, University Heights, Warrensville Heights, Westview, Wickliffe, Willowwick, and suburban districts. Total population supplied about 1,370,000.
Source: Lake Erie.
Treatment: Ammoniation, prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, ammoniation, and postchlorination.
Rated capacity of treatment plant: 300,000,000 gpd.
Raw-water storage: 80,600,000 gal.
Finished-water storage: 270,300,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	2.4	Hardness as $CaCO_3$:	
Iron (Fe)	.12	Total	128
Manganese (Mn)	.00	Noncarbonate	43
Calcium (Ca)	39		
Magnesium (Mg)	7.3	Color	3
Sodium (Na)	8.7	pH	6.8
Potassium (K)	1.3	Specific conductance (micromhos at 25 C.)	286
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	103	Temperature (F.)	--
Sulfate (SO_4)	30	Date of collection	April 30, 1951
Chloride (Cl)	20		
Fluoride (F)	.1		
Nitrate (NO_3)	1.5		
Dissolved solids	169		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	91	98	84	8.2	8.4	7.0	125	--	--	19	110	1
Finished water	82	91	60	7.5	7.9	6.8	125	--	--	--	--	--

CLEVELAND HEIGHTS
(Population, 59,141)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

COLUMBUS
(Population, 375,901)

Ownership: Municipal; supplies also Bexley, Gahanna, Grandview Heights, Upper Arlington, Whitehall, and about 17,000 people outside the city limits. Total population supplied, about 450,000.
Source: Scioto River, impounded in Griggs Reservoir and O'Shaughnessy Reservoir (96 percent of supply); 4 wells (1 to 4), about 100 ft. deep, total yield reported to be 10,000,000 gpd. Emergency supply, White Sulfur Quarry (seepage water) and Olentangy River.
Treatment: Coagulation with alum, softening with lime and soda ash, activated carbon at times, sedimentation, recarbonation, rapid sand filtration, Calgon, chlorination, and chlorine dioxide when necessary. The water is softened to a hardness of about 70 ppm. The supply from wells is treated at the Nelson Road Plant, which operates for about 4 months each year. All other supplies are treated at the Dublin Road Plant.
Rated capacity of treatment plants: Dublin Road Plant, 54,000,000 gpd; Nelson Road Plant, 8,000,000 gpd.
Raw-water storage: 8,000,000,000 gal.
Finished-water storage: 20,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well (raw water)	Finished water [a]		Well (raw water)	Finished water [a]
Silica (SiO_2)	18	2.2	Hardness as $CaCO_3$:		
Iron (Fe)	3.4	.10	Total	576	60
Manganese (Mn)	--	--	Noncarbonate	150	27
Calcium (Ca)	145	19			
Magnesium (Mg)	52	3.1	Color	2	3
Sodium (Na)	9.2	49	pH	7.4	10.2
Potassium (K)			Specific conductance (micromhos at 25 C.)	1,000	391
Carbonate (CO_3)	0	18	Turbidity	--	--
Bicarbonate (HCO_3)	519	4	Temperature (F.)	--	--
Sulfate (SO_4)	157	115	Date of collection	Nov. 9, 1949	Sept. 26, 1949
Chloride (Cl)	3.2	8			
Fluoride (F)	.8	.3			
Nitrate (NO_3)	.2	2.2			
Dissolved solids	663	227			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	130	195	50	8.0	8.4	7.3	217	307	58	102	953	10
Finished water	34	76	17	10.2	11.0	9.4	81	157	21	--	--	--

[a] Scioto River

CUYAHOGA FALLS
(Population, 29,195)

Ownership: Municipal; supplies also Silver Lake. Total population supplied, about 30,000.
Source: 5 wells (1, 2, 3, 5, 6), 120, 130, 129, 130, and 120 ft deep; yield of wells 1, 2, 5, and 6 reported to be 1,000, 1,500, 1,500, and 850 gpm.
Treatment: Aeration, rapid sand filtration, part zeolite softening, adjustment of pH with soda ash, and chlorination.
Rated capacity of treatment plant: 4,000,000 gpd.
Raw-water storage: 270,000 gal.
Finished-water storage: 2,600,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well 2 (raw water)	Finished water		Well 2 (raw water)	Finished water
Silica (SiO_2)	7.8	9.4	Hardness as $CaCO_3$:		
Iron (Fe)	.82	.18	Total	204	97
Manganese (Mn)	.05	.00	Noncarbonate	62	0
Calcium (Ca)	63	26			
Magnesium (Mg)	11	7.8	Color	2	1
Sodium (Na)	7.3	69	pH	7.4	7.8
Potassium (K)	1.3	5.6	Specific conductance (micromhos at 25 C.)	431	504
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	172	197	Turbidity	--	--
Sulfate (SO_4)	67	72	Temperature (F.)	--	--
Chloride (Cl)	9.8	18	Date of collection	May 2, 1951	May 2, 1951
Fluoride (F)	.1	.0			
Nitrate (NO_3)	.1	.3			
Dissolved solids	266	303			

Regular determinations at treatment plant, 1949

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	184	193	167	7.4	--	--	263	282	240	--	--	--
Finished water	188	201	167	7.9	--	--	--	--	--	--	--	--

DAYTON
(Population, 243,872)

Ownership: Municipal; supplies also Oakwood and about 100,000 people outside the city limits. Total population supplied, about 353,000.
Source: 23 wells (11 to 16 and 19 to 35), 20 of which are 54 to 85 ft deep, and 3 of which are 154, 157, and 161 ft deep. Auxiliary supply, 145 wells in groups of 6, 94, 6, 28 and 11 wells.
Treatment: Chlorination.
Raw-water storage: 35,000,000 gal.
Finished-water storage: 5,400,000 gal.

A softening and filtration plant is under construction (1951).

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	10	Hardness as $CaCO_3$:	
Iron (Fe)	.22	Total	358
Manganese (Mn)	--	Noncarbonate	74
Calcium (Ca)	91		
Magnesium (Mg)	32	Color	2
Sodium (Na)	5.7	pH	8.2
Potassium (K)		Specific conductance (micromhos at 25 C.)	654
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	346	Temperature (F.)	--
Sulfate (SO_4)	66	Date of collection	Oct. 18, 1950
Chloride (Cl)	10		
Fluoride (F)	.2		
Nitrate (NO_3)	4.4		
Dissolved solids	391		

EAST CLEVELAND
(Population, 40,047)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

EAST LIVERPOOL
(Population, 24,217)

Ownership: Municipal; supplies also about 7,200 people outside the city limits. Total population supplied, about 31,400.
Source: Ohio River.
Treatment: Prechlorination, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, postchlorination, and chlorine dioxide.
Rated capacity of treatment plant: 6,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 6,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.5	4.3	Hardness as $CaCO_3$:		
Iron (Fe)	.02	.16	Total	78	106
Manganese (Mn)	.30	.00	Noncarbonate	67	83
Calcium (Ca)	22	33			
Magnesium (Mg)	5.8	5.8	Color	3	2
Sodium (Na)	6.9	7.0	pH	6.1	8.9
Potassium (K)	.5	1.5	Specific conductance (micromhos at 25 C.)	220	262
Carbonate (CO_3)	0	5	Turbidity	--	--
Bicarbonate (HCO_3)	14	18	Temperature (F.)	--	--
Sulfate (SO_4)	73	85	Date of collection	May 3, 1951	May 3, 1951
Chloride (Cl)	6.2	8.0			
Fluoride (F)	.2	.2			
Nitrate (NO_3)	1.8	1.5			
Dissolved solids	133	170			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	13	30	3	6.7	7.9	6.1	95	150	60	48	200	13
Finished water	25	37	14	8.6	10.2	7.4	120	160	80	--	--	--

ELYRIA
(Population, 30,307)

Ownership: Municipal; supplies also Amherst, Penfield Junction, Vincent, other small communities, and suburban districts. Total population supplied, about 42,000.

Source: Lake Erie. The treatment plant is located at Lorain. The raw water intake is at two submerged cribs in Lake Erie 1,500 ft. offshore, west northwest from the treatment plant, and 2.5 miles west of the mouth of the Black River.

Treatment: Ammoniation, activated carbon, chlorination, coagulation with alum, adjustment of pH to about 7.3 by addition of lime, sedimentation, rapid sand filtration, ammoniation, and postchlorination.

