

GEOLOGICAL SURVEY CIRCULAR 283



THE INDUSTRIAL UTILITY OF
PUBLIC WATER SUPPLIES IN
THE MIDDLE ATLANTIC
STATES, 1952

UNITED STATES DEPARTMENT OF THE INTERIOR
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W. E. Wrather, Director

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THE MIDDLE ATLANTIC STATES, 1952

By E. W. Lohr, W. F. White, and N. H. Beamer

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ILLUSTRATION

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 2

THE INDUSTRIAL UTILITY OF PUBLIC WATER SUPPLIES IN THE MIDDLE ATLANTIC 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 than 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 eighth of the series and includes data for the States of New Jersey, New York, and Pennsylvania. (See fig. 1). The report gives the population (1950) of the city, the population supplied, ownership, sources, and treatment of supplies, storage facilities for both raw and finished waters and chemical analyses of the water for a total of 140 of the larger cities in the States of the Middle Atlantic group. 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 New Jersey were collected by J. J. Murphy, chemist, and others; in New York by W. A. Beetem, chemist, and others; in Pennsylvania by E. F. McCarren and N. H. Beamer, chemists, Philadelphia, Pa. Work on the project in the three-state area was under the general supervision of W. F. White, district chemist, Washington, D. C. Review and final compilation of all data were made by E. W. Lohr in the Washington office under the direction of S. K. Love, Chief, Quality of Water Branch.

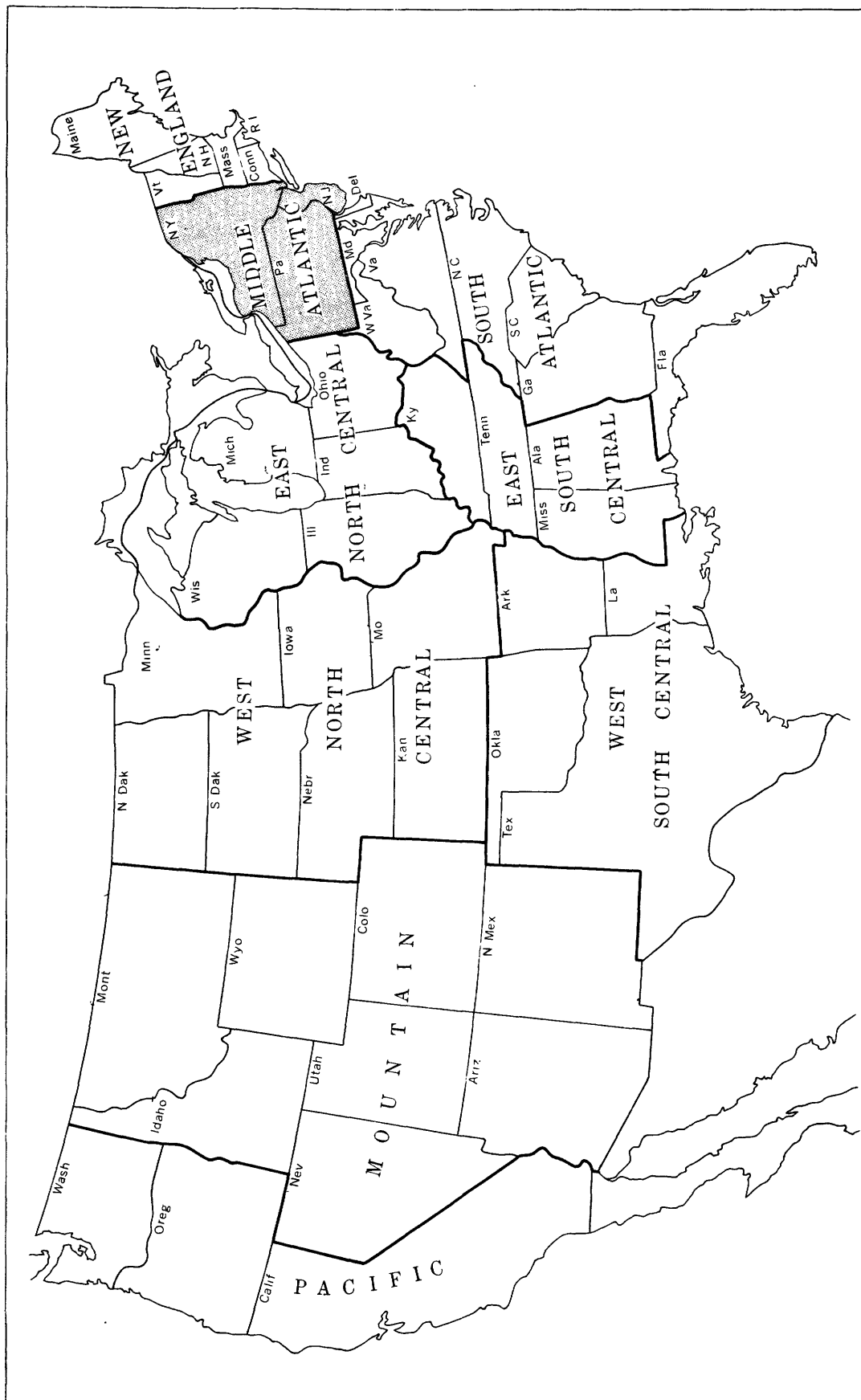


Figure 1. -Map of the United States showing sections covered by the nine circulars on the Industrial Utility of Public Water Supplies of the United States, 1952. The shaded portion represents the section of the country covered by this circular.

ATLANTIC CITY
(Population, 61,657)

Ownership: Municipal.

Source: 12 wells (1 to 4, 6 to 13) 675, 102, 213, 105, 91, 200, 97, 200, 199, 199, 200, and 95 ft deep, 54 percent of supply; 2 ponds (Absecon Creek impounded)

46 percent of supply. The wells are reported to yield from 695 to 1,390 gpm.

Treatment: Aeration, sedimentation, ammoniation, and chlorination.

Rated capacity of treatment plant: 40,000,000 gpd.

Raw-water storage: 7,000,000 gal.

Finished-water storage: 500,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	9.9	Hardness as CaCO ₃ :	
Iron (Fe) .....	.47	Total	10
Manganese (Mn) .....	.03	Noncarbonate	6
Calcium (Ca)	2.2	Color	25
Magnesium (Mg)	1.0	pH	5.9
Sodium (Na)	4.8	Specific conductance	
Potassium (K) .....	.9	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	52.0
Bicarbonate (HCO ₃)	4	Turbidity .....	.8
Sulfate (SO ₄)	7.5	Temperature (F.).....	54
Chloride (Cl)	8.2	Date of collection	Feb. 5,
Fluoride (F) .....	.2		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	41		

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.....	2.4	2.5	2.3	5.0	5.2	5.0	5.3	5.4	4.9	0	1	0
Finished water...	2.4	2.6	2.3	5.0	5.2	5.0	5.3	5.4	4.9	0	1	0

BAYONNE
(Population, 77,203)

Ownership: Municipal. Supplied by North Jersey District Water Supply Commission. (See Newark, Wanaque supply.)

NEW JERSEY

BELLEVILLE
(Population 32,019)

Ownership: Supplied by Newark, Pequannock supply. (See Newark.)

BERGENFIELD
(Population, 17,647)

Ownership: Private water utility supplied by Hackensack Water Company. (See Hackensack.)

BLOOMFIELD
(Population, 49,307)

Ownership: Municipal. Supplied by Newark, Pequannock supply, Cedar Grove Reservoir. (See Newark.)

BRIDGETON
(Population, 18,378)

Ownership: Municipal. Total population supplied, about 19,500.

Source: 10 wells (1 to 10) 75, 97, 110, 95, 87, 105, 84, 93, 104, and 103 ft deep; yield reported to be 260, 620, 400, 250, 370, 460, 500, 460, 500, and 450 gpm. Emergency supply, Sunset Lake.

Treatment: None.

Storage: 2,500,000 gal.

ANALYSIS

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

	Wells (city tap)		Wells (city tap)
Silica (SiO ₂)	8.9	Hardness as CaCO ₃ :	
Iron (Fe) .....	.07	Total	14
Manganese (Mn) .....	.02	Noncarbonate	10
Calcium (Ca)	3.9	Color	0
Magnesium (Mg)	1.0	pH	5.7
Sodium (Na)	4.5	Specific conductance	
Potassium (K)	1.5	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	74.0
Bicarbonate (HCO ₃)	5	Turbidity	2.3
Sulfate (SO ₄)	4.4	Temperature (F.).....	--
Chloride (Cl)	8.0	Date of collection	Mar. 23,
Fluoride (F) .....	.0		1953
Nitrate (NO ₃)	9.5		
Dissolved solids	53		

CAMDEN
(Population, 124,555)

Ownership: Municipal; supplies about 100,000 people; New Jersey Water Company supplies the 11th and 12th wards; Merchantville-Pensauken Water Commission supplies a small part.

Source: Municipal wells as follows: Camden, 12 wells (1 to 12) at different points in the city, 118 to 195 ft deep; Morris field, 9 wells 107 to 145 ft deep, located between Pennsylvania railroad tracks on the east, Pensauken Creek on the north, and Delaware River on the west; Delair field, 3 wells 129 to 144 ft deep just west of Delair station on Pennsylvania railroad; Puchack field, 5 wells 175 to 185 ft deep at School Lane and River Road, Delair. New Jersey Water Company, Stockton field, 6 wells.

Treatment: Morris station wells, aeration; other wells, none.

Raw-water storage: Morris station reservoir, 500,000 gal.

The city wells are equipped with high-duty turbine pumps that pump directly into the distribution mains. The Morris wells are equipped with individual low-duty turbine pumps which pump into a concrete reservoir, from which the water is pumped into the city by centrifugal pumps. The Delair wells pump directly into the mains. The Puchack wells are equipped with individual high-duty turbine pumps which force the water into a large main leading to the city. The New Jersey Water Company wells are tied into a common line for distribution into the 11th and 12th wards.

The water from the wells in the different well fields differs considerably in chemical composition. The Delair field and the Puchack field are relatively close together and furnish water similar in character. The analyses selected show the approximate range in dissolved solids and hardness of the water furnished by the wells in the different well fields.

NEW JERSEY

CAMDEN--Continued

ANALYSES

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

	Camden well 1	Camden well 2a	Camden well 6	Camden well 7	Morris /well 2
Silica (SiO ₂)	13	8.7	7.0	6.1	7.3
Iron (Fe)	1.2	.12	.75	.02	.37
Manganese (Mn) .....	.28	.60	.77	.03	.05
Calcium (Ca)	24	39	39	7.0	6.6
Magnesium (Mg)	9.4	17	35	4.7	3.6
Sodium (Na)	18	26	46	9.7	4.4
Potassium (K)	3.6	6.7	18	3.6	1.5
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	63	122	116	1	14
Sulfate (SO ₄)	37	71	137	41	13
Chloride (Cl)	36	29	48	13	6.0
Fluoride (F) .....	.2	.1	.1	.0	.1
Nitrate (NO ₃)	1.0	20	52	4.0	9.4
Dissolved solids	181	289	460	103	59
Hardness as CaCO ₃ :					
Total	99	168	241	37	31
Noncarbonate	47	68	146	36	20
Color	3	1	3	2	3
pH	6.0	6.9	6.0	4.6	5.6
Specific conductance (micromhos at 25 C.)	306	482	735	166	99.1
Turbidity	--	--	--	--	--
Temperature (F.)	--	--	--	--	--
Date of collection	Nov. 28, 1949	Dec. 22, 1949	Nov. 28, 1949	Feb. 16, 1951	Nov. 7, 1949

CAMDEN--Continued

ANALYSES

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

	Morris well 3	Morris well 6	Puchack well 1	Puchack well 4	Well 44 ^a
Silica (SiO ₂)	6.2	4.8	5.6	8.7	10
Iron (Fe)	5.5	.25	.17	.07	.02
Manganese (Mn)	2.7	.00	.01	.01	.30
Calcium (Ca)	13	15	12	4.0	12
Magnesium (Mg)	6.2	8.7	7.2	1.9	4.7
Sodium (Na)	4.4	6.8	11	3.9	59
Potassium (K)	1.8	2.1	2.6	1.2	2.7
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	54	62	13	4	2
Sulfate (SO ₄)	15	18	51	4.9	140
Chloride (Cl)	5.2	7.9	10	6.1	18
Fluoride (F) .....	.1	.1	.1	.0	.0
Nitrate (NO ₃)	4.6	6.6	6.9	13	11
Dissolved solids	86	99	116	49	290
Hardness as CaCO ₃ :					
Total	63	73	60	18	49
Noncarbonate	19	22	49	14	48
Color	4	4	3	2	4
pH	6.4	6.4	5.4	5.3	5.4
Specific conductance (micromhos at 25 C.)	158	182	199	69.8	444
Turbidity	--	--	--	--	--
Temperature (F.)	--	--	--	--	56
Date of collection	Nov. 7, 1949	Nov. 7, 1949	Nov. 7, 1949	Nov. 7, 1949	Feb. 16, 1951

^a New Jersey Water Company.CLIFTON
(Population, 64,511)

Ownership: The distribution system is owned by the city and the Passaic Valley Water Commission. Supplied by the Passaic Valley Water Commission, Wanaque supply. (See Passaic.)