Rated capacity of treatment plant: 12,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 3,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	2.1	1.1	Hardness as $CaCO_3$:		
Iron (Fe)	.01	.14	Total	129	131
Manganese (Mn)	.00	.00	Noncarbonate	33	42
Calcium (Ca)	38	38			
Magnesium (Mg)	8.3	8.7	Color	3	1
Sodium (Na)	8.2	8.4	pH	8.0	7.5
Potassium (K)	2.9	2.8	Specific conductance (micromhos at 25 C.)	300	310
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	117	108	Temperature (F.)	--	--
Sulfate (SO_4)	26	35	Date of collection	June 1, 1951	June 19, 1951
Chloride (Cl)	18	22			
Fluoride (F)	.1	.1			
Nitrate (NO_3)	1.8	1.3			
Dissolved solids	167	180			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	91	100	71	7.9	8.5	7.6	--	--	--	85	800	5
Finished water	82	92	64	7.3	7.5	6.9	--	--	--	--	--	--

EUCLID
(Population, 41,396)

Ownership: Municipal.

Source: Supplied by Cleveland. (See Cleveland.)

HAMILTON
(Population, 57,951)

Ownership: Municipal; supplies also about 1,500 people outside the city limits. Total population supplied, about 59,500.
Source: 6 wells (2 to 6, and 8), 155, 142, 115, 180, 138, and 168 ft. deep; yield reported to be 2,000, 2,500, 2,000, 2,000, 2,000, and 1,950 gpm. Well 2 provides 5 percent of the supply, well 4, 20 percent, and wells 3, 5, and 6, 25 percent each.
Treatment: Aeration, coagulation with alum, softening with lime and soda ash, recarbonation, sedimentation, rapid sand filtration, chlorination, and ammoniation.
Rated capacity of treatment plant: 6,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 11,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	12	8.0	Hardness as $CaCO_3$:		
Iron (Fe)	.66	.18	Total	334	89
Manganese (Mn)	.38	.00	Noncarbonate	53	69
Calcium (Ca)	84	21			
Magnesium (Mg)	30	9.0	Color	3	0
Sodium (Na)	8.4	10	pH	7.3	8.8
Potassium (K)	5.1	5.2	Specific conductance (micromhos at 25 C.)	631	255
Carbonate (CO_3)	0	5	Turbidity	--	--
Bicarbonate (HCO_3)	342	15	Temperature (F.)	--	--
Sulfate (SO_4)	74	76	Date of collection	May 23, 1951	May 23, 1951
Chloride (Cl)	11	12			
Fluoride (F)	.2	.1			
Nitrate (NO_3)	.7	.4			
Dissolved solids	379	156			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	280	295	260	7.3	--	--	344	370	322	--	--	--
Finished water	42	57	27	9.1	--	--	83	119	70	--	--	--

IRONTON
(Population, 16,333)

Ownership: Municipal; supplies also Coal Grove. Total population supplied, about 18,300.
Source: Ohio River.
Treatment: Coagulation with alum and lime, sedimentation, chlorination, and chlorine dioxide.
Rated capacity of treatment plant: 4,000,000 gpd.
Raw-water storage: 1,000,000 gal.
Finished-water storage: 5,000,000 gal.

ANALYSES

(Analyses, in parts per million, by Ohio Department of Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	10	3	Hardness as $CaCO_3$:		
Iron (Fe)	--	.15	Total	95	122
Manganese (Mn)	--	--	Noncarbonate	73	96
Calcium (Ca)	35	46			
Magnesium (Mg)	2	2	Color	10	2
Sodium (Na)	--	--	pH	7.4	8.7
Potassium (K)	--	--	Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	6			
Bicarbonate (HCO_3)	27	20			
Sulfate (SO_4)	--	--	Turbidity	30	0
Chloride (Cl)	12	12	Temperature (F.)	--	--
Fluoride (F)	.2	.2	Date of collection	Jan. 25, 1951	Jan. 25, 1951
Nitrate (NO_3)	--	.6			
Dissolved solids	--	202			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	33	130	18	7.0	--	--	121	--	--	118	600	10
Finished water	20	36	15	7.8	--	--	130	--	--	--	--	--

LAKEWOOD
(Population, 68,071)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

LANCASTER
(Population, 24,180)

Ownership: Municipal; supplies also about 450 people outside the city limits. Total population supplied, about 24,600.
Source: 7 wells (4, 5, 7 to 11), each 95 ft. deep. The specific capacity (after 8 hours pumping) of wells 4, 5, 7, 8, 9, and 10 was reported to be 243, 931, 501, 491, 648, and 567 gpm. The yield of well 11 is reported to be 1,200 gpm.
Treatment: Aeration, rapid sand filtration, zeolite softening, chlorination, and final adjustment of pH to 7.3-8.0 with soda ash.
Rated capacity of treatment plant: 3,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,300,000 gal.

ANALYSES

(Analyses, in parts per million, by Ohio Department of Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	15	15	Hardness as $CaCO_3$:		
Iron (Fe)	--	.1	Total	430	72
Manganese (Mn)	.25	.03	Noncarbonate	98	0
Calcium (Ca)	114	16			
Magnesium (Mg)	35	8	Color	5	5
Sodium (Na)	--	--	pH	7.2	7.6
Potassium (K)	--	--	Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	405	415	Turbidity	35	0
Sulfate (SO_4)	--	--	Temperature (F.)	--	--
Chloride (Cl)	14	14	Date of collection	Jan. 10, 1951	Jan. 10, 1951
Fluoride (F)	.1	.1			
Nitrate (NO_3)	--	.2			
Dissolved solids	--	569			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	309	--	--	7.3	--	--	413	--	--	54	--	--
Finished water	359	--	--	7.9	8.0	7.5	94	428	55	55	--	--

LIMA
(Population, 50,246)

Ownership: Municipal; supplies also about 15,000 people outside the city limits. Total population supplied, about 65,000.

Source: Ottawa River, stored in upland reservoirs. Auxiliary supply, 6 wells (1 to 6), 410, 400, 245, 400, 400, and 400 ft. deep. The yield from each of wells 1 to 4 is reported to be 250 gpm. The total yield from wells 5 and 6 is reported to be 750 gpm.

Treatment: Coagulation with alum, softening with lime and soda ash, sedimentation, recarbonation, rapid sand filtration, addition of polyphosphate, and chlorination.

Rated capacity of treatment plant: 12,000,000 gpd.

Raw-water storage: 2,700,000,000 gal.

Finished-water storage: Clear-water wells, 2,750,000 gal; elevated tank, 1,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	3.4	4.7	Hardness as $CaCO_3$:		
Iron (Fe)	.03	.09	Total	173	80
Manganese (Mn)	.00	.00	Noncarbonate	60	48
Calcium (Ca)	47	18			
Magnesium (Mg)	13	8.5	Color	17	1
Sodium (Na)	5.0	12	pH	7.9	9.0
Potassium (K)	5.0	4.3	Specific conductance (micromhos at 25 C.)	368	244
Carbonate (CO_3)	0	8	Turbidity	--	--
Bicarbonate (HCO_3)	135	22	Temperature (F.)	--	--
Sulfate (SO_4)	64	66	Date of collection	June 5, 1951	June 5, 1951
Chloride (Cl)	6.0	7.5			
Fluoride (F)	.2	.2			
Nitrate (NO_3)	5.4	5.1			
Dissolved solids	229	153			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	106	138	84	8.1	8.3	7.5	190	218	164	28	45	5
Finished water	34	60	20	9.6	10.5	9.0	90	115	74	--	--	--

LORAIN
(Population, 51,202)

Ownership: Municipal; supplies also Sheffield Lake and suburban districts. Total population supplied, about 56,000.
Source: Lake Erie. The raw water intake is at a submerged crib in Lake Erie, north northwest of the treatment plant, and 2,800 ft. offshore.
Treatment: Prechlorination, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, postchlorination, and final adjustment of pH to about 7.5 by addition of lime.
Rated capacity of treatment plant: 11,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 4,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	1.1	1.0	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.07	Total	125	132
Manganese (Mn)	--	.00	Noncarbonate	32	40
Calcium (Ca)	32	39			
Magnesium (Mg)	11	8.3	Color	10	1
Sodium (Na)	8.6	8.5	pH	7.7	7.5
Potassium (K)	.9	2.6	Specific conductance (micromhos at 25 C.)	293	319
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	113	111	Temperature (F.)	--	--
Sulfate (SO_4)	27	37	Date of collection	May 1, 1951	June 19, 1951
Chloride (Cl)	18	22			
Fluoride (F)	.1	.1			
Nitrate (NO_3)	1.2	1.3			
Dissolved solids	164	179			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	87	96	69	7.9	8.6	7.6	123	138	100	49	340	3
Finished water	77	88	51	7.3	7.6	6.7	131	144	111	--	--	--

MANSFIELD
(Population, 43,564)