EAST ORANGE
(Population, 79,340)

Ownership: East Orange Water Department.

Source: 12 wells: North, Middle, South Braidburn wells 123, 126, and 122 ft deep, and reported to yield 1,220, 1,050, and 800 gpm; North, Middle, South Canoe Brook wells 108, 111, and 121 ft deep, and reported to yield 1,400, 1,400, and 450 gpm; North, Middle, South Dickinson wells 133, 129, and 126 ft deep, and reported to yield 1,000, 1,000, and 500 gpm; North, Middle, South Slough Brook wells each 280 ft deep, and each reported to yield 225 gpm.

Treatment: Chlorination.

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

Raw-water storage: --

Finished-water storage: 10,000,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	23	Hardness as CaCO ₃ :	
Iron (Fe) .....	.00	Total	139
Manganese (Mn) .....	.00	Noncarbonate	37
Calcium (Ca)	36	Color	4
Magnesium (Mg)	12	pH	7.8
Sodium (Na)	10	Specific conductance	
Potassium (K) .....	.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	304
Bicarbonate (HCO ₃)	125	Turbidity	1.2
Sulfate (SO ₄)	40	Temperature (F.).....	--
Chloride (Cl)	6.4	Date of collection	Feb. 21,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃)	5.0		
Dissolved solids	194		

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...	52	--	--	7.7	--	--	52	--	--	0	--	--

ELIZABETH
(Population, 112,817)

Ownership: Elizabethtown Water Company; North Jersey District Water Supply Commission (see Newark, Wanaque supply). The Elizabethtown Water Company supplies about 1/3 of the population of Elizabeth, also Dunellen, Linden, Middlesex, and South Plainfield (part); and Clark, Hillside, and Union (90 per cent) townships. Total population supplied, about 148,000.

Source: Raritan River, Millstone River, Delaware Canal, and 141 wells in the following well fields: Conant Field, 5 wells 400 to 600 ft deep, total yield 1,500,000 gpd; Hummock Field, 46 wells 70 to 600 ft deep, total yield 3,500,000 gpd; Springfield Field, 50 wells 70 to 600 ft deep, total yield 3,500,000 gpd; Greenbrook Field, 20 wells 20 to 30 ft deep, total yield 775,000 gpd; and Piscataway Field, 20 wells 20 to 30 ft deep, total yield 2,000,000 gpd.

Treatment: Surface water: Aeration, coagulation with alum, lime, sedimentation, rapid sand filtration and chlorination. Well water: Chlorination.

Rated capacity of treatment plant: 25,000,000 gpd.

Raw-water storage: None.

Finished-water storage: Hancock reservoir, 1,000,000 gal; Springfield reservoir, 1,000,000 gal; clear well, 1,000,000 gal.

ANALYSES

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

	Raw water ^a	Finished water ^a	Finished water ^b	Well water (composite)
Silica (SiO ₂)	--	14	8.5	22
Iron (Fe).....	--	.03	.14	.06
Manganese (Mn)	--	.00	.00	.00
Calcium (Ca)	--	19	15	85
Magnesium (Mg)	--	6.1	3.1	9.5
Sodium (Na).....	4.4	6.4	3.3	12
Potassium (K)		1.6	.8	.9
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	32	29	38	216
Sulfate (SO ₄)	30	42	18	71
Chloride (Cl).....	5	10	4.8	15
Fluoride (F)	--	.0	.1	.0
Nitrate (NO ₃)	5.1	5.4	1.5	10
Dissolved solids	--	117	80	338
Hardness as CaCO ₃ :				
Total	59	72	50	251
Noncarbonate	33	49	19	74
Color.....	12	5	5	5
pH.....	7.0	7.3	7.6	8.1
Specific conductance (micromhos at 25 C.)	156	188	125	511
Turbidity	--	2.1	4.0	2.1
Temperature (F.)	--	--	--	--
Date of collection	Feb. 1, 1952	Feb. 1, 1952	Feb. 1, 1952	Feb. 1, 1952

^a Surface supplies, composite (60 percent Raritan and Millstone rivers, 40 percent Delaware Canal).

^b Mixed surface supplies, City Hall tap.

ENGLEWOOD
(Population, 23,145)

Ownership: Supplied by the Hackensack Water Company. (See Hackensack.)

FAIR LAWN
(Population, 23,885)

Ownership: Municipal.

Source: 13 wells (1 to 12, 14) 300 to 500 ft deep. The yield of the wells is reported to range from 100 to 400 gpm.

Treatment: Chlorination.

Raw-water storage: Collecting basin, 200,000 gal.

Finished-water storage: 1,300,000 gal.

Wells (1 to 7) are located in one field (Cadmus Place) and pump into a collecting basin; well 8 is on Willow Street; well 9, on George Street; and wells 10, 11, 12, and 14, are in one field (Westmoreland). Wells 8, 9, and those in Westmoreland field pump directly into the distribution system being automatically chlorinated.

Cadmus Place wells furnish about 40 percent of the supply; Westmoreland wells, about 30 percent; and the other two, about 15 percent each.

ANALYSIS

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

	Finished water ^a		Finished water ^a
Silica (SiO ₂)	18	Hardness as CaCO ₃ :	
Iron (Fe) .....	.30	Total	195
Manganese (Mn) .....	.00	Noncarbonate	98
Calcium (Ca)	50		
Magnesium (Mg)	17	Color	4
Sodium (Na)	10	pH	7.3
Potassium (K)	1.0	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	118	25 C.).....	428
Sulfate (SO ₄)	81	Turbidity .....	.6
Chloride (Cl)	11	Temperature (F.).....	53
Fluoride (F) .....	.0	Date of collection	Feb. 6,
Nitrate (NO ₃)	26		1952
Dissolved solids	282		

^a Compositated according to percentage furnished from each source.

GARFIELD
(Population, 27, 550)

Ownership: Municipal; also supplies East Paterson and Saddle River township.

Total population supplied, about 54,000.

Source: 5 wells. Auxiliary or emergency supply, tie-in with the Passaic Valley Water Commission.

Treatment: Chlorination. Copper sulfate is used in the receiving basin for control of algae.

Raw-water storage: Receiving basin, 500,000 gal.

Finished-water storage: 3 standpipes, 814,000 gal.

ANALYSES

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

	Well 4 (raw water)	Finished water ^a		Well 4 (raw water)	Finished water ^a
Silica (SiO ₂)	23	20	Hardness as CaCO ₃ :		
Iron (Fe)	--	.88	Total	272	206
Manganese (Mn)	--	.02	Noncarbonate.....	77	69
Calcium (Ca)	--	58			
Magnesium (Mg).....	--	15	Color	4	10
Sodium (Na)	15	12	pH	7.4	7.5
Potassium (K)		1.5	Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	238	168	25 C.).....	558	434
Sulfate (SO ₄)	74	62	Turbidity	--	.6
Chloride (Cl)	16	12	Temperature (F.)...	--	--
Fluoride (F)	--	.0	Date of collection...	Jan. 29, 1952	Jan. 29, 1952
Nitrate (NO ₃)	12	11			
Dissolved solids.....	--	277			

^a Wells, composite sample.

HACKENSACK
(Population, 29,219)

Ownership: Hackensack Water Company. Also supplies Bergenfield, Cliffside Park, Dumont, Englewood, Fort Lee, Lyndhurst township (part), North Bergen township, Ridgefield Park township, Rutherford, Teaneck township (part), Union City, Weehawken township, West New York, and numerous boroughs, towns, and townships in whole or in part. Total population supplied, about 500,000.

Source: Hackensack River and tributaries impounded in Oradell Lake and Woodcliff Lake.

Treatment: Prechlorination, ammoniation, coagulation with alum, addition of activated carbon, sedimentation, rapid sand filtration, adjustment of pH, ammoniation, and postchlorination.

Rated capacity of treatment plant: (At New Milford) 72,000,000 gpd.

Raw-water storage: Oradell Lake, 2,850,000,000 gal; Woodcliff Lake, 889,000,000 gal.

Finished-water storage: Weehawken reservoirs 1 and 2, 16,000,000 and 69,200,000 gal, respectively; Fairview reservoir, 18,900,000 gal; Western reservoir (Woodcliff), 5,000,000 gal; Carlstadt tank, 1,300,000 gal; clear wells and suction wells (New Milford Plant-Oradell), 2,100,000 gal.

ANALYSES

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

	Raw water	Finished water	Finished water ^a
Silica (SiO ₂)	9.0	8.3	5.9
Iron (Fe)	--	.00	.03
Manganese (Mn)	--	.04	.04
Calcium (Ca)	--	21	31
Magnesium (Mg)	--	4.0	5.9
Sodium (Na)	10	12	10
Potassium (K)		1.3	
Carbonate (CO ₃)		0	--
Bicarbonate (HCO ₃)	38	38	64
Sulfate (SO ₄)	28	36	43
Chloride (Cl)	16	17	26
Fluoride (F)	--	.0	--
Nitrate (NO ₃)	3.6	2.3	.8
Dissolved solids	--	125	176
Hardness as CaCO ₃ :			
Total	64	69	102
Noncarbonate	33	38	48
Color	11	8	9
pH	6.9	7.5	7.2
Specific conductance (micromhos at 25 C.)	193	212	--
Turbidity	--	.9	0
Temperature (F.)	--	--	56
Date of collection	Jan. 28, 1952	Jan. 28, 1952	1951

^a Average of monthly analyses for year 1951. Analyses by the Hackensack Water Company.

HOBOKEN
(Population, 50,676)

Ownership: Municipal. Supplied by Jersey City. (See Jersey City.)

IRVINGTON
(Population, 59,201)

Ownership: Supplied by the Commonwealth Water Company. (See Summit.)

JERSEY CITY
(Population, 299,017)

Ownership: Municipal; also supplies Hoboken, part of Lyndhurst township, and North Arlington. Total population supplied, about 391,000.

Source: Rockaway River impounded in Boonton Reservoir. The supply system is interconnected with 7 other major water supply systems in metropolitan area of New Jersey.

Treatment: Plain sedimentation (in storage reservoir) and chlorination.

Rated capacity of treatment plant: 100,000,000 gpd.

Raw-water storage: Boonton Reservoir, 7,500,000,000 gal.