Ownership: Municipal; supplies also about 7,000 people outside the city limits. Total population supplied, about 50,600.
Source: 11 wells (1 to 11), average depth reported to be 150 ft; total yield reported to be 7,500,000 gpd. Auxiliary supply, Clear Fork Reservoir located about 5 miles southwest of Mansfield. This reservoir will be used as a source of supply after January, 1952.
Treatment: Surface supply: Prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, and postchlorination. Well supply: chlorination.
Rated capacity of treatment plant: 7,500,000 gpd.
Raw-water storage: Reservoir, 4,000,000,000 gal.
Finished-water storage: 6,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Wells (finished water)		Wells (finished water)
Silica (SiO_2)	12	Hardness as $CaCO_3$:	
Iron (Fe)	.48	Total	229
Manganese (Mn)	.11	Noncarbonate	34
Calcium (Ca)	61		
Magnesium (Mg)	19	Color	0
Sodium (Na)	6.8	pH	7.4
Potassium (K)	1.0	Specific conductance (micromhos at 25 C.)	471
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	240	Temperature (F.)	--
Sulfate (SO_4)	48	Date of collection	May 1, 1951
Chloride (Cl)	4.2		
Fluoride (F)	.1		
Nitrate (NO_3)	.7		
Dissolved solids	277		

MARION
(Population, 33,817)

Ownership: The Marion Water Co. (controlled by American Water Works and Electric Co.); supplies also about 2,000 people outside the city limits. Total population supplied, about 35,800.

Source: 13 wells (13, 15, 17, 18, 20 to 28), 142, 142, 142, 145, 141, 140, 140, 140, 224, 225, 212, 184, and 202 ft deep. The yield of the wells is reported to be 210, 127, 232, 210, 127, 210, 175, 150, 410, 235, 202, 650, and 500 gpm, respectively.

Treatment: Aeration, coagulation with alum, softening with lime and soda ash, sedimentation, recarbonation, and chlorination. The water is softened to a hardness of about 137 ppm.

Rated capacity of treatment plant: 5,000,000 gpd.

Raw-water storage: 1,000,000 gal.

Finished-water storage: 2,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water [a]	Finished water [a]		Raw water [a]	Finished water [a]
Silica (SiO_2)	15	4.8	Hardness as $CaCO_3$:		
Iron (Fe)	.08	.14	Total	653	126
Manganese (Mn)	.07	.00	Noncarbonate	346	89
Calcium (Ca)	176	32			
Magnesium (Mg)	52	11	Color	3	2
Sodium (Na)	15	125	pH	7.6	9.0
Potassium (K)	4.9	6.0	Specific conductance (micromhos at 25 C.)	1,140	840
Carbonate (CO_3)	0	7			
Bicarbonate (HCO_3)	375	30	Turbidity	--	--
Sulfate (SO_4)	370	348	Temperature (F.)	--	--
Chloride (Cl)	5.8	6.5	Date of collection	June 19, 1951	June 19, 1951
Fluoride (F)	1.3	.6			
Nitrate (NO_3)	.1	.1			
Dissolved solids	882	556			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	318	328	292	--	--	--	677	742	611	56	66	46
Finished water	31	73	21	--	--	--	149	239	105	--	--	--

[a] Wells 15 and 21 to 28.

MASSILLON
(Population, 29,594)

Ownership: Ohio Water Service Co., (controlled by Federal Water Service Corp.); supplies also Genoa Sewer District and about 700 people outside the city limits. Total population supplied, about 37,000.

Source: 2 wells (1 and 2), 175 and 165 ft. deep; yield reported to be 2,100 and 1,400 gpm, (65 percent of supply); Newman Creek. Auxiliary supply, well (North), 175 ft. deep. Newman Creek and North well provide 35 percent of the supply.

Treatment: Aeration, coagulation with alum, softening with lime and soda ash, sedimentation, recarbonation, rapid sand filtration, and chlorination. The water is softened to a hardness of about 85 ppm.

Rated capacity of treatment plant: 3,500,000 gpd.

Raw-water storage: None.

Finished-water storage: 900,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Wells 1 & 2 (raw water)	North well (raw water)	Newman Creek (raw water)	Finished water
Silica (SiO_2)	14	14	8.5	8.9
Iron (Fe)	.10	1.1	.08	.11
Manganese (Mn)	.00	.08	--	.05
Calcium (Ca)	90	91	52	11
Magnesium (Mg)	24	23	14	7.3
Sodium (Na)	8.4	12	6.8	36
Potassium (K)	1.4	2.2	2.0	1.8
Carbonate (CO_3)	0	0	0	24
Bicarbonate (HCO_3)	274	284	134	0
Sulfate (SO_4)	103	89	77	80
Chloride (Cl)	9.0	20	8.0	12
Fluoride (F)	.1	.1	.2	.1
Nitrate (NO_3)	.2	.1	5.2	1.8
Dissolved solids	396	406	248	180
Hardness as $CaCO_3$:				
Total	322	322	186	58
Noncarbonate	99	89	78	17
Color	5	3	25	4
pH	7.5	7.5	7.5	9.6
Specific conductance (micromhos at 25 C.)	615	651	397	304
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection	Apr. 9, 1951	Apr. 9, 1951	Apr. 9, 1951	Apr. 9, 1951

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	183	263	52	7.3	--	--	304	412	140	50	64	34
Finished water	32	--	--	9.4	--	--	102	172	62	--	--	--

MIDDLETOWN
(Population, 33,695)

Ownership: Municipal; supplies also about 12,000 people through Lemon Township Sanitary District. Total population supplied, about 45,700.
Source: 18 wells. Three of the wells, 40, 183, and 186 ft deep, individually pumped, are reported to yield 2,000 gpm each. The remaining wells, 32 to 40 ft deep, are grouped, and are reported to yield 3,000,000 gpd.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 6,200,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	11	Hardness as $CaCO_3$:	
Iron (Fe)	.24	Total	302
Manganese (Mn)	.00	Noncarbonate	43
Calcium (Ca)	78		
Magnesium (Mg)	26	Color	1
Sodium (Na)	6.1	pH	7.4
Potassium (K)	2.9	Specific conductance (micromhos at 25 C.)	580
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	315	Temperature (F.)	--
Sulfate (SO_4)	48	Date of collection	May 23, 1951
Chloride (Cl)	7.8		
Fluoride (F)	.2		
Nitrate (NO_3)	3.3		
Dissolved solids	337		

NEWARK
(Population, 34,275)

Ownership: Municipal; supplies also about 2,500 people outside the city limits. Total population supplied, about 36,800.
Source: North Fork Licking River.
Treatment: Coagulation with alum, softening with lime and soda ash, ammoniation, activated carbon, sedimentation, recarbonation, rapid sand filtration, and chlorination. The water is softened to a hardness of about 70 ppm.
Rated capacity of treatment plant: 9,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 3,000,000 gal.

ANALYSES

(Analyses, in parts per million, by Ohio Department of Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	7	7	Hardness as $CaCO_3$:		
Iron (Fe)	--	.3	Total	199	61
Manganese (Mn)	.04	.04	Noncarbonate	46	29
Calcium (Ca)	57	21			
Magnesium (Mg)	14	2	Color	12	0
Sodium (Na)	--	--	pH	7.8	9.6
Potassium (K)	--	--	Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	12			
Bicarbonate (HCO_3)	187	15			
Sulfate (SO_4)	--	--	Turbidity	10	0
Chloride (Cl)	3	3	Temperature (F.)	--	--
Fluoride (F)	.1	.1	Date of collection	Apr. 10, 1950	Apr. 10, 1950
Nitrate (NO_3)	--	.3			
Dissolved solids	--	121			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	175	237	62	--	--	--	215	290	84	159	3000	25
Finished water	33	57	23	--	--	--	70	104	46	--	--	--

NORWOOD
(Population, 35,001)

Ownership: Municipal; supplies also about 100 people in Cincinnati. Total population supplied, about 35,100.
Source: 8 wells, 240 to 280 ft. deep (50 percent of supply); finished water purchased from Cincinnati (50 percent of supply).
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 1,830,000 gal.

ANALYSIS

(Analyses, in parts per million, by Ohio Department of Health)

	Finished water		Finished water
Silica (SiO_2)	15	Hardness as $CaCO_3$:	
Iron (Fe)	2.0	Total	410
Manganese (Mn)	.45	Noncarbonate	38
Calcium (Ca)	119		
Magnesium (Mg)	27	Color	8
Sodium (Na)	--	pH	7.3
Potassium (K)	--	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	0	Turbidity	5
Bicarbonate (HCO_3)	454	Temperature (F.)	--
Sulfate (SO_4)	--	Date of collection	Sept. 6, 1950
Chloride (Cl)	27		
Fluoride (F)	.05		
Nitrate (NO_3)	.3		
Dissolved solids	--		

PARMA
(Population, 28,897)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

PORTSMOUTH
(Population, 36,798)

Ownership: Municipal; supplies also New Boston, West Portsmouth, Wheelersburg, and about 3,200 people outside the city limits. Total population supplied, about 48,000.
Source: Ohio River.
Treatment: Coagulation with alum and lime, sedimentation, rapid sand filtration, sodium chlorite, chlorination, and final adjustment of pH to 8.0-8.2 by addition of lime.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 22,500,000 gal.

ANALYSES

(Analyses, in parts per million, by Ohio Department of Health)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	7	5	Hardness as $CaCO_3$:		
Iron (Fe)	--	.05	Total	90	96
Manganese (Mn)	.5	.5	Noncarbonate	68	72
Calcium (Ca)	33	35			
Magnesium (Mg)	2	2	Color	8	0
Sodium (Na)	--	--	pH	7.3	7.5
Potassium (K)	--	--	Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	27	29			
Sulfate (SO_4)	--	--	Turbidity	--	--
Chloride (Cl)	15	15	Temperature (F.)	--	--
Fluoride (F)	.2	.2	Date of collection	Jan. 2, 1951	Jan. 2, 1951
Nitrate (NO_3)	--	.6			
Dissolved solids	223	170			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	28	46	15	6.7	7.1	6.4	105	159	66	164	800	10
Finished water	30	48	18	7.5	8.5	7.0	115	169	92	--	--	--

SANDUSKY
(Population, 29,375)

Ownership: Municipal; supplies also about 5,000 people outside the city limits. Total population supplied, about 34,000.
Source: Lake Erie. The raw water intake is at a submerged crib in Lake Erie, 1,900 ft. northeast of Cedar Point beach. Emergency supply through a separate intake in Lake Erie-Sandusky Bay.
Treatment: Prechlorination, coagulation with alum, activated carbon at times, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 9,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 4,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	2.2	1.6	Hardness as $CaCO_3$:		
Iron (Fe)	.03	.04	Total	144	124
Manganese (Mn)	--	.00	Noncarbonate	37	33
Calcium (Ca)	42	36			
Magnesium (Mg)	9.7	8.0	Color	4	1
Sodium (Na)	8.6	8.0	pH	8.1	7.5
Potassium (K)	1.3	2.4	Specific conductance (micromhos at 25 C.)	322	297
Carbonate (CO_3)	6	0			
Bicarbonate (HCO_3)	119	109			
Sulfate (SO_4)	31	29	Turbidity	--	--
Chloride (Cl)	16	20	Temperature (F.)	--	--
Fluoride (F)	.1	.1	Date of collection	June 1, 1951	June 19, 1951
Nitrate (NO_3)	2.2	1.4			
Dissolved solids	186	166			

Regular determinations at treatment plant, 1949

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	92	98	88	7.9	--	--	--	--	--	41	450	10
Finished water	84	89	71	7.2	--	--	--	--	--	--	--	--

SHAKER HEIGHTS
(Population, 28,222)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

SOUTH EUCLID
(Population, 15,432)

Ownership: Municipal.
Source: Supplied by Cleveland. (See Cleveland.)

SPRINGFIELD
(Population, 78,508)

Ownership: Municipal; supplies also about 3,000 people outside the city limits. Total population supplied, about 81,500.
Source: Buck Creek diverted to natural filter beds, 80 percent of supply; Conduit in underground gravel, 20 percent of supply. Auxiliary supply, Beaver Creek diverted to natural filter beds.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: None.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	10	Hardness as $CaCO_3$:	
Iron (Fe)	.13	Total	332
Manganese (Mn)	.00	Noncarbonate	70
Calcium (Ca)	81		
Magnesium (Mg)	31	Color	0
Sodium (Na)	3.2	pH	7.7
Potassium (K)	2.7	Specific conductance (micromhos at 25 C.)	605
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	317	Turbidity	--
Sulfate (SO_4)	66	Temperature (F.)	--
Chloride (Cl)	5.0	Date of collection	May 23, 1951
Fluoride (F)	.2		
Nitrate (NO_3)	6.0		
Dissolved solids	363		

STEUBENVILLE
(Population, 35,872)

Ownership: Municipal; supplies also about 400 people outside the city limits. Total population supplied, about 36,300.
Source: Ohio River.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, postchlorination, chlorine dioxide, and stabilization by addition of phosphates.
Rated capacity of treatment plant: 6,000,000 gpd.
Raw-water storage: 6,300,000 gal.
Finished-water storage: 3,700,000 Gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	5.6	8.7	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.25	Total	88	111
Manganese (Mn)	.44	.32	Noncarbonate	75	96
Calcium (Ca)	23	34			
Magnesium (Mg)	7.5	6.3	Color	2	6
Sodium (Na)	7.1	7.4	pH	6.4	7.5
Potassium (K)	.8	1.5	Specific conductance (micromhos at		
Carbonate (CO_3)	0	0	25 C.)	229	287
Bicarbonate (HCO_3)	16	18	Turbidity	--	--
Sulfate (SO_4)	76	100	Temperature (F.)	--	--
Chloride (Cl)	5.8	8.5	Date of collection	May 4, 1951	May 4, 1951
Fluoride (F)	.1	.1			
Nitrate (NO_3)	1.4	1.3			
Dissolved solids	143	187			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	15	28	5	6.3	7.3	4.7	114	184	70	88	650	3
Finished water	23	42	9	8.0	9.9	5.4	130	186	90	--	--	--

TOLEDO
(Population, 303,616)

Ownership: Municipal; supplies also Maumee, Ottawa Hills, Rossford, and suburban districts. Total population supplied, about 369,000.
Source: Lake Erie. The raw water intake is at a crib in Lake Erie, about 9 miles east of Toledo, near Reno Beach, and 2 miles offshore.
Treatment: Prechlorination, coagulation with alum and lime, activated carbon at times, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 80,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 35,000,000 gal.

The crib is a circular concrete structure 100 ft in diameter with walls 16 ft thick having 16 intake ports 10 ft square that are 22 ft under the surface of the water. There is a large cabin superstructure.
The water from the crib is conveyed by gravity flow through 108 in. concrete pipe to the shore to the low service pumping station near Reno Beach. The water is pumped from this station through a 78 in. steel pipe line, 9 miles to the easterly edge of the city (Collins Park) to the treatment plant. The finished water is pumped into the distribution system and into elevated storage by a high service pumping station.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	3.3	2.4	Hardness as $CaCO_3$:		
Iron (Fe)	.02	.23	Total	146	170
Manganese (Mn)	--	.00	Noncarbonate	42	56
Calcium (Ca)	42	51			
Magnesium (Mg)	10	10	Color	5	3
Sodium (Na)	7.7	7.5	pH	7.6	7.6
Potassium (K)	1.4	1.5	Specific conductance (micromhos at 25 C.)	314	378
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	127	137	Temperature (F.)	--	--
Sulfate (SO_4)	30	53	Date of collection	May 1, 1951	May 15, 1951
Chloride (Cl)	19	16			
Fluoride (F)	.2	.2			
Nitrate (NO_3)	4.4	2.6			
Dissolved solids	192	228			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	92	129	53	8.0	8.8	7.5	136	224	81	111	1,360	10
Finished water	89	128	51	7.8	8.1	7.4	146	260	112	--	--	--

WARREN
(Population, 49,856)

Ownership: Municipal; supplies also about 2,500 people outside the city limits. Total population supplied, about 52,400.
Source: Mahoning River.
Treatment: Ammoniation, prechlorination, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, postchlorination, and final adjustment of pH to about 8.0 by addition of lime.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,100,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	6.4	5.2	Hardness as $CaCO_3$:		
Iron (Fe)	.08	.42	Total	96	128
Manganese (Mn)	.00	.16	Noncarbonate	56	84
Calcium (Ca)	26	38			
Magnesium (Mg)	7.3	7.8	Color	23	5
Sodium (Na)	5.1	5.2	pH	7.6	7.9
Potassium (K)	2.2	2.2	Specific conductance (micromhos at 25 C.)	238	299
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	48	52			
Sulfate (SO_4)	61	85	Turbidity	--	--
Chloride (Cl)	6.5	9.0	Temperature (F.)	--	--
Fluoride (F)	.2	.1	Date of collection	Apr.10, 1951	Apr.10, 1951
Nitrate (NO_3)	1.9	2.1			
Dissolved solids	150	189			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	58	110	14	7.6	8.7	6.6	137	213	50	45	525	3
Finished water	58	108	16	8.1	9.0	7.6	161	227	83	--	--	--

YOUNGSTOWN
(Population, 168,330)