Finished-water storage: 2 distribution system reservoirs, 100,000,000 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)	9.8	7.4	Hardness as CaCO₃:		
Iron (Fe) .....	.18	.50	Total	36	49
Manganese (Mn) .....	.00	.00	Noncarbonate.....	19	14
Calcium (Ca)	9.0	11	Color	10	15
Magnesium (Mg).....	3.3	5.2			
Sodium (Na)	3.1	6.3			
Potassium (K) .....	.8				
Carbonate (CO ₃)	0	0			
Bicarbonate (HCO ₃)	21	42	pH	7.3	7.7
Sulfate (SO ₄)	17	16	Specific conductance		
Chloride (Cl)	6.5	7.7	(micromhos at		
Fluoride (F) .....	.1	--	25 C.)	98.0	--
Nitrate (NO ₃)	1.0	.8	Turbidity	2.0	3
Dissolved solids.....	65	92	Temperature (F.)...	--	--
			Date of collection...	Jan. 30, 1952	Sept. 19, 1951

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.....	26	39	15	7.1	7.6	6.7	44	64	30	4	20	3
Finished water...	24	35	15	6.8	7.2	6.5	44	62	30	4	10	3

^a Analysis by Jersey City Water Department.

NEW JERSEY

KEARNEY
(Population, 39,952)

Ownership: Supplied by North Jersey District Water Supply Commission. (See Newark, Wanaque supply.)

LINDEN
(Population, 30,644)

Ownership: Supplied by Elizabethtown Water Company. (See Elizabeth.)

ANALYSIS

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

	Finished water ^a		Finished water ^a
Silica (SiO ₂)	--	Hardness as CaCO ₃ :	
Iron (Fe) .....	.12	Total	66
Manganese (Mn)	--	Noncarbonate	44
Calcium (Ca)	--		
Magnesium (Mg)	--	Color	5
Sodium (Na)	5.8	pH	7.1
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	27	25 C.).....	178
Sulfate (SO ₄)	41	Turbidity	--
Chloride (Cl)	7	Temperature (F.).....	--
Fluoride (F)	--	Date of collection	Feb. 1,
Nitrate (NO ₃)	5.0		1952
Dissolved solids	--		

^a City tap, Linden.

LONG BRANCH
(Population, 23,090)

Ownership: Monmouth Consolidated Water Company; also supplies Asbury Park (part), Bradley Beach, Fair Haven, Middletown township (part), Neptune township, Oceanport, Ocean township, Rumson, Shrewsbury township, and a number of other boroughs. Total population supplied, about 111,000; in summer about 229,000.

Source: Swimming River impounded, Whalepond Brook impounded, Jumping Brook and Shark River (97 percent of supply); 2 wells (1 and 2) Whitesville Station, 662 and 985 ft deep, 5 wells (10, 12, 15, 16, 20) Ocean Grove Station, 450 to 605 ft deep, and 1 well (3) Jumping Brook Station, 1,065 ft deep (3 percent of supply).

Treatment: Prechlorination, coagulation with alum, lime, sedimentation, rapid sand filtration, and postchlorination.

Rated capacity of treatment plant: 20,000,000 gpd.

Raw-water storage: 175,000,000 gal.

Finished-water storage: 2,090,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	9.4	10	Hardness as CaCO ₃ :		
Iron (Fe)	--	.02	Total	52	59
Manganese (Mn)	--	.00	Noncarbonate.....	31	40
Calcium (Ca)	17	20	Color.....	20	4
Magnesium (Mg).....	2.3	2.3	pH.....	7.4	7.2
Sodium (Na)	4.9	4.8	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	141	163
Bicarbonate (HCO ₃)	25	24	Turbidity	22	.7
Sulfate (SO ₄)	23	31	Temperature (F.)...	36	--
Chloride (Cl)	10	11	Date of collection...	Feb. 18,	Feb. 18,
Fluoride (F) .....	.0	.0		1952	1952
Nitrate (NO ₃)	4.8	4.6			
Dissolved solids.....	84	102			

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.....	34	97	20	6.8	7.1	6.5	65	70	55	47	190	48
Finished water...	36	46	22	7.8	8.2	7.6	70	80	54	1	5	0

LYNDHURST township
(Population, 19,980)

Ownership: Distribution system, Lyndhurst township. Supplied by Jersey City and Hackensack Water Company. (See Jersey City and Hackensack.)

MAPLEWOOD township
(Population, 25,201)

Ownership: Commonwealth Water Company. (See Summit, Canoe Brook and Short Hills Stations.)

MONTCLAIR
(Population, 43,927)

Ownership: Municipal. Supplied by North Jersey District Water Supply Commission. (See Newark, Wanaque supply.)
Finished-water storage: 4,000,000 gal.

NEWARK

(Population, 438,776)

Ownership: (Distribution system owned by the city) Municipal (Pequannock supply); also supplies Belleville, Bloomfield, Nutley, and Wayne township. Total population supplied, about 400,000. North Jersey District Water Supply Commission (Wanaque supply): Participants are allotted daily quantities of water as follows: Bloomfield, 4,000,000 gal; Clifton, 6,750,000 gal; Glen Ridge, 750,000 gal; Kearney, 12,000,000 gal; Montclair, 5,000,000 gal; Newark, 40,500,000 gal; Paterson, 20,000,000 gal; Passaic, 11,000,000 gal; Total population supplied, about 640,000.

Source: Municipal: Pequannock River and tributaries impounded in four main reservoirs, Oak Ridge, Clinton, Canistear, and Echo Lake, the flow from which in natural stream beds is controlled through the Macopin Intake Reservoir. North Jersey District Water Supply Commission: Wanaque River impounded, northeast of and adjoining the Pequannock watershed.

Treatment: Pequannock supply: Ammoniation, chlorination at intake into aqueducts at Macopin, aeration and sedimentation in Cedar Grove Reservoir, and rechlorination at distribution outlet of this reservoir. Copper sulfate or chlorine is used to control algae in the reservoirs. Wanaque supply: Ammoniation and chlorination as water leaves Wanaque Reservoir, and addition of lime for pH control. Copper sulfate is used in reservoir when necessary for control of algae.

Raw-water storage: Pequannock supply: Oak Ridge Reservoir, 3,895,000,000 gal; Clinton Reservoir, 3,518,000,000 gal; Canistear Reservoir, 2,407,000,000 gal; Echo Lake Reservoir, 1,678,000,000 gal; and Macopin Intake Reservoir, 32,000,000 gal. Total, 11,530,000,000 gal. Wanaque supply: Wanaque Reservoir, 27,600,000,000 gal.

Finished-water storage: Pequannock supply: Cedar Grove Reservoir, (main distribution reservoir), on mountain above Montclair, 679,000,000 gal; South Orange Avenue Reservoir (equalizing reservoir), 9,000,000 gal; Belleville Reservoir (equalizing reservoir), which also may receive Wanaque water, 14,000,000 gal; Wanaque supply: Balancing reservoir (in Clifton), 15,000,000 gal.

Pequannock water, which is delivered from Cedar Grove Reservoir, can be supplied to all section of Newark. However it is used principally in the higher sections of the city; Wanaque Aqueduct conveys water from Wanaque Reservoir to Belleville Reservoir from which point the supply is connected with the Newark distribution system. The Wanaque supply is also interconnected with the Pequannock supply at several points. Wanaque water is distributed to the lower lying sections of Newark.

NEWARK--Continued

ANALYSES

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

	Pequannock Supply		Wanaque Supply		Mixed Supply
	Finished water a	Finished water b	Finished water c	Finished water d	Finished water
Silica (SiO ₂)	6.7	2.6	3.5	4.5	5.2
Iron (Fe) .....	.07	.30	.09	.34	.27
Manganese (Mn)	--	.00	.04	.00	.00
Calcium (Ca)	9.0	6.6	8.7	7.4	7.6
Magnesium (Mg)	2.9	2.1	2.2	1.6	1.7
Sodium (Na)	1.0	1.4	4.5	2.0	1.6
Potassium (K) .....		.4		.7	.4
Carbonate (CO ₃)	--	0	--	0	0
Bicarbonate (HCO ₃)	16	14	18	14	13
Sulfate (SO ₄)	12	10	13	12	12
Chloride (Cl)	6.0	4.1	8.3	4.2	4.5
Fluoride (F)	--	.1	--	.1	.1
Nitrate (NO ₃)	1.2	.6	.2	.3	.4
Dissolved solids	55	39	57	43	44
Hardness as CaCO ₃ :					
Total	35	25	31	25	26
Noncarbonate	21	14	16	14	15
Color	19	15	18	8	5
pH	6.9	6.8	7.7	8.0	7.2
Specific conductance (micromhos at 25 C.)	--	64.9	--	70.6	65.9
Turbidity	2.8	1.6	2	5.1	.6
Temperature (F.)	--	--	50	--	--
Date of collection	1951	Jan. 28, 1952	1951	Jan. 28, 1952	Jan. 30, 1952

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
Finished water e.	13	17	9.6	6.9	7.0	6.8	35	38	31	19	25	15
Finished water f.	15	20	11	7.7	8.2	7.2	31	38	28	2	3	1

^a Average of analyses of monthly composites of daily samples. Analyses by Newark Water Department.

^b City tap, Bloomfield, N. J.

^c Average of analyses of monthly composites of daily samples. Analyses by Passaic Valley Water Commission, at Little Falls treatment plant.

^d City tap, Bayonne, N. J.

^e Pequannock supply.

^f Wanaque supply.

NEW BRUNSWICK
(Population, 38,811)

Ownership: Municipal; also supplies Franklin (part), Highland Park, Milltown, and North Brunswick township. Total population supplied, about 59,000.

Source: Lawrence Brook impounded.

Treatment: Coagulation with alum, activated carbon, lime, sedimentation, rapid sand filtration, ammoniation, and chlorination.

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

Raw-water storage: 800,000,000 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)	7.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.29	Total	44
Manganese (Mn) .....	.00	Noncarbonate	29
Calcium (Ca)	12		
Magnesium (Mg)	3.4	Color	10
Sodium (Na)	4.8	pH	9.0
Potassium (K)	1.8	Specific conductance	
Carbonate (CO ₃)	3	(micromhos at	
Bicarbonate (HCO ₃)	12	25 C.).....	131
Sulfate (SO ₄)	26	Turbidity	11
Chloride (Cl)	7.5	Temperature (F.).....	--
Fluoride (F) .....	.4	Date of collection	Jan. 28,
Nitrate (NO ₃)	3.2		1952
Dissolved solids	84		

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	12	7	5.7	6.4	5.0	30	35	25	65	90	40
Finished water...	16	24	9	7.9	8.4	7.5	51	53	48	6	10	3

NORTH BERGEN township
(Population, 41,560)

Ownership: Supplied by Hackensack Water Company. (See Hackensack.)

NUTLEY
(Population, 26,992)

Ownership: Municipal. Purchases water wholesale from the Passaic Valley Water Commission. (See Passaic.)

ORANGE
(Population, 38,037)

Ownership: Municipal.

Source: 4 wells (1 to 4) 42, 132, 76, and 100 ft deep, 63 percent of supply; West Branch of Rahway River, 37 percent of supply. The yield of the wells is reported to be 740, 1,400, 1,400, and 1,395 gpm. Auxiliary or emergency supply, interconnection with the supply systems of East Orange and the Commonwealth Water Company.

Treatment: Coagulation with alum, filtration, and chlorination.

Rated capacity of treatment plant: 4,000,000 gpd.

Raw-water storage: 275,000,000 gal.

Finished-water storage: 6,000,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	18	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	84
Manganese (Mn) .....	.00	Noncarbonate	38
Calcium (Ca)	22		
Magnesium (Mg)	7.0	Color	0
Sodium (Na)	7.2	pH	7.6
Potassium (K) .....	.7	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	56	25 C.).....	199
Sulfate (SO ₄)	34	Turbidity .....	.4
Chloride (Cl)	10	Temperature (F.).....	--
Fluoride (F) .....	.1	Date of collection	January,
Nitrate (NO ₃)	1.8		1952
Dissolved solids	129		

PASSAIC
(Population, 57,702)

Ownership: Passaic Valley Water Commission. The Water Commission owns and operates the distribution systems in Passaic, Paterson, part of Clifton and Prospect Park; it sells water wholesale to the Clifton Water Department, East Paterson, Garfield, Haledon, Harrison, Little Falls, Nutley, Totowa, West Paterson, and Hackensack Water Company. Total population supplied, about 360,000.

Source: Passaic River; Wanaque Reservoir. (About 50 percent from each source was used for the supply of Passaic in 1951.)

Treatment: Passaic River supply: Prechlorination, coagulation with alum, activated carbon when necessary, sedimentation, rapid sand filtration, postchlorination, and adjustment of pH with lime. Wanaque Reservoir supply: Ammoniation, chlorination, and addition of lime at outlet of Wanaque Reservoir, rechlorination, and pressure filtration at Little Falls plant of the Passaic Valley Water Commission.

Rated capacity of treatment plants: Little Falls: gravity, 55,000,000 gpd; pressure, 40,000,000 gpd.

Raw-water storage: --

Finished-water storage: 3 reservoirs: Great Notch, 178,500,000 gal; New Street, 63,900,000 gal; Grand Street, 20,460,000 gal. 2 clear wells, 3,250,000 gal.

The Passaic Valley Water Commission has water rights to 75 mgd from the Passaic River and 37.75 mgd from the Wanaque Reservoir. Mixed finished water supplied to the various places consists of about 10 percent more Wanaque Reservoir water than Passaic River water. The low pressure system is supplied with water from the Passaic River.

PASSAIC--Continued

ANALYSES

(Analyses, in parts per million, by Passaic Valley Water Commission, Clifton)

	Passaic River		Wanaque Supply		Mixed Supply
	Raw water a	Finished water a	Raw water a	Finished water a	Finished water a b
Silica (SiO ₂)	11	7.3	3.5	3.3	4.7
Iron (Fe) .....	.58	.04	.09	.05	.05
Manganese (Mn) .....	.06	.02	.04	.02	.02
Calcium (Ca)	14	20	8.7	8.8	13
Magnesium (Mg)	4.5	4.5	2.2	2.2	3.0
Sodium (Na)	8.6	9.0	4.5	5.1	6.6
Potassium (K)					
Carbonate (CO ₃)	--	--	--	--	--
Bicarbonate (HCO ₃)	41	42	18	19	28
Sulfate (SO ₄)	25	33	13	14	21
Chloride (Cl)	8.9	14	8.3	8.7	10
Fluoride (F)	--	--	--	--	--
Nitrate (NO ₃)	1.6	1.6	.2	.2	.7
Dissolved solids	112	130	57	56	86
Hardness as CaCO ₃ :					
Total	55	69	31	31	45
Noncarbonate	22	35	16	16	22
Color	48	4	18	9	7
pH	7.0	7.1	7.7	7.6	7.3
Specific conductance (micromhos at 25 C.)	--	--	--	--	--
Turbidity	8	0	2	.4	.4
Temperature (F.)	54	54	50	50	52
Date of collection	1951	1951	1951	1951	1951

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 c	34	53	19	7.0	7.4	6.8	55	70	37	8	11	4
Finished water c	34	50	22	7.1	7.4	7.1	70	90	49	0	0	0
Raw water d	15	20	11	7.7	8.2	7.2	31	38	28	2	3	1
Finished water d	15	21	12	7.6	8.1	7.2	31	37	28	.4	1	0

^a Average of analyses of monthly composites of daily samples.^b Approximately equal parts of each supply.^c Passaic River supply.^d Wanaque Reservoir supply.

PATERSON
(Population, 139,336)

Ownership: Supplied by Passaic Valley Water Commision. (See Passaic.)

PENNSAUKEN township
(Population, 22,767)

Ownership: Merchantville-Pennsauken Water Commission. Supplies Merchantville, a large part of the townships of Pennsauken and Delaware, and a small part of Camden. Total population supplied, about 35,000.

Source: Park Avenue Well Field: 5 wells (1, 5, 6, 7, 12) 285, 288, 260, 185, 256, ft deep; yield reported to be 1,005, 1,000, 500, 600, and 1,000 gpm.

Emergency connection, Delaware Gardens well and pumping station.

Treatment: Aeration, sedimentation, and pressure filtration.

Rated capacity of treatment plant: 2,500,000 gpd.

Raw-water storage: 85,000 gal; facilities under construction, 500,000 gal.

Finished-water storage: 1,200,000 gal.

ANALYSES

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

	Well 7 (raw water)	Wells (finished water)		Well 7 (raw water)	Wells (finished water)
Silica (SiO₂)	9.6	13	Hardness as CaCO₃:		
Iron (Fe) .....	.17	.02	Total	21	24
Manganese (Mn) .....	.02	.00	Noncarbonate	16	15
Calcium (Ca)	4.5	6.2	Color	2	5
Magnesium (Mg)	2.3	2.2	pH	5.7	7.0
Sodium (Na)	4.7	3.3	Specific conductance		
Potassium (K)	1.8	1.8	(micromhos at		
Carbonate (CO₃)	0	0	25 C.)	78.2	80.7
Bicarbonate (HCO₃)	6	12	Turbidity	--	1.0
Sulfate (SO₄)	13	15	Temperature (F.) ...	55	--
Chloride (Cl)	6.9	5	Date of collection ...	Nov. 28, 1949	Mar. 20, 1952
Fluoride (F) .....	.1	.0			
Nitrate (NO₃)	4.6	2.7			
Dissolved solids	50	57			

PERTH AMBOY
(Population, 41,330)

Ownership: Municipal; also supplies Sayreville, Spotswood, and part of the townships of East Brunswick, Raritan, and Woodbridge. Total population supplied, about 66,300.

Source: 3 Layne wells (1 to 3) 291, 265, and 68 ft deep; 58 suction wells, ranging in depth from 40 to 94 ft. The yield of the Layne wells is reported to be 1,500, 1,529, and 800 gpm, respectively.

Treatment: Addition of lime for iron removal and adjustment of pH, sedimentation, and pressure filtration.

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

Raw-water storage: None.

Finished-water storage: 40,000,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	4.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.28	Total	65
Manganese (Mn) .....	.01	Noncarbonate	31
Calcium (Ca)	21		
Magnesium (Mg)	3.1	Color	5
Sodium (Na)	3.3	pH	8.0
Potassium (K)	1.1	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	42	25 C.).....	156
Sulfate (SO ₄)	28	Turbidity .....	.9
Chloride (Cl)	6.5	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	Mar. 12,
Nitrate (NO ₃) .....	.3		1952
Dissolved solids	93		

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.....	--	--	--	--	--	--	--	--	--	--	--	--
Finished water...	40	44	30	7.6	8.0	7.0	40	50	28	54	56	52

PHILLIPSBURG
(Population, 18,919)

Ownership: The Peoples Water Company; also supplies about 1,000 people outside the city limits. Total population supplied, about 20,000.

Source: Infiltration chamber 8 ft high, 8 ft wide and 225 ft long, about 30 ft below ground. The yield is reported to be 10,000,000 gpd. Auxiliary or emergency supply, Delaware River.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 8,000,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	9.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.06	Total	117
Manganese (Mn) .....	.00	Noncarbonate	28
Calcium (Ca)	27	Color	3
Magnesium (Mg)	12	pH	8.1
Sodium (Na)	3.0	Specific conductance	
Potassium (K)	1.0	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	234
Bicarbonate (HCO ₃)	108	Turbidity .....	.9
Sulfate (SO ₄)	22	Temperature (F.).....	--
Chloride (Cl)	5.7	Date of collection	Mar. 12,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃)	4.3		
Dissolved solids	140		

PLAINFIELD
(Population, 42,366)

Ownership: Plainfield-Union Water Company; also supplies Fanwood, Garwood, Kenilworth, Linden (small part), Mountainside, North Plainfield, Roselle, Roselle Park, South Plainfield, Watchung (part), and Westfield; and the townships of Clark, Cranford, Scotch Plains, Union (part), Winfield, and other consumers. Total population supplied, about 160,000.

Source: 39 wells (32 in use, 5 in reserve, 2 applications filed for use) in several well fields and individual wells: Netherwood Field, Plainfield, 19 wells 78 to 500 ft deep, average yield of 255 gpm; Jerusalem Rd. Field, Scotch Plains, 3 wells (1 to 3) 650, 665, and 708 ft deep, average yield 283 gpm; Greenbrook Field, Greenbrook township, 8 wells (1 to 8) 44 to 550 ft deep, average yield 431 gpm; Clinton Avenue Field, South Plainfield, 3 wells (1 to 3) 300, 300, and 400 ft deep, average yield 317 gpm; Kenilworth, 3 wells (Newark Ave., Richfield Ave., and Quinton Ave.) 275, 401, and 550 ft deep, average yield 228 gpm; Westfield well 523 ft deep, yield 500 gpm; Mountainside, Charles St. well 454 ft deep, yield 500 gpm. Emergency connections with Elizabethtown Water Company.

Treatment: Chlorination.

Finished-water storage: 12,000,000 gal.

PLAINFIELD--Continued

ANALYSES

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

	Wells ^a	Wells ^b	Wells ^c	Well ^d	Wells Netherwood Station
Silica (SiO ₂)	--	--	--	--	21
Iron (Fe)	0	.10	.10	.10	.00
Manganese (Mn)	--	--	--	--	.00
Calcium (Ca)	--	--	--	--	74
Magnesium (Mg)	--	--	--	--	8.9
Sodium (Na)	--	--	--	--	12
Potassium (K)	--	--	--	--	.7
Carbonate (CO ₃)	--	--	--	--	0
Bicarbonate (HCO ₃)	106	110	122	222	198
Sulfate (SO ₄)	--	--	--	--	58
Chloride (Cl)	16	18	10	11	10
Fluoride (F) .....	.3	.2	--	.0	.0
Nitrate (NO ₃) .....	.8	2.0	2.0	4.0	16
Dissolved solids	1,080	579	205	409	304
Hardness as CaCO ₃ :					
Total	650	250	164	240	221
Noncarbonate	563	489	54	58	59
Color	--	--	--	--	0
pH	7.8	7.5	7.6	7.6	8.1
Specific conductance (micromhos at 25 C.)	--	--	--	--	465
Turbidity	--	--	--	--	.2
Temperature (F.)	--	--	--	--	--
Date of collection	--	--	--	--	Jan. 31, 1952
Depth (feet)	650-708	44-550	275-550	78	78-500
Diameter (inches)	12	12	8-12	28-16	10-12
Date drilled	1948- 1950	1945- 1950	1906, 1943-44	1946	1910- 1948

^a Jerusalem Rd. Station; analysis furnished by Plainfield-Union Water Company, Westfield, N. J.

^b Greenbrook Station; analysis furnished by Plainfield-Union Water Company, Westfield, N. J.

^c Kenilworth Station; analysis furnished by Plainfield-Union Water Company, Westfield, N. J.

^d Columbia Ave. Station; analysis furnished by Plainfield-Union Water Company, Westfield, N. J.

RAHWAY
(Population, 21,290)

Ownership: Municipal.

Source: Rahway River. Auxiliary or emergency connection with Elizabethtown Water Company and Middlesex Water Company.

Treatment: Coagulation with alum, activated carbon, copper sulfate, sedimentation, rapid sand filtration, chlorination, sodium chlorite, and soda ash.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: 1,250,000 gal.