Ownership: Mahoning Valley Sanitary District (controlled by cities of Youngstown and Niles); supplies also Boardman, Canfield, McDonald, Niles, and about 6,100 people outside of the city limits. Total population supplied, about 204,000.
Source: Meander Creek impounded in Meander Creek Reservoir.
Treatment: Coagulation with alum, softening with lime and soda ash, sedimentation, recarbonation, activated carbon, rapid sand filtration, ammoniation, chlorination, and stabilization by addition of phosphates.
Rated capacity of treatment plant: 40,000,000 gpd.
Raw-water storage: Reservoir, 10,000,000,000 gal.
Finished-water storage: 35,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	4.7	7.6	Hardness as $CaCO_3$:		
Iron (Fe)	.04	.07	Total	92	86
Manganese (Mn)	.00	.00	Noncarbonate	58	69
Calcium (Ca)	24	33			
Magnesium (Mg)	7.5	.7	Color	12	4
Sodium (Na)	4.0	11	pH	7.7	10.3
Potassium (K)	2.3	2.2	Specific conductance (micromhos at 25 C.)	223	275
Carbonate (CO_3)	0	10	Turbidity	--	--
Bicarbonate (HCO_3)	40	[a]0	Temperature (F.)	--	--
Sulfate (SO_4)	61	67	Date of collection	Apr.10, 1951	Apr.10, 1951
Chloride (Cl)	5.5	5.8			
Fluoride (F)	.1	.1			
Nitrate (NO_3)	2.6	2.0			
Dissolved solids	139	156			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	47	62	34	7.7	8.6	7.3	120	150	98	13	55	4
Finished water	38	45	33	10.6	10.7	10.4	84	92	77	.4	.7	.2

[a]Hydroxide (OH), 7 ppm.

ZANESVILLE
(Population, 40,517)

Ownership: Municipal; supplies also about 1,500 people outside the city limits. Total population supplied, about 42,000.
Source: 8 wells (1 to 8) each 65 ft. deep; yield of wells 1 and 2 reported to be 800 gpm each, and of wells 3 to 8, 1,000 gpm. each.
Treatment: Chlorination.
Rated capacity of treatment plant: 15,500,000 gpd.
Raw-water storage: None.
Finished-water storage: 4,700,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water (city tap)		Finished water (city tap)
Silica (SiO_2)	10	Hardness as $CaCO_3$:	
Iron (Fe)	.51	Total	259
Manganese (Mn)	.07	Noncarbonate	129
Calcium (Ca)	83		
Magnesium (Mg)	13	Color	2
Sodium (Na)	37	pH	7.5
Potassium (K)	2.3	Specific conductance (micromhos at 25 C.)	701
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	160	Temperature (F.)	--
Sulfate (SO_4)	92	Date of collection	May 4, 1951
Chloride (Cl)	85		
Fluoride (F)	.2		
Nitrate (NO_3)	.3		
Dissolved solids	424		

APPLETON
(Population, 34,010)

Ownership: Municipal; supplies also about 800 people outside the city limits. Total population supplied, about 34,800.
Source: Fox River.
Treatment: Prechlorination, coagulation with alum, softening with lime, aeration during summer months, activated carbon, sedimentation, recarbonation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 8,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 4,250,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Raw water	Finished water		Raw water	Finished water
Silica (SiO_2)	2.5	2.7	Hardness as $CaCO_3$:		
Iron (Fe)	.10	.22	Total	169	81
Manganese (Mn)	.00	.03	Noncarbonate	21	29
Calcium (Ca)	38	20			
Magnesium (Mg)	18	7.5	Color	10	5
Sodium (Na)	4.5	5.2	pH	7.9	9.0
Potassium (K)	1.7	2.0	Specific conductance (micromhos at 25 C.)	319	190
Carbonate (CO_3)	0	6	Turbidity	--	--
Bicarbonate (HCO_3)	180	51	Temperature (F.)	--	--
Sulfate (SO_4)	20	30	Date of collection	Jan. 16, 1952	Jan. 16, 1952
Chloride (Cl)	7.0	8.0			
Fluoride (F)	.1	1.2			
Nitrate (NO_3)	.5	.4			
Dissolved solids	200	112			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	144	168	110	8.0	8.7	7.4	168	196	144	4.2	57	1.5
Finished water	37	57	20	9.2	10.2	8.6	72	98	60	.8	6.6	.2

BELOIT
(Population, 29,590)

Ownership: Wisconsin Power and Light Company; supplies also South Beloit, and about 100 people outside the city limits. Total population supplied, about 32,900.
Source: 4 drilled wells (3, 4, 5, 8), 1,160, 967, 1,225, and 140 ft deep, respectively. Well 3 furnishes 12 percent of supply; well 4, 15 percent; well 5, 13 percent; well 8, 59 percent. Auxiliary supply, wells 1, 6, and 2 (1 percent of supply).
Treatment: Chlorination.
Raw-water storage: 1,550,000 gal.
Finished-water storage: 1,200,000 gal.

ANALYSES

(Analyses, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Well 3	Well 4	Well 5	Well 8
Silica (SiO_2)	8.9	9.5	9.3	18
Iron (Fe)	.1	.00	.00	.00
Manganese (Mn)	.00	.00	.00	.00
Calcium (Ca)	56	59	51	71
Magnesium (Mg)	36	37	35	31
Sodium (Na)	1.8	1.0	1.9	2.2
Potassium (K)	2.0	1.6	1.6	.0
Carbonate (CO_3)	0	0	0	0
Bicarbonate (HCO_3)	344	354	317	325
Sulfate (SO_4)	8.5	10	10	30
Chloride (Cl)	3.0	2.0	2.5	5.5
Fluoride (F)	.0	.0	.0	.9
Nitrate (NO_3)	.0	.4	.3	2.0
Dissolved solids	288	302	262	320
Hardness as $CaCO_3$:				
Total	288	299	271	305
Noncarbonate	6	9	11	38
Color	5	2	2	2
pH	7.7	7.4	7.6	7.7
Specific conductance (micromhos at 25 C.)	--	--	--	--
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection	May 27, 1952	May 27, 1952	May 27, 1952	May 27, 1952
Depth (feet)	1,160	967	1,225	140
Diameter (inches)	12	12	12	30
Date drilled	1937	1926	1927	1947
Percent of supply	12	15	13	59

EAU CLAIRE
(Population, 36, 058)

Ownership: Municipal.
Source: 11 drilled wells, from 75 to 105 ft deep. The yield of the wells is reported to be from 1, 420 to 2, 120 gpm, and to average 1, 786 gpm.
Treatment: Chlorination, and fluoridation.
Raw-water storage: None.
Finished-water storage: 3, 500, 000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	19	Hardness as $CaCO_3$:	
Iron (Fe)	.09	Total	54
Manganese (Mn)	.00	Noncarbonate	7
Calcium (Ca)	12		
Magnesium (Mg)	5.8	Color	5
Sodium (Na)	4.0	pH	7.4
Potassium (K)	.7	Specific conductance (micromhos at 25 C.)	122
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	57	Turbidity	--
Sulfate (SO_4)	6.7	Temperature (F.)	--
Chloride (Cl)	3.2	Date of collection	Nov. 20, 1951
Fluoride (F)	1.0		
Nitrate (NO_3)	2.2		
Dissolved solids	86		

FOND DU LAC
(Population, 29,936)

Ownership: Municipal; supplies also about 90 people outside the city limits.
Total population supplied, about 30,000.
Source: 11 drilled wells (2 to 6, 8 to 13) 480 to 885 ft deep.
Treatment: Chlorination, and fluoridation.
Raw-water storage: 2,000,000 gal.
Finished-water storage: 500,000 gal.

ANALYSIS

(Analysis, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Finished water		Finished water
Silica (SiO_2)	17	Hardness as $CaCO_3$:	
Iron (Fe)	.1	Total	401
Manganese (Mn)	.0	Noncarbonate	196
Calcium (Ca)	103		
Magnesium (Mg)	35	Color	3
Sodium (Na)	38	pH	7.4
Potassium (K)	4.4	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	251	Temperature (F.)	--
Sulfate (SO_4)	185	Date of collection	Feb. 13, 1952
Chloride (Cl)	88		
Fluoride (F)	1.2		
Nitrate (NO_3)	.0		
Dissolved solids	628		

GREEN BAY
(Population, 52,735)

Ownership: Municipal.
Source: 9 drilled wells (1 to 9) 804 to 956 ft deep, located, respectively, within the city limits as follows: Cass Street, Farlin Avenue, Shawano Avenue, Boland Road, James Church, 9th Street, Mason Street, Gray Street, and Military.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 4,000,000 gal.