Finished-water storage: 400,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	17	11	Hardness as CaCO ₃ :		
Iron (Fe)	--	.0	Total	106	97
Manganese (Mn)	--	.01	Noncarbonate.....	58	66
Calcium (Ca)	--	30			
Magnesium (Mg).....	--	5.5	Color	7	2
Sodium (Na)	9.6	22	pH	7.2	7.0
Potassium (K)		1.8	Specific conductance		
Carbonate (CO ₃)		0	(micromhos at		
Bicarbonate (HCO ₃)	58	39	25 C.).....	282	320
Sulfate (SO ₄)	48	63	Turbidity	--	.3
Chloride (Cl)	18	33	Temperature (F.)...	--	--
Fluoride (F)	--	.3	Date of collection...	Feb. 1,	Feb. 1,
Nitrate (NO ₃)	5.0	4.2		1952	1952
Dissolved solids.....	--	197			

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.....	46	--	--	7.2	7.7	6.7	98	105	94	18	135	1.0
Finished water...	34	--	--	6.9	7.4	5.9	--	--	--	.6	1.8	0.

SUMMIT
(Population, 17,929)

Ownership: Commonwealth Water Company (controlled by American Water Works Company, Inc.) owns and operates the supply works, the transmission and distribution systems, and serves Irvington, New Providence, Summit, and West Orange; Chatham, Maplewood, Millburn, New Providence, Passaic and Springfield townships; also a small part of Hillside and Union townships. It sells water for the entire supply to Livingston township. Total population supplied, about 160,000.

Source: Canoe Brook Station (in Millburn): 8 wells of 17 (9 wells held in reserve) 121 to 379 ft deep, and Canoe Brook pumped into 2 reservoirs (1 and 2); Baltusrol Station (in Summit): 9 wells (of 16) 200 to 300 ft deep and infiltration galleries; Short Hills Station (in Springfield): 3 wells 77 to 85 ft deep. The aggregate diversion from the Canoe Brook Station is limited to 10,375,000 gpd; from the Baltusrol Station, to 1,570,000 gpd; and from the Short Hills Station, to 3,000,000 gpd.

Treatment: Surface Supply: Plain sedimentation, coagulation with alum, activated carbon, sedimentation, rapid sand filtration, pH adjustment, and chlorination.

Rated capacity of treatment plant: 20,000,000 gpd.

Raw-water storage: Canoe Brook Station: Reservoir 1, 735,000,000 gal and Reservoir 2 (filled by transfer from Reservoir 1) 600,000,000 gal; suction basin, 250,000 gal; Baltusrol Station: suction basin, 200,000 to 700,000 gal; Short Hills Station: suction basin, 100,000 gal.

Finished-water storage: Druid Hill standpipe (in Summit), 610,000 gal; West Orange standpipes, 1,131,000 gal; Short Hills standpipe (in Millburn), 317,200 gal; Day elevated tank (in Millburn), 100,000 gal; West Orange reservoir (concrete covered), 1,000,000 gal; Wyoming Reservoirs (in Millburn township), 900,000 and 1,700,000 gal.

There are 6 services on the supply system, 4 of which are supplied by booster pumps. The greater part of the area served is on the Canoe Brook Station low service. A higher section of Millburn is supplied by the Short Hills Pumping Station high service. Practically all of Summit and all the area north and west of Summit is supplied by the Summit high service from the Baltusrol Pumping Station with an auxiliary supply from the Canoe Brook low service.

SUMMIT--Continued

ANALYSES

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

	Finished water ^a	Finished water ^b	Finished water ^c
Silica (SiO ₂)	15	23	25
Iron (Fe) .....	.02	.01	.01
Manganese (Mn) .....	.00	.01	.00
Calcium (Ca)	34	28	50
Magnesium (Mg).....	4.3	3.8	11
Sodium (Na).....	11	9.0	7.7
Potassium (K)	1.1	1.0	.6
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	69	70	150
Sulfate (SO ₄).....	55	36	44
Chloride (Cl)	8.0	8.0	8.5
Fluoride (F) .....	.1	.1	.0
Nitrate (NO ₃)	1.6	1.5	7.8
Dissolved solids	171	145	243
Hardness as CaCO ₃ :			
Total	103	85	170
Noncarbonate	46	28	47
Color	0	0	0
pH.....	7.9	7.1	7.9
Specific conductance (micromhos at 25 C.).....	258	219	355
Turbidity .....	.2	.4	.3
Temperature (F.)	--	--	--
Date of collection	Jan. 31, 1952	Jan. 31, 1952	Jan. 31, 1952

^a Canoe Brook Station; mixture of water from wells and Canoe Brook.^b Baltusrol Station.^c Short Hills Station.

TEANECK township
(Population, 33,772)

Ownership: Supplied by Hackensack Water Company. (See Hackensack.)

TRENTON
(Population, 128, 009)

Ownership: Municipal; also supplies parts of Ewing, Hamilton, and Lawrence townships. Total population supplied, about 175,000.

Source: Delaware River.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, chlorination, and adjustment of pH with lime.

Rated capacity of treatment plant: 30,000,000 gpd.

Raw-water storage: --

Finished-water storage: 120,000,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	7.6	5.7	Hardness as CaCO ₃ :		
Iron (Fe)	--	.01	Total	48	53
Manganese (Mn)	--	.00	Noncarbonate.....	25	33
Calcium (Ca)	--	17			
Magnesium (Mg).....	--	2.6	Color.....	11	0
Sodium (Na)	3.2	3.0	pH.....	6.9	7.5
Potassium (K) .....		.9	Specific conductance		
Carbonate (CO ₃)		0	(micromhos at		
Bicarbonate (HCO ₃)	28	24	25 C.).....	119	128
Sulfate (SO ₄)	21	27	Turbidity.....	--	.5
Chloride (Cl)	5	5.1	Temperature (F.)...	--	--
Fluoride (F)	--	.1	Date of collection...	Feb. 1, 1952	Feb. 1, 1952
Nitrate (NO ₃)	3.7	3.1			
Dissolved solids.....	--	80			

Regular determinations at treatment plant, 1952

	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.....	31	61	9	7.3	8.3	6.7	--	--	--	30	500	3
Finished water...	33	70	2	7.2	9.8	4.4	59	72	40	0	0	0

NEW JERSEY**UNION CITY**
(Population, 55,537)

Ownership: Supplied by Hackensack Water Company. (See Hackensack.)

WESTFIELD
(Population, 21,243)

Ownership: Supplied by the Plainfield-Union Water Company. (See Plainfield.)

WEST NEW YORK
(Population, 37,683)

Ownership: Supplied by Hackensack Water Company. (See Hackensack.)

WEST ORANGE
(Population, 28,605)

Ownership: Supplied by the Commonwealth Water Company, Canoe Brook Station.
(See Summit.)

ALBANY
(Population, 134,995)

Ownership: Municipal.

Source: Alcove Creek impounded in Alcove Reservoir, about 92 percent of supply;
Basic Creek impounded in Basic Reservoir, about 8 percent of supply. Auxiliary or emergency supply, Hudson River.

Treatment: Aeration, coagulation with alum, sedimentation, rapid sand filtration, chlorination, and adjustment of pH with lime.

Rated capacity of treatment plant: 32,000,000 gpd.

Raw-water storage: Alcove Reservoir, 12,000,000,000 gal; Basic Reservoir, 1,000,000,000 gal.

Finished-water storage: 202,000,000 gal.

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) .....	.00	Total	54
Manganese (Mn) .....	.00	Noncarbonate	20
Calcium (Ca)	18	Color	2
Magnesium (Mg)	2.2	pH	8.1
Sodium (Na)	1.7	Specific conductance	
Potassium (K) .....	.9	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	122
Bicarbonate (HCO ₃)	41	Turbidity	4.2
Sulfate (SO ₄)	21	Temperature (F.).....	41
Chloride (Cl)	2.4	Date of collection	Jan. 16,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.2		
Dissolved solids	70		

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.....	--	--	--	--	--	--	--	--	--	--	--	--
Finished water...	30	43	20	8.5	8.9	7.3	47	59	39	0.1	0.3	0.0

AMSTERDAM
(Population, 32,240)

Ownership: Municipal.

Source: Glen Wild Reservoir (impounded supply).

Treatment: Chlorination.

Raw-water storage: 2,600,000,000 gal.

Finished-water storage: --

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	6.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.22	Total	11
Manganese (Mn) .....	.01	Noncarbonate	9
Calcium (Ca)	2.8		
Magnesium (Mg)	1.0	Color	38
Sodium (Na) .....	.6	pH	5.5
Potassium (K) .....	.2	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	2	25 C.).....	36.6
Sulfate (SO ₄)	7.8	Turbidity	3.9
Chloride (Cl)	2.0	Temperature (F.).....	46
Fluoride (F) .....	.1	Date of collection	Jan. 15,
Nitrate (NO ₃) .....	.7		1952
Dissolved solids	36		

AUBURN
(Population, 36,722)

Ownership: Municipal; also supplies about 2,000 people outside the city limits.

Total population supplied, about 38,700.

Source: Owasco Lake.

Treatment: Slow sand filtration, and chlorination.

Rated capacity of treatment plant: 9,500,000 gpd.

Raw-water storage: Owasco Lake.

Finished-water storage: 12,500,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	4.2	Hardness as CaCO ₃ :	
Iron (Fe) .....	.02	Total	127
Manganese (Mn) .....	.00	Noncarbonate	20
Calcium (Ca)	38		
Magnesium (Mg)	7.8	Color	4
Sodium (Na)	1.7	pH	8.0
Potassium (K)	1.0	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	131	25 C.).....	252
Sulfate (SO ₄)	17	Turbidity	1.1
Chloride (Cl)	2.6	Temperature (F.).....	42
Fluoride (F) .....	.1	Date of collection	Jan. 31,
Nitrate (NO ₃)	2.4		1952
Dissolved solids	144		

BINGHAMTON
(Population, 80,674)

Ownership: Municipal; also supplies about 12,000 people outside the city limits.

Total population supplied, about 93,000.

Source: Susquehanna River. Auxiliary or emergency supply, wells (2,000,000 gpd).

Treatment: Prechlorination, coagulation with alum and lime, carbon when needed, sedimentation, rapid sand filtration, and postchlorination (chlorine dioxide).

Rated capacity of treatment plant: 21,000,000 gpd.

Raw-water storage: --

Finished-water storage: 5,750,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	3.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.06	Total	70
Manganese (Mn) .....	.03	Noncarbonate	16
Calcium (Ca)	24	Color	0
Magnesium (Mg)	2.5	pH	7.3
Sodium (Na)	2.2	Specific conductance	
Potassium (K) .....	.9	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	153
Bicarbonate (HCO ₃)	66	Turbidity .....	.4
Sulfate (SO ₄)	16	Temperature (F.).....	--
Chloride (Cl)	3.2	Date of collection	Feb. 19,
Fluoride (F) .....	.1		1952
Nitrate (NO ₃)	1.8		
Dissolved solids	91		

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.....	--	--	--	7.3	7.7	6.8	62	93	30	60	1400	10
Finished water...	--	--	--	7.2	7.4	6.7	57	87	26	0	0	0

BUFFALO
(Population, 580,132)

Ownership: Municipal.

Source: Lake Erie. Emergency supply, Niagara River.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 160,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 30,000,000 gal (clear well).

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂) .....	.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.10	Total	124
Manganese (Mn) .....	.00	Noncarbonate	35
Calcium (Ca)	36	Color	1
Magnesium (Mg)	8.3	pH	7.4
Sodium (Na)	9.3	Specific conductance	
Potassium (K)	1.3	(micromhos at	
Carbonate (CO ₂)	0	25 C.).....	285
Bicarbonate (HCO ₃)	108	Turbidity .....	.6
Sulfate (SO ₄)	26	Temperature (F.).....	--
Chloride (Cl)	20	Date of collection	Mar. 19,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	164		

CHEEKTOWAGA town
(Population, 45,354)

Ownership: Supplied by Western New York Water Company. (See Lackawanna.)

COHOES
(Population, 21,272)

Ownership: Municipal.

Source: Mohawk River.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, incidental pH correction, and chlorination.

Rated capacity of treatment plant: 8,500,000 gpd.

Raw-water storage: --

Finished-water storage: 250,000 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) .....	.06	Total	104
Manganese (Mn) .....	.00	Noncarbonate	34
Calcium (Ca)	32		
Magnesium (Mg)	5.9	Color	4
Sodium (Na)	4.0	pH	7.1
Potassium (K)	1.1	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	86	25 C.).....	222
Sulfate (SO ₄)	34	Turbidity	6.5
Chloride (Cl)	5.1	Temperature (F.).....	39
Fluoride (F) .....	.0	Date of collection	Jan. 16,
Nitrate (NO ₃)	1.4		1952
Dissolved solids	132		

CORTLAND
(Population, 18,152)

Ownership: Municipal; also supplies about 300 people outside the city limits.

Total population supplied, about 18,500.

Source: 3 dug wells (1 to 3) 17, 15, and 76 ft deep; yield reported to be 3,000, 2,000, and 2,500 gpm.

Treatment: Chlorination.

Rated capacity of treatment plant: --

Raw-water storage: --

Finished-water storage: 2,200,000 gal.

ANALYSIS

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

	Well 1		Well 1
Silica (SiO ₂)	7.6	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	168
Manganese (Mn) .....	.00	Noncarbonate	30
Calcium (Ca)	53	Color	0
Magnesium (Mg)	8.8	pH	7.6
Sodium (Na)	2.2	Specific conductance	
Potassium (K) .....	.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	317
Bicarbonate (HCO ₃)	169	Turbidity .....	.4
Sulfate (SO ₄)	21	Temperature (F.).....	--
Chloride (Cl)	3.5	Date of collection	Jan. 31,
Fluoride (F) .....	.1		1952
Nitrate (NO ₃)	11		
Dissolved solids	188		
Depth (feet)			17
Diameter (feet)			20
Date dug			1917
Percent of supply			--

DUNKIRK
(Population, 18,007)

Ownership: Municipal; also supplies about 800 people outside the city limits.

Total population supplied, about 18,800.

Source: Lake Erie. Auxiliary supply connection with the city system of Fredonia.

Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, and postchlorination.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: --

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)	2.6	Hardness as CaCO ₃ :	
Iron (Fe) .....	.11	Total	128
Manganese (Mn) .....	.00	Noncarbonate	47
Calcium (Ca)	38	Color	0
Magnesium (Mg)	8.0	pH	7.4
Sodium (Na)	10	Specific conductance	
Potassium (K)	1.3	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	303
Bicarbonate (HCO ₃)	98	Turbidity .....	.3
Sulfate (SO ₄)	32	Temperature (F.).....	36
Chloride (Cl)	26	Date of collection	Feb. 6,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	178		

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	96	88	7.9	8.3	7.5	--	--	--	21	150	.4
Finished water...	86	92	80	7.2	7.5	6.9	121	122	120	.04	.40	.02

ELMIRA
(Population, 49,716)

Ownership: Municipal.

Source: Chemung River 58 percent of supply; Hoffman Creek impounded 42 percent of supply.

Treatment: Aeration (spray), coagulation with alum, sedimentation, rapid sand filtration, ammoniation, and chlorination. Soda ash or lime is used when necessary.

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: 150,000,000 gal.

Finished-water storage: 10,000,000 gal.

ANALYSES

(Analyses, in parts per million, by Bureau of Environmental Sanitation)

	Chemung River		Hoffman Creek		
	Raw water	Finished water	Raw water	Raw water ^a	Finished water
Silica (SiO ₂)	30	0.8	20	5.7	4.5
Iron (Fe) .....	.20	.05	1.8	.03	.05
Manganese (Mn) .....	.05	0	.01	.00	--
Calcium (Ca)	42	41	13	18	14
Magnesium (Mg)	5.2	5.3	3.0	3.8	3.4
Sodium (Na)	12	15	4.1	3.5	4.6
Potassium (K)				1.3	
Carbonate (CO ₃)	--	--	--	0	--
Bicarbonate (HCO ₃)	115	105	32	32	28
Sulfate (SO ₄)	31	37	18	32	26
Chloride (Cl)	19	23	5.0	6.2	5.5
Fluoride (F)	--	--	--	.0	--
Nitrate (NO ₃) .....	.1	.3	2.2	2.4	1.6
Dissolved solids	230	185	105	92	85
Hardness as CaCO ₃ :					
Total	126	124	45	60	49
Noncarbonate	32	38	19	34	26
Color	8	0	40	4	0
pH	7.9	7.6	7.1	7.7	7.2
Specific conductance (micromhos at 25 C.)	--	--	--	156	--
Turbidity	5.0	0	50	1.0	0
Temperature (F.)	--	--	--	--	--
Date of analyses	Sept. 10, 1951	Sept. 10, 1951	Sept. 10, 1951	Feb. 11, 1952	Sept. 10, 1951

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	53	95	10	7.5	8.4	6.1	103	144	42	116	--	5
Finished water	44	86	10	7.4	8.4	6.1	103	144	51	0	0	0

^a Analysis by U. S. Geological Survey.

ENDICOTT
(Population, 20,050)

Ownership: Endicott Water Works Company; also supplies about 31,000 people in other places. Total population supplied, about 51,000.

Source: 5 wells 100, 160, 100, 150, and 150 ft deep; yield reported to be 4,000, 3,000, 2,500, 1,500, and 4,000 gpm.

Treatment: Chlorination.

Raw-water storage: --

Finished-water storage: 5,500,000 gal.

ANALYSIS

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

	Well 1 ^a		Well 1 ^a
Silica (SiO ₂)	10	Hardness as CaCO ₃ :	
Iron (Fe) .....	.02	Total	138
Manganese (Mn) .....	.02	Noncarbonate	15
Calcium (Ca)	41	Color	5
Magnesium (Mg)	8.8	pH	8.0
Sodium (Na)	8.0	Specific conductance	
Potassium (K) .....	.6	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	296
Bicarbonate (HCO ₃)	151	Turbidity	1.8
Sulfate (SO ₄)	16	Temperature (F.).....	52
Chloride (Cl)	10	Date of collection	Feb. 12,
Fluoride (F) .....	.1		1952
Nitrate (NO ₃)	1.5		
Dissolved solids	176		
Depth (feet)			100
Diameter (feet)			13
Date drilled			1947
Percent of supply			--

^a Ranney collector.

FREEPORT
(Population, 24,680)

Ownership: Municipal.

Source: 2 wells (N68, N134) 552, and 557 ft deep; yield reported to be 1,570 and 1,500 gpm.

Treatment: Addition of Calgon and lime.

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

Raw-water storage: --

Finished-water storage: 1,500,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	7.1	Hardness as CaCO ₃ :	
Iron (Fe) .....	.26	Total	7
Manganese (Mn)	--	Noncarbonate	0
Calcium (Ca)	2.1		
Magnesium (Mg) .....	.5	Color	2
Sodium (Na)	3.1	pH	6.4
Potassium (K) .....	.4	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	10	25 C.)	31.3
Sulfate (SO ₄)	3.5	Turbidity .....	.4
Chloride (Cl)	3.2	Temperature (F.)	--
Fluoride (F) .....	.0	Date of collection	Jan. 16,
Nitrate (NO ₃)	--		1952
Dissolved solids	25		

GLEN FALLS
(Population, 19,610)

Ownership: Municipal; also supplies about 1,500 people outside the city limits.

Total population supplied, about 21,100.

Source: Streams impounded in 3 reservoirs: Butler Reservoir 49 percent of supply; Keenan Reservoir 41 percent of supply; Wilkie Reservoir 10 percent of supply. Auxiliary or emergency supply, Halfway Brook impounded.

Treatment: Chlorination.

Raw-water storage: 878,000,000 gal.

Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	6.4	Hardness as CaCO ₃ :	
Iron (Fe) .....	.14	Total	16
Manganese (Mn) .....	.00	Noncarbonate	6
Calcium (Ca)	4.8		
Magnesium (Mg)	1.0	Color	3
Sodium (Na)	1.0	pH	6.7
Potassium (K) .....	.5	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	12	25 C.).....	41.4
Sulfate (SO ₄)	5.0	Turbidity	4.8
Chloride (Cl)	1.8	Temperature (F.).....	50
Fluoride (F) .....	.2	Date of collection	Jan. 15,
Nitrate (NO ₃) .....	.4		1952
Dissolved solids	29		

GLOVERSVILLE
(Population, 23,634)

Ownership: Municipal; also supplies about 500 people outside the city limits.

Total population supplied, about 24,100.

Source: Small streams impounded in 3 reservoirs. Auxiliary or emergency supply, Mountain Lake by pumping from city of Johnstown.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, chlorination, soda ash for pH control, and Actophos for iron suspension.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: 560,000,000 gal.

Finished-water storage: 7,500,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	6.0	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	21
Manganese (Mn) .....	.01	Noncarbonate	0
Calcium (Ca)	7.0	Color	2
Magnesium (Mg) .....	.9	pH	7.5
Sodium (Na)	8.4	Specific conductance	
Potassium (K) .....	.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	82.5
Bicarbonate (HCO ₃)	29	Turbidity .....	.8
Sulfate (SO ₄)	14	Temperature (F.).....	--
Chloride (Cl)	1.2	Date of collection	Feb. 14,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	53		

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.....	10	14	7	6.7	6.9	6.5	17	20	15	2	4	1
Finished water...	23	25	21	7.5	7.5	7.5	23	25	21	.1	.1	.1

HEMPSTEAD
(Population, 29,135)

Ownership: Municipal.

Source: 6 wells. The depths of wells 2, 5, and 6 are reported to be 426, 525, and 406 ft; and the yields, 1,200, 1,000, and 1,000 gpm, respectively.

Treatment: Aeration (spray), chlorination, sedimentation, and addition of lime and Calgon.

Rated capacity of treatment plant: --

Raw-water storage: Aeration basin, 2,225,000 gal.

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

ANALYSIS

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

	Wells (finished water)		Wells (finished water)
Silica (SiO ₂)	7.6	Hardness as CaCO ₃ :	
Iron (Fe) .....	.14	Total	10
Manganese (Mn) .....	.00	Noncarbonate	3
Calcium (Ca)	2.2		
Magnesium (Mg)	1.1	Color	0
Sodium (Na)	4.9	pH	6.4
Potassium (K) .....	.6	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	8	25 C.).....	48.7
Sulfate (SO ₄)	4.2	Turbidity	2.2
Chloride (Cl)	8.6	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	Apr. 8,
Nitrate (NO ₃)	1.8		1952
Dissolved solids	35		

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.....	--	--	--	5.5	5.9	5.2	--	--	--	--	--	--
Finished water...	--	--	--	7.5	8.5	7.5	--	--	--	--	--	--

HUNTINGTON
(Population, 9,324)

Ownership: New York Water Service Corporation; also supplies Centerport, Cold Spring Harbor, Huntington Bay Hills, Huntington Station, and Loyd Harbor.

Total population supplied, about 30,000.

Source: Wells: 5 wells 45 ft deep; 2 wells 540 and 600 ft deep, each reported to yield 700 gpm.

Treatment: Chlorination.

Raw-water storage: --

Finished-water storage: 1,335,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	13	Hardness as CaCO ₃ :	
Iron (Fe) .....	.12	Total	37
Manganese (Mn) .....	.00	Noncarbonate	8
Calcium (Ca)	9.2	Color	1
Magnesium (Mg)	3.5	pH	7.3
Sodium (Na)	7.1	Specific conductance	
Potassium (K)	1.8	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	115
Bicarbonate (HCO ₃)	36	Turbidity .....	.3
Sulfate (SO ₄)	9.0	Temperature (F.).....	--
Chloride (Cl)	7.4	Date of collection	Feb. 15,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃)	5.2		
Dissolved solids	80		

IRONDEQUOIT town
(Population, 34,417)

Ownership: Supplied by Rochester. (See Rochester.)