The analyses selected show the approximate range of dissolved solids and hardness in the water furnished by the wells. Complete analyses of samples from the other wells indicate that the water furnished by them is very similar in chemical character to that from the wells for which analyses are given.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Cass St. well (raw water)	Farlin Ave. well (raw water)	James Church well [a]	Gray St. well (raw water)	Military well (raw water)
Silica (SiO_2)	6.5	7.3	7.5	7.4	7.5
Iron (Fe)	.44	.79	.49	.58	.23
Manganese (Mn)	.00	.00	.00	.00	.00
Calcium (Ca)	50	57	60	56	58
Magnesium (Mg)	20	22	29	22	24
Sodium (Na)	23	40	35	15	13
Potassium (K)	6.0	6.0	4.5	4.9	4.2
Carbonate (CO_3)	0	0	0	6	0
Bicarbonate (HCO_3)	210	194	265	246	274
Sulfate (SO_4)	65	110	51	40	40
Chloride (Cl)	17	43	58	10	9.5
Fluoride (F)	2.4	2.4	1.6	1.3	1.1
Nitrate (NO_3)	.2	.0	.0	.2	.2
Dissolved solids	296	395	385	282	288
Hardness as $CaCO_3$:					
Total	208	234	272	232	245
Noncarbonate	35	74	52	29	19
Color	3	2	3	3	0
pH	7.8	7.8	7.7	8.1	7.7
Specific conductance (micromhos at 25 C.)	492	615	645	473	484
Turbidity	--	--	--	--	--
Temperature (F.)	53	53	--	53	53
Date of collection	Jan. 10, 1952	Jan. 10, 1952	Jan. 10, 1952	Feb. 26, 1952	Feb. 26, 1952
Depth (feet)	918	956	860	804	816
Diameter (inches)	15	15	15	15	19
Date drilled	1936	1930	1941	1913	1951
Percent of supply	11	11	9	7	15

[a] Raw water.

JANESVILLE
(Population, 24, 899)

Ownership: Municipal; supplies also about 200 people outside the city limits. Total population supplied, about 25, 100.
Source: 2 drilled wells (1, 3). Well 1 furnishes 74 percent of supply; well 3, 25 percent of supply. Auxiliary supply, well 2 (1 percent of supply).
Treatment: None.
Storage: 9, 000, 000 gal.

ANALYSES

(Analyses, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Main pumping station	Pumping station No. 3		Main pumping station	Pumping station No. 3
Silica (SiO_2)	22	18	Hardness as $CaCO_3$:		
Iron (Fe)	.00	.00	Total	321	314
Manganese (Mn)	.00	.00	Noncarbonate	42	33
Calcium (Ca)	71	70			
Magnesium (Mg)	35	34	Color	2	2
Sodium (Na)	.0	2.2	pH	7.5	7.5
Potassium (K)	.0	.0	Specific conductance (micromhos at 25 C.)	--	--
Carbonate (CO_3)	0	0	Turbidity	--	--
Bicarbonate (HCO_3)	340	344	Temperature (F.)	--	--
Sulfate (SO_4)	18	20	Date of collection	May 27, 1952	May 27, 1952
Chloride (Cl)	4.5	4.0			
Fluoride (F)	.1	1.8			
Nitrate (NO_3)	3.8	3.6			
Dissolved solids	334	330			

KENOSHA
(Population, 54,368)

Ownership: Municipal; supplies also about 1,000 people outside the city limits. Total population supplied, about 55,400.
Source: Lake Michigan.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 14,000,000 gpd.
Raw-water storage: 1,500,000 gal.
Finished-water storage: 6,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.3	Hardness as $CaCO_3$:	
Iron (Fe)	.07	Total	132
Manganese (Mn)	.00	Noncarbonate	26
Calcium (Ca)	34		
Magnesium (Mg)	12	Color	2
Sodium (Na)	3.4	pH	7.7
Potassium (K)	1.0	Specific conductance (micromhos at 25 C.)	274
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	132	Temperature (F.)	--
Sulfate (SO_4)	23	Date of collection	Apr. 30, 1952
Chloride (Cl)	6.0		
Fluoride (F)	.0		
Nitrate (NO_3)	1.1		
Dissolved solids	158		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	118	122	117	8.0	8.2	7.9	128	132	127	80	300	5
Finished water	113	115	110	7.6	7.7	7.5	128	132	127	0	0	0

LA CROSSE
(Population, 47, 535)

Ownership: Municipal; supplies also about 100 people outside the city limits. Total population supplied, about 47, 600.
Source: Drilled wells in several groups: group 1 (16. 4 percent of supply); group 3 (14. 7 percent of supply); group 4 (9. 4 percent of supply); group 6 (2. 8 percent of supply); Hood St. well (10. 4 percent of supply); Sill St. well (2. 6 percent of supply); Myrick Park well 7 (15. 2 percent of supply); Myrick Park well 8 (7. 8 percent of supply); Myrick Park well 9 (19. 8 percent of supply); Losey Boulevard well 2 (0. 9 percent of supply). Auxiliary supply, well groups 2 and 5, and Losey Boulevard well 1.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 6, 000, 000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Wells Group 1 (finished water)	Wells Group 4 (finished water)	Hood Street well (finished water)
Silica (SiO_2)	19	19	--
Iron (Fe)	3. 8	. 18	. 07
Manganese (Mn)	--	--	. 00
Calcium (Ca)	61	74	66
Magnesium (Mg)	25	38	24
Sodium (Na)	2. 5	2. 9	14
Potassium (K)	2. 2	1. 4	2. 5
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	269	354	231
Sulfate (SO_4)	36	51	50
Chloride (Cl)	3. 0	4. 5	15
Fluoride (F)	. 1	. 1	. 1
Nitrate (NO_3)	. 2	. 9	49
Dissolved solids	290	362	358
Hardness as $CaCO_3$:			
Total	254	338	264
Noncarbonate	35	51	74
Color	8	3	0
pH	7. 3	7. 5	7. 8
Specific conductance (micromhos at 25 C.)	465	576	554
Turbidity	--	--	--
Temperature (F.)	--	--	--
Date of collection	Dec. 20, 1951	Dec. 20, 1951	Dec. 21, 1951
Depth (feet)	115-125	120-131	151
Diameter (inches)	10	10	12
Date drilled	1912	1912	1936
Percent of supply	16. 4	9. 4	10. 4

LA CROSSE--Continued

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey--Continued)

	Myrick Park well 7 (finished water)	Myrick Park well 8 (finished water)	Myrick Park well 9 (finished water)
Silica (SiO_2)	18	19	20
Iron (Fe)	.12	.02	.13
Manganese (Mn)	.02	.02	.00
Calcium (Ca)	65	61	60
Magnesium (Mg)	30	27	27
Sodium (Na)	5.8	3.5	3.1
Potassium (K)	1.7	2.5	1.6
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	273	251	273
Sulfate (SO_4)	48	43	37
Chloride (Cl)	8.8	6.8	3.0
Fluoride (F)	.1	.1	.1
Nitrate (NO_3)	23	17	8.9
Dissolved solids	330	303	292
Hardness as $CaCO_3$:			
Total	285	262	260
Noncarbonate	62	58	37
Color	3	2	1
pH	7.8	7.5	7.6
Specific conductance (micromhos at 25 C.)	525	479	476
Turbidity	--	--	--
Temperature (F.)	--	--	--
Date of collection	Dec. 21, 1951	Dec. 21, 1951	Dec. 20, 1951
Depth (feet)	137	150	155
Diameter (inches)	20	14	14
Date drilled	1948	1948	1948
Percent of supply	15.2	7.8	19.8

MADISON
(Population, 96, 056)