ITHACA
(Population, 29,257)

Ownership: Municipal; also supplies about 2,000 people outside the city limits.

Total population supplied, about 31,300.

Source: Six Mile Creek impounded. Emergency supply, connection with Cornell University supply.

Treatment: Superchlorination, coagulation with alum, sedimentation, rapid sand filtration, and dechlorination with sulfur dioxide.

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

Raw-water storage: 316,000,000 gal.

Finished-water storage: 4,924,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	3.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.08	Total	67
Manganese (Mn) .....	.00	Noncarbonate	29
Calcium (Ca)	22	Color	1
Magnesium (Mg)	2.9	pH	7.4
Sodium (Na)	5.2	Specific conductance	
Potassium (K) .....	.8	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	163
Bicarbonate (HCO ₃)	46	Turbidity .....	.5
Sulfate (SO ₄)	29	Temperature (F.).....	--
Chloride (Cl)	5.8	Date of collection	Feb. 5,
Fluoride (F) .....	.2		1952
Nitrate (NO ₃)	1.6		
Dissolved solids	96		

Regular determinations at treatment plant, 1952

	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.....	72	113	44	7.5	7.7	7.3	93	129	63	80	261	11
Finished water...	66	98	40	6.7	6.8	6.7	92	132	61	4	13	--

JAMESTOWN
(Population, 43,354)

Ownership: Municipal; also supplies about 6,600 people outside the city limits.

Total population supplied, about 50,000.

Source: 16 wells each about 130 ft deep 3 miles east of the city. Nine wells, (total yield reported to be 3,500 gpm) during periods of high ground water level, are siphoned into a receiving well from which the water is pumped into the transmission and distribution system. Seven wells (total yield reported to be 4,900 gpm) are equipped with deep well pumps, and during summer months and dry periods, pump into the receiving well.

Treatment: Chlorination.

Raw-water storage: --

Finished-water storage: English Hill reservoir, 5,000,000 gal; Buffalo Street reservoir, 1,500,000 gal.

ANALYSIS

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

	Well 4 (raw water)		Well 4 (raw water)
Silica (SiO ₂)	6.1	Hardness as CaCO ₃ :	
Iron (Fe) .....	.13	Total	103
Manganese (Mn) .....	.01	Noncarbonate	21
Calcium (Ca)	32		
Magnesium (Mg)	5.6	Color	1
Sodium (Na)	3.9	pH	8.0
Potassium (K) .....	.7	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	100	25 C.).....	214
Sulfate (SO ₄)	24	Turbidity .....	.7
Chloride (Cl)	2.6	Temperature (F.).....	48
Fluoride (F) .....	.1	Date of collection	Feb. 5,
Nitrate (NO ₃) .....	.3		1952
Dissolved solids	127		
Depth (feet)			125
Diameter (inches).....			12
Date drilled			1947
Percent of supply			--

JOHNSON CITY
(Population, 19,249)

Ownership: Municipal; also supplies about 4,100 people outside the city limits.

Total population supplied, about 23,300.

Source: 3 wells (1 to 3) 100, 101, and 89 ft deep; yield reported to be 2,100, 2,180, and 2,200 gpm. Auxiliary supply, 2 wells.

Treatment: Chlorination.

Finished-water storage: 4,000,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	9.9	Hardness as CaCO ₃ :	
Iron (Fe) .....	.08	Total	207
Manganese (Mn) .....	.00	Noncarbonate	46
Calcium (Ca)	55	Color	4
Magnesium (Mg)	17	pH	8.1
Sodium (Na)	7.8	Specific conductance	
Potassium (K)	1.2	(micromhos at	
Carbonate (CO ₃) .....	.0	25 C.).....	411
Bicarbonate (HCO ₃)	197	Turbidity	1.3
Sulfate (SO ₄)	40	Temperature (F.).....	50
Chloride (Cl)	12	Date of collection	Jan. 15,
Fluoride (F) .....	.4		1952
Nitrate (NO ₃)	3.2		
Dissolved solids	247		

KENMORE
(Population, 20,066)

Ownership: Supplied by the Western New York Water Company. (See Lackawanna.)

KINGSTON
(Population, 28,817)

Ownership: Municipal.

Source: Mountain stream impounded. Auxiliary supply, small spring reservoir.

Treatment: Coagulation with alum, sedimentation, pressure filtration, addition of lime for corrosion control, and chlorination.

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: 1,100,000,000 gal.

Finished-water storage: 12,000,000 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) .....	.27	Total	20
Manganese (Mn) .....	.00	Noncarbonate	10
Calcium (Ca)	6.6	Color	7
Magnesium (Mg) .....	.9	pH	7.1
Sodium (Na) .....	.8	Specific conductance	
Potassium (K) .....	.1	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	48.5
Bicarbonate (HCO ₃)	13	Turbidity	1.2
Sulfate (SO ₄)	9.0	Temperature (F.).....	--
Chloride (Cl)	1.6	Date of collection	Feb. 15,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	30		

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.....	5.2	6.3	4.5	6.8	7.0	6.5	--	--	--	1	2	0
Finished water...	9.4	11	7.9	9.0	9.2	8.6	20	34	14	0	0	0

LACKAWANNA
(Population, 27,658)

Ownership: Supplied by the Western New York Water Company; also supplies Alden town, Amherst town (part), Blasdel, Cheektowaga town, Clarence (part), Depew, Hamburg town (part), Kenmore, Lancaster, Lancaster town (part), Orchard Park (part), Sloan, Tonawanda town (part), West Seneca town (part), Williamsville, Woodlawn, and other water districts and places. Total population supplied, about 200,000.

Source: Lake Erie. Emergency supply, interconnection with Buffalo city system.
Treatment: Coagulation with alum and lime, sedimentation, rapid sand filtration, addition of sodium chlorite, and chlorine.

Rated capacity of treatment plant: 16,000,000 gpd.

Raw-water storage: --

Finished-water storage: 13,000,000 gal.

ANALYSIS

(Analysis, in parts per million, by Western New York Water Co.)

	Finished water		Finished water
Silica (SiO ₂)	4.1	Hardness as CaCO ₃ :	
Iron (Fe)	0	Total	138
Manganese (Mn)	--	Noncarbonate	48
Calcium (Ca)	44		
Magnesium (Mg)	6.8	Color	0
Sodium (Na)	4.8	pH	8.1
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	2	(micromhos at	
Bicarbonate (HCO ₃)	110	25 C.).....	--
Sulfate (SO ₄)	24	Turbidity	0
Chloride (Cl)	22	Temperature (F.).....	70
Fluoride (F)	--	Date of collection	June 12,
Nitrate (NO ₃) .....	.2		1950
Dissolved solids	a 161		

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.....	89	92	83	7.8	8.0	7.7	114	120	110	16	200	--
Finished water...	94	99	88	8.1	8.3	7.9	122	128	118	--	5	0

^a Sum of determined constituents.

LEVITTOWN
(Population, 45,000 approximate)

Ownership: Town of Hempstead Water Company.

Source: 8 wells (1 to 8) 211, 84, 358, 81, 320, depth not reported for well 6, 95, and 307 ft deep; yield reported to be 800, 800, 800, 800, 1,000, not reported for well 6, 800, and 800 gpm.

Treatment: Addition of lime, Calgon, and chlorine.

Rated capacity of treatment plant: --

Raw-water storage: --

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

The analyses selected of the raw water show the range in hardness of the water from the wells, and of the finished water, the character of the water furnished in three different sections of the area served.

ANALYSES

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

	Well 2 (raw water)	Well 3 (raw water)	Finished water (city tap) ^a	Finished water (city tap) ^b	Finished water (city tap) ^c
Silica (SiO ₂)	9.9	7.1	9.2	9.2	7.1
Iron (Fe) .....	.04	.05	.12	.26	.08
Manganese (Mn)	--	--	.01	.03	.01
Calcium (Ca)	--	--	27	36	2.8
Magnesium (Mg)	--	--	4.5	6.8	.5
Sodium (Na)	9.8	3.6	11	13	3.6
Potassium (K) .....			.9	1.6	.3
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	10	4	37	43	10
Sulfate (SO ₄)	90	1	30	54	3.0
Chloride (Cl)	22	4	14	18	3.6
Fluoride (F)	--	--	.0	.0	.0
Nitrate (NO ₃)	34	2.3	37	38	3.1
Dissolved solids	--	--	146	208	36
Hardness as CaCO ₃ :					
Total	139	4	86	118	9
Noncarbonate	131	1	56	82	1
Color	5	2	0	0	0
pH	5.8	5.6	7.3	7.9	6.9
Specific conductance (micromhos at 25 C.)	396	29.0	234	311	38.2
Turbidity	--	--	1.7	1.1	1.0
Temperature (F.)	--	--	--	--	--
Date of collection	Jan. 21, 1952	Jan. 21, 1952	Jan. 23, 1952	Jan. 21, 1952	Jan. 21, 1952
Depth (feet)	84	358	--	--	--
Diameter (inches)	12	12	--	--	--
Date drilled	1947	1951	--	--	--
Percent of supply	--	--	--	--	--

^a 107 Azala.

^b 34 Center Land.

^c 101 Shepherd Road.

LOCKPORT
(Population, 25, 133)

Ownership: Municipal; also supplies about 400 people outside the city limits.

Total population supplied, about 25, 500.

Source: Niagara River. Auxiliary or emergency supply, Barge Canal (emergency pumping station).

Treatment: Prechlorination at North Tonawanda pumping station, coagulation with alum, sedimentation, rapid sand filtration, and chlorination (chlorine dioxide).

Rated capacity of treatment plant: 10,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 6,600,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂) .....	.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.12	Total	126
Manganese (Mn) .....	.00	Noncarbonate	38
Calcium (Ca)	37	Color	1
Magnesium (Mg)	8.2	pH	7.4
Sodium (Na)	9.3	Specific conductance	
Potassium (K)	1.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	290
Bicarbonate (HCO ₃)	107	Turbidity .....	.4
Sulfate (SO ₄)	27	Temperature (F.).....	36
Chloride (Cl)	22	Date of collection	Feb. 6,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.5		
Dissolved solids	169		

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.....	100	110	90	7.8	8.0	7.6	115	--	--	20	150	5
Finished water...	95	105	85	7.3	7.4	7.2	105	--	--	0	.0	0

MIDDLETOWN
(Population, 22, 586)

Ownership: Municipal; also supplies about 800 people outside the city limits.

Total population supplied, about 23,400.

Source: Lakes.

Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, postchlorination, pH adjustment, and carbon for taste control.

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: 1,341,000,000 gal.

Finished-water storage: 350,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	2.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	30
Manganese (Mn) .....	.00	Noncarbonate	12
Calcium (Ca)	9.2	Color	2
Magnesium (Mg)	1.7	pH	7.0
Sodium (Na)	4.2	Specific conductance	
Potassium (K) .....	.8	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	83.1
Bicarbonate (HCO ₃)	22	Turbidity .....	.8
Sulfate (SO ₄)	18	Temperature (F.).....	--
Chloride (Cl)	2.0	Date of collection	Feb. 13,
Fluoride (F) .....	.4		1952
Nitrate (NO ₃) .....	.3		
Dissolved solids	50		

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.....	17	--	--	--	--	--	--	45	--	5.0	--	--
Finished water...	22	--	--	7.0	7.6	--	--	45	--	0	0	0

MOUNT VERNON
(Population, 71, 899)

Ownership: Municipal. Supplied by New York City. (See New York, Croton supply.)

NEWBURGH
(Population, 31, 956)

Ownership: Municipal; also supplies about 3,000 people outside the city limits.

Total population supplied, about 35,000.