Ownership: Municipal; supplies also Maple Bluff, Monona, Shorewood Hills, and about 1, 975 people outside the city limits. Total population supplied, about 103, 500.
Source: 11 drilled wells (1 to 8, Dayton Street, East, and Main Station) 615 to 840 ft deep. The yield of the wells is reported to range from 960 to 2, 540 gpm, and to average 1, 552 gpm.
Treatment: Chlorination, and fluoridation.
Raw-water storage: None.
Finished-water storage: 12, 000, 000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Unit well 4 (raw water)	Unit well 1 (finished water)	Unit well 2 (finished water)	Unit well 5 (finished water)	Unit well 8 (finished water)
Silica (SiO_2)	20	--	13	16	15
Iron (Fe)	.53	--	.14	.14	.15
Manganese (Mn)	.00	--	.00	--	--
Calcium (Ca)	94	55	63	61	66
Magnesium (Mg)	52	33	42	44	43
Sodium (Na)	10	--	5.7	3.6	6.4
Potassium (K)	1.4	--	1.3	1.6	1.6
Carbonate (CO_3)	0	0	0	0	0
Bicarbonate (HCO_3)	422	335	374	401	372
Sulfate (SO_4)	88	4.0	30	9.7	23
Chloride (Cl)	20	1.4	7.5	2.5	10
Fluoride (F)	.0	--	1.0	.1	.6
Nitrate (NO_3)	14	--	.8	1.4	1.5
Dissolved solids	516	--	350	320	350
Hardness as $CaCO_3$:					
Total	450	272	331	332	340
Noncarbonate	103	0	23	4	37
Color	1	2	3	1	2
pH	7.6	7.6	7.2	7.4	7.4
Specific conductance (micromhos at 25 C.)	810	495	612	584	605
Turbidity	--	--	--	--	--
Temperature (F.)	--	--	--	--	--
Date of collection	Apr. 30, 1952	Apr. 30, 1952	Apr. 30, 1952	May 6, 1952	Apr. 30, 1952
Depth (feet)	737	840	615	828	774
Diameter (inches)	16	12	16	12	16
Date drilled	1930	1923	1924	1926	1945
Percent of supply	--	--	--	--	--

Regular determinations at treatment plant, 1951

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	--	--	--	--	--	--	--	--	--	--	--	--
Finished water	--	--	--	7.5	7.7	7.2	300	320	280	0	0	0

MANITOWOC
(Population, 27,598)

Ownership: Municipal; supplies also about 70 people outside the city limits. Total population supplied, about 27,700.
Source: Wells (Ranney Collectors), infiltration from Lake Michigan. Auxiliary supply, Lake Michigan.
Treatment: Chlorination.
Raw-water storage: None.
Finished-water storage: 4,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Ranney collector "A"	Ranney collector "B"		Ranney collector "A"	Ranney collector "B"
Silica (SiO_2)	6.2	--	Hardness as $CaCO_3$:		
Iron (Fe)	.06	--	Total	166	208
Manganese (Mn)	.00	--	Noncarbonate	33	45
Calcium (Ca)	41	--			
Magnesium (Mg)	16	--	Color	0	5
Sodium (Na)	5.6	--	pH	7.9	8.3
Potassium (K)	1.2	--	Specific conductance (micromhos at 25 C.)	330	402
Carbonate (CO_3)	0	4			
Bicarbonate (HCO_3)	165	187			
Sulfate (SO_4)	31	34	Turbidity	--	--
Chloride (Cl)	8.0	6.0	Temperature (F.)	--	--
Fluoride (F)	.1	--	Date of collection	Nov. 2, 1951	Nov. 2, 1951
Nitrate (NO_3)	1.0	--			
Dissolved solids	194	--			
Depth (feet)				66	86
Diameter (feet)				13	13
Date drilled				June, 1945	Mar., 1945
Percent of supply				--	--

MILWAUKEE
(Population, 637,392)

Ownership: Municipal; supplies also Fox Point, Shorewood, West Allis, West Milwaukee, Whitefish Bay, and about 84,700 people outside the city limits. Total population supplied, about 804,000.
Source: Lake Michigan. The intake is located about 5 miles north of Milwaukee Harbor.
Treatment: Prechlorination, coagulation with alum, activated carbon, ammoniation (ammonium sulfate), sedimentation, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 200,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 70,000,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Finished water	Finished water [a]		Finished water	Finished water [a]
Silica (SiO_2)	3.0	3.5	Hardness as $CaCO_3$:		
Iron (Fe)	.03	.01	Total	126	131
Manganese (Mn)	--	.0	Noncarbonate	19	28
Calcium (Ca)	32	34			
Magnesium (Mg)	11	11	Color	2	0
Sodium (Na)	4.5	5.3	pH	7.5	7.4
Potassium (K)	.9		Specific conductance (micromhos at 25 C.)	265	--
Carbonate (CO_3)	0	0	Turbidity	--	0
Bicarbonate (HCO_3)	130	126	Temperature (F.)	--	--
Sulfate (SO_4)	21	23	Date of collection	May 2, 1952	1950
Chloride (Cl)	6.8	5.8			
Fluoride (F)	.1	.1			
Nitrate (NO_3)	.6	.6			
Dissolved solids	145	152			

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	111	113	106	8.1	8.5	7.8	129	132	124	1.5	26	0.1
Finished water	104	106	98	7.5	7.8	7.1	128	130	125	0	0	0

[a] Analyses by Milwaukee Water Department of samples collected during the months March, May, and November, 1950.

OSHKOSH
(Population, 41,084)

Ownership: Municipal; supplies also about 160 people outside the city limits. Total population supplied, about 41,200.
Source: Lake Winnebago.
Treatment: Preammoniation, prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, granular carbon filtration, post-ammoniation, postchlorination, and fluoridation.
Rated capacity of treatment plant: 10,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 2,300,000 gal.

ANALYSIS

(Analysis, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Finished water		Finished water
Silica (SiO_2)	7.6	Hardness as $CaCO_3$:	
Iron (Fe)	.0	Total	186
Manganese (Mn)	.0	Noncarbonate	32
Calcium (Ca)	41		
Magnesium (Mg)	20	Color	10
Sodium (Na)	2.0	pH	7.2
Potassium (K)	.8	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	188	Temperature (F.)	--
Sulfate (SO_4)	33	Date of collection	Feb. 13, 1952
Chloride (Cl)	8.0		
Fluoride (F)	1.1		
Nitrate (NO_3)	.7		
Dissolved solids	226		

Regular determinations at treatment plant, 1951

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	160	192	145	8.0	8.2	7.9	176	192	155	--	--	--
Finished water	136	165	122	7.3	7.5	7.2	176	192	155	53	77	39

RACINE
(Population, 71,193)

Ownership: Municipal; supplies also about 2,500 people outside the city limits. Total population supplied, about 73,700.
Source: Lake Michigan.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, postchlorination, and fluoridation.
Rated capacity of treatment plant: 20,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 6,350,000 gal.

ANALYSIS

(Analysis, in parts per million, by U. S. Geological Survey)

	Finished water		Finished water
Silica (SiO_2)	3.4	Hardness as $CaCO_3$:	
Iron (Fe)	.14	Total	130
Manganese (Mn)	.00	Noncarbonate	24
Calcium (Ca)	35		
Magnesium (Mg)	10	Color	2
Sodium (Na)	3.4	pH	7.6
Potassium (K)	1.1	Specific conductance (micromhos at 25 C.)	267
Carbonate (CO_3)	0		
Bicarbonate (HCO_3)	127	Turbidity	--
Sulfate (SO_4)	20	Temperature (F.)	--
Chloride (Cl)	6.5	Date of collection	Apr. 30, 1952
Fluoride (F)	1.0		
Nitrate (NO_3)	1.2		
Dissolved solids	152		

SHEBOYGAN
(Population, 42,365)

Ownership: Municipal; supplies also Sheboygan Falls, and about 200 people outside the city limits. Total population supplied, about 46,300.
Source: Lake Michigan.
Treatment: Prechlorination, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, fluoridation, and postchlorination at times.
Rated capacity of treatment plant: 18,000,000 gpd.
Raw-water storage: None.
Finished-water storage: Clear well, 2,750,000 gal; elevated, 4,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Finished water		Finished water
Silica (SiO_2)	3.7	Hardness as $CaCO_3$:	
Iron (Fe)	.0	Total	132
Manganese (Mn)	.0	Noncarbonate	22
Calcium (Ca)	36		
Magnesium (Mg)	10	Color	1
Sodium (Na)	2.4	pH	7.8
Potassium (K)	1.2	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	134	Temperature (F.)	--
Sulfate (SO_4)	24	Date of collection	Feb. 11, 1952
Chloride (Cl)	8.5		
Fluoride (F)	1.1		
Nitrate (NO_3)	.4		
Dissolved solids	154		

Regular determinations at treatment plant, 1950

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	115	126	109	8.1	8.4	7.9	--	--	--	4.7	42	2
Finished water	109	119	102	7.6	7.9	7.4	--	135	125	0	0	0

SHOREWOOD
(Population, 16,199)

Ownership: Municipal.
Source: Supplied by Milwaukee. (See Milwaukee.)

STEVENS POINT
(Population, 16,564)

Ownership: Municipal; supplies also about 200 people outside the city limits. Total population supplied, about 16,800.
Source: 3 wells (1 to 3) 30, 52, and 52 ft deep, 1 mile east of the city limits. In 1950 well 1 supplied 79 percent of the supply; well 2, 10 percent; well 3, 11 percent.
Treatment: Chlorination (emergency only).
Raw-water storage: None.
Finished-water storage: 340,000 gal.

ANALYSES

(Analyses, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Well 1	Well 2	Well 3
Silica (SiO_2)	12	10	11
Iron (Fe)	.10	.10	.30
Manganese (Mn)	.12	.12	.56
Calcium (Ca)	23	32	32
Magnesium (Mg)	9.4	15	15
Sodium (Na)	2.0	2.0	.0
Potassium (K)	1.1	1.1	1.2
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	105	159	173
Sulfate (SO_4)	13	10	8.5
Chloride (Cl)	4.0	3.0	2.5
Fluoride (F)	.2	.2	.2
Nitrate (NO_3)	1.0	1.1	.1
Dissolved solids	122	[a]153	154
Hardness as $CaCO_3$:			
Total	96	142	142
Noncarbonate	10	12	0
Color	10	10	10
pH	7.4	7.6	7.5
Specific conductance (micromhos at 25 C.)	--	--	--
Turbidity	--	--	--
Temperature (F.)	--	--	--
Date of collection	Dec. 19, 1951	Dec. 19, 1951	Dec. 19, 1951
Depth (feet)	30	52	52
Diameter (inches)	360	20	24
Date drilled	1922	1930	1938
Percent of supply	--	--	--

[a] Sum of determined constituents.

SUPERIOR
(Population, 35,325)

Ownership: Superior Water, Light and Power Company; supplies also about 250 people outside the city limits. Total population supplied, about 35,600.
Source: Infiltration wells both vertical and horizontal (Lake Superior).
Treatment: Prechlorination, aeration, slow sand filtration, and postchlorination.
Rated capacity of treatment plant: 7,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 1,300,000 gal.

ANALYSIS

(Analysis, in parts per million, by Wisconsin State Laboratory of Hygiene)

	Finished water		Finished water
Silica (SiO_2)	4.0	Hardness as $CaCO_3$:	
Iron (Fe)	.7	Total	50
Manganese (Mn)	.0	Noncarbonate	2
Calcium (Ca)	16		
Magnesium (Mg)	2.6	Color	15
Sodium (Na)	1.2	pH	7.2
Potassium (K)	.0	Specific conductance (micromhos at 25 C.)	--
Carbonate (CO_3)	0	Turbidity	--
Bicarbonate (HCO_3)	59	Temperature (F.)	38
Sulfate (SO_4)	3.0	Date of collection	Mar. 19, 1952
Chloride (Cl)	4.5		
Fluoride (F)	.2		
Nitrate (NO_3)	.2		
Dissolved solids	68		

Regular determinations at treatment plant, 1951

	Alkalinity as $CaCO_3$ (ppm)			pH			Hardness as $CaCO_3$ (ppm)			Temperature (°F.)		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water	--	--	--	6.4	6.8	6.4	--	--	--	47	61	37
Finished water	--	--	--	6.8	7.1	6.7	--	--	--	--	--	--

WAUKESHA
(Population, 21,233)

Ownership: Municipal; supplies also about 300 people outside the city limits. Total population supplied, about 21,500.
Source: 4 drilled wells. North Street well 1,907 ft deep (14 percent of supply); Moreland Avenue well 1,918 ft deep (28 percent of supply); Baxter Street well 1,785 ft deep (28 percent of supply); Newhall Avenue well 1,995 ft deep (30 percent of supply).
Treatment: Aeration.
Raw-water storage: None.
Finished-water storage: 1,891,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well, North St. (finished water)	Well, Baxter St. (finished water)	Well, Newhall Ave. (finished water)
Silica (SiO_2)	8.7	8.5	8.8
Iron (Fe)	.37	.45	1.8
Manganese (Mn)	.05	.04	.03
Calcium (Ca)	30	53	88
Magnesium (Mg)	31	25	29
Sodium (Na)	12	8.2	8.4
Potassium (K)	4.0	3.2	3.4
Carbonate (CO_3)	0	0	0
Bicarbonate (HCO_3)	285	261	290
Sulfate (SO_4)	111	68	103
Chloride (Cl)	12	5.2	5.2
Fluoride (F)	.5	.5	.5
Nitrate (NO_3)	.8	.4	.3
Dissolved solids	[a] 440	[b] 336	[c] 506
Hardness as $CaCO_3$:			
Total	[d] 337	[d] 273	[d] 387
Noncarbonate	104	59	150
Color	3	1	2
pH	7.6	7.8	7.7
Specific conductance (micromhos at 25 C.)	658	539	728
Turbidity	--	--	--
Temperature (F.)	--	--	--
Date of collection	May 2, 1952	May 2, 1952	May 2, 1952
Depth (feet)	1,907	1,785	1,995
Diameter (inches)	12	12	12
Date drilled	1935	1928	1945
Percent of supply	--	--	--

[a] Includes 52 ppm of strontium (Sr).
[b] Includes 33 ppm of strontium (Sr).
[c] Includes 40 ppm of strontium (Sr).
[d] Includes $CaCO_3$ equivalent to strontium (Sr).

WAUSAU
(Population, 30,414)

Ownership: Municipal.
Source: 8 drilled wells (1 to 8) 96, 93, 96, 96, 78, 109, 100, and 97 ft deep; yield reported to be 1,750, 2,200, 800, 1,750, 500, 3,600, 3,180, and 1,500 gpm.
Treatment: Aeration, coagulation with alum and lime, sedimentation, chlorination, rapid sand filtration, and postchlorination.
Rated capacity of treatment plant: 5,000,000 gpd.
Raw-water storage: None.
Finished-water storage: 3,070,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well 3 (raw water)	Well 4 (raw water)	Well 5 (raw water)	Finished water
Silica (SiO_2)	--	--	24	25
Iron (Fe)	--	--	.14	.23
Manganese (Mn)	--	--	--	--
Calcium (Ca)	25	23	18	33
Magnesium (Mg)	9.2	12	7.3	11
Sodium (Na)	--	--	5.0	4.3
Potassium (K)	--	--	.9	.6
Carbonate (CO_3)	0	0	0	0
Bicarbonate (HCO_3)	97	104	34	126
Sulfate (SO_4)	16	9.7	20	17
Chloride (Cl)	9.0	8.5	12	10
Fluoride (F)	--	--	.0	.0
Nitrate (NO_3)	--	--	25	1.5
Dissolved solids	--	--	134	182
Hardness as $CaCO_3$:				
Total	101	105	74	129
Noncarbonate	21	22	47	24
Color	6	5	0	5
pH	7.2	7.5	7.3	8.0
Specific conductance (micromhos at 25 C.)	217	212	190	260
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection	Nov. 7, 1951	Nov. 7, 1951	Nov. 7, 1951	Nov. 11, 1951
Depth (feet)	96	96	78	--
Diameter (inches)	24	24	24	--
Date drilled	1940	1943	1945	--
Percent of supply	--	--	--	--

WAUWATOSA
(Population, 33,324)

Ownership: Municipal.
Source: 7 drilled wells (2 to 8) 1,600, 1,703, 1,804, 1,714, 1,660, 1,675, and 1,750 ft deep; yield reported to be 400, 900, 1,250, 1,000, 1,400, 1,400 and 1,450 gpm. Wells 2 and 6 furnish 26 percent of supply; well 3, 3 percent; well 4, 22 percent; well 5, 18 percent; well 7, 29 percent; well 8, 2 percent.
Treatment: Chlorination.
Raw-water storage: 4,450,000 gal.
Finished-water storage: 1,500,000 gal.

ANALYSES

(Analyses, in parts per million, by U. S. Geological Survey)

	Well 2 (finished water)	Well 6 (finished water)		Well 2 (finished water)	Well 6 (finished water)
Silica (SiO_2)	8.7	8.5	Hardness as $CaCO_3$:		
Iron (Fe)	1.8	.56	Total	530	495
Manganese (Mn)	.00	.03	Noncarbonate	360	323
Calcium (Ca)	161	150			
Magnesium (Mg)	31	29	Color	3	1
Sodium (Na)	14	12	pH	7.5	7.4
Potassium (K)	3.7	3.1	Specific conductance (micromhos at 25 C.)	954	903
Carbonate (CO_3)	0	0			
Bicarbonate (HCO_3)	206	208	Turbidity	--	--
Sulfate (SO_4)	367	334	Temperature (F.)	--	--
Chloride (Cl)	10	10	Date of collection	May 6, 1952	May 6, 1952
Fluoride (F)	.4	.3			
Nitrate (NO_3)	.1	.0			
Dissolved solids	742	699			

Depth (feet)	1,600	1,660
Diameter (inches)	8	12
Date drilled	1897	1930
Percent of supply	--	--

WEST ALLIS
(Population, 42,959)

Ownership: Municipal.
Source: Supplied by Milwaukee. (See Milwaukee.)

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