Source: Impounding Reservoir.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, adjustment of pH with lime, chlorination, and fluoridation.

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

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

Finished-water storage: 1,800,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	0.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.05	Total	102
Manganese (Mn) .....	.00	Noncarbonate	36
Calcium (Ca)	35	Color	4
Magnesium (Mg)	3.6	pH	8.2
Sodium (Na)	5.6	Specific conductance	
Potassium (K)	1.3	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	230
Bicarbonate (HCO ₃)	81	Turbidity	1.6
Sulfate (SO ₄)	36	Temperature (F.).....	--
Chloride (Cl)	8.6	Date of collection	Feb. 3,
Fluoride (F)	1.1		1952
Nitrate (NO ₃) .....	.8		
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.....	57	60	52	7.5	7.9	7.2	52	60	48	2	5	1
Finished water...	59	63	54	8.1	8.4	7.8	90	100	70	.2	1.0	.05

NEW ROCHELLE
(Population, 59,725).

Ownership: New Rochelle Water Company, New Rochelle Division; also supplies Bronxville, Eastchester town (part), North Pelham, Pelham Manor, Pelham town (part), and Tuckahoe. Total population supplied, about 101,000.

Source: Croton Aqueduct of New York City supply. (See New York.)

Treatment: Chlorination, and addition of lime.

Rated capacity of treatment plant: 17,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 3,200,000 gal.

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.....	37	41	35	7.2	7.3	7.0	50	52	42	--	5	--
Finished water...	40	45	30	8.2	8.4	7.8	60	74	53	--	5	--

NEW YORK
(Population, 7,891,957)

Ownership: Municipal; supplies 7,500,000 people in New York and in addition a population of about 300,000 in other communities and cities among which are Mount Kisco, Mount Vernon, New Rochelle, Ossining, White Plains, and Yonkers.

Jamaica Water Supply Company; supplies about 450,000 people in the borough of Queens.

New York Water Service Corporation (Woodhaven Plant); supplies about 50,000 people in the Fourth Ward of Queens. Total population supplied, about 8,300,000.

Systems, Sources, and Storage of Supply

System	Sources	Impounding and Storage Reservoirs	Available Storage (mg), or yield
Croton	Croton River { East Branch Middle Branch West Branch	12 reservoirs and six controlled lakes	103,075
Catskill	{ Esopus Creek	Ashokan	130,478
	{ Schoharie Creek	Schoharie	19,583
	{ Bronx River	Kensico	30,573
	{ Byram River	Byram Lake	948
	{ Wampus River	Wampus	99
	{ Rondout Creek ^a	Rondout	48,700
Ridgewood (Long Island watershed)	{ West watershed	Hemstead Reservoir	880
		Hempstead Pond	27
		Pines Pond	9
	{ (Driven wells, 10 pump- ing plants)	{ Smith's Pond ^b	42
		{ Valley Stream Pond ^b	--
		--	--
Queens	{ East watershed	East Meadow Pond	19
		Wantagh Pond	44
	{ (Driven wells, five plants; 2 infiltration galleries)	Massapequa Pond	17
		--	30-40 mgd
Queens	Wells (7 well stations, 1 pumping station)	--	10 mgd
Richmond	Wells (2 well plants, one of which has five stations)	--	5 mgd
Jamaica Water Supply Co.	Drilled wells	--	29.1 mgd
N. Y. Water Service Corp.	Drilled wells	--	9.1 mgd

^a Delaware System.

^b Emergency only

NEW YORK--Continued

Treatment: Surface waters: plain sedimentation in large storage reservoirs (Catskill supply, aeration, chlorination, coagulation with alum when necessary at Pleasantville plant, addition of lime near Kensico Reservoir, sedimentation in Kensico Reservoir, and rechlorination), chlorination, and rechlorination at points in the distribution system. Well waters: iron removal by rapid sand filtration at Springfield and Jameco Pumping Stations, and pressure filtration at Flushing Station. The private companies operate two gravity and three pressure filters for iron removal. Many of the wells are pumped directly into the distribution system.

Distribution Reservoirs and Standpipes

Source of Supply	Name	Storage (mg)	Borough
Croton	Central Park Reservoir	1,021	Manhattan
Catskill	Hillview Reservoir	929	Bronx
Croton	Jerome Park Reservoir	773	
Catskill and Long Island	Ridgewood Reservoir (3 basins)	302	Brooklyn (municipal)
Catskill	Far Rockaway Standpipe	0.3	Queens (municipal)
Catskill	Silver Lake Reservoir	438	Richmond
Catskill	Grimes Hill Standpipe	0.2	

The water from the Catskill, Bronx and Byram, Rondout, and Croton West Branch sources intermingles in Kensico Reservoir. From this reservoir the water flows through the Catskill and Delaware Aqueducts to Hillview Reservoir from which it is delivered to the five boroughs by the two City Tunnels. The Catskill supply because of its greater pressure is usually used to the full capacity of the Catskill Aqueduct.

Croton water flows to the city by gravity and is delivered to the lower elevations in Manhattan and the Bronx to the extent of about 1/3 of the total from this source. The remainder of the supply has to be pumped.

Part of the water from sub-surface sources from the Ridgewood, Brooklyn, and Queens Borough systems is delivered directly into the Ridgewood Reservoir, which also receives water from the Catskill system. Ridgewood Reservoir is an equalizing reservoir for the Brooklyn low service.

The daily aggregate consumption of water within Greater New York during 1951 averaged 1,042.1 mgd, including 38.9 mgd furnished by the private water companies in Queens. In addition the city supplied to communities outside the city, 28.1 mgd.

Partial analyses of samples of well supplies in 1952 of the Jamaica Water Service Co. show a range in hardness of 15 to 336 ppm with an average of 126 ppm; and show a range in dissolved solids of 44 to 373 ppm with an average of 181 ppm. Partial analyses of samples of well supplies in 1952 of the N. Y. Water Service Corp. show a range in hardness of 250 to 375 ppm with an average of 292 ppm; and show a range in dissolved solids of 290 to 488 ppm with an average of 393 ppm.

NEW YORK--Continued

ANALYSES

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

	Finished water ^a	Finished water ^b	Finished water ^c	Well 13 df (raw water)	Station 12 ^{ef}
Silica (SiO ₂)	4.9	2.5	2	--	17
Iron (Fe) .....	.63	.33	.05	.00	.04
Manganese (Mn) .....	.00	.00	--	--	--
Calcium (Ca)	13	5.3	--	--	--
Magnesium (Mg)	4.3	1.7	--	--	--
Sodium (Na)	3.0	1.4	--	--	--
Potassium (K)	1.4	.6	--	--	--
Carbonate (CO ₃)	0	0	--	--	--
Bicarbonate (HCO ₃)	36	10	9	49	200
Sulfate (SO ₄)	20	11	--	--	--
Chloride (Cl)	5.8	2.6	2.8	11	19
Fluoride (F) .....	.1	.1	--	--	--
Nitrate (NO ₃) .....	.4	.3	.1	9.0	11
Dissolved solids	75	34	43	202	392
Hardness as CaCO ₃ :					
Total	50	20	20	118	282
Noncarbonate	21	6	--	--	--
Color	0	1	6	5	4
pH	7.1	6.9	6.7	6.3	7.7
Specific conductance (micromhos at 25 C.)	121	53.4	44	260	432
Turbidity	1.2	1.9	3	0	0
Temperature (F.)	55	54	46	54	--
Date of collection	June 4, 1952	June 4, 1952	1952	1952	1952

^a Croton supply; Central Park Reservoir.^b Catskill supply; Shaft 15A, Brooklyn.^c Catskill-Long Island supply, Ridgewood Reservoir 3, pipe 73.^d Jamaica Water Supply Co.^e 76th St. & 86th Ave., N. Y. Water Service Corp.^f Analysis by Department of Water Supply, Gas, and Electricity, New York.

NIAGARA FALLS
(Population, 90,872)

Ownership: Municipal.

Source: Niagara River (Tonawanda channel).

Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, and chlorine dioxide for taste and odor control.

Rated capacity of treatment plant: 40,000,000 gpd.

Raw-water storage: --

Finished-water storage: 750,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂) .....	.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.12	Total	126
Manganese (Mn) .....	.00	Noncarbonate	38
Calcium (Ca)	37		
Magnesium (Mg)	8.2	Color	1
Sodium (Na)	9.3	pH	7.4
Potassium (K)	1.4	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	107	25 C.).....	290
Sulfate (SO ₄)	27	Turbidity .....	.4
Chloride (Cl)	22	Temperature (F.).....	36
Fluoride (F) .....	.0	Date of collection	Feb. 6,
Nitrate (NO ₃) .....	.5		1952
Dissolved solids	169		

NORTH TONAWANDA
(Population, 24,731)

Ownership: Municipal.

Source: Niagara River.

Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, and postchlorination (chlorine dioxide).

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 500,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂) .....	.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.11	Total	125
Manganese (Mn) .....	.00	Noncarbonate	37
Calcium (Ca)	37		
Magnesium (Mg)	8.0	Color	1
Sodium (Na)	9.6	pH	7.3
Potassium (K)	1.3	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	108	25 C.).....	290
Sulfate (SO ₄)	28	Turbidity .....	.4
Chloride (Cl)	21	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	Feb. 11,
Nitrate (NO ₃) .....	.5		1952
Dissolved solids	167		

OLEAN
(Population, 22,884)

Ownership: Municipal.

Source: Olean Creek.

Treatment: Superchlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, pH control with lime, and dechlorination with sulfur dioxide. Chlorination of distribution reservoirs for control of algae.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 10,500,000 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) .....	.17	Total	51
Manganese (Mn) .....	.00	Noncarbonate	36
Calcium (Ca)	18	Color	2
Magnesium (Mg)	1.4	pH	6.4
Sodium (Na)	1.8	Specific conductance	
Potassium (K) .....	.9	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	129
Bicarbonate (HCO ₃)	18	Turbidity .....	.5
Sulfate (SO ₄)	30	Temperature (F.).....	--
Chloride (Cl)	5.8	Date of collection	Feb. 6,
Fluoride (F)	1.3		1952
Nitrate (NO ₃)	1.3		
Dissolved solids	77		

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	118	8	7.4	8.5	6.9	66	102	35	27	1,200	3
Finished water...	57	106	12	7.1	7.4	6.8	79	113	53	0	0	0

OSWEGO
(Population, 22,647)

Ownership: Municipal; also supplies about 1,500 people outside the city limits.

Total population supplied, about 24,100.

Source: Lake Ontario.

Treatment: Chlorination and ammoniation.

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 24,300,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	1.2	Hardness as CaCO ₃ :	
Iron (Fe) .....	.33	Total	140
Manganese (Mn) .....	.00	Noncarbonate	46
Calcium (Ca)	42		
Magnesium (Mg)	8.6	Color	6
Sodium (Na)	10	pH	7.9
Potassium (K)	1.3	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	115	25 C.).....	323
Sulfate (SO ₄)	29	Turbidity	3.0
Chloride (Cl)	26	Temperature (F.).....	--
Fluoride (F) .....	.1	Date of collection	Feb. 4,
Nitrate (NO ₃)	1.0		1952
Dissolved solids	179		

PORT CHESTER
(Population, 23,970)

Ownership: Port Chester Water Works, Inc.; also supplies the city of Rye. Total population supplied, about 38,000.

Source: Putman Lake, Rockwood Lake, and Brush Dam, located in Greenwich, Connecticut.

Treatment: Prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, postchlorination, and adjustment of pH with lime.

Rated capacity of treatment plant: 16,500,000 gpd.

Raw-water storage: Brush Dam, 14,000,000 gal; Rockwood Lake, 500,000,000 gal; Putman Lake, 572,000,000 gal.

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

Water from both Rockwood Lake and Brush Dam go into Putman Lake from which the water is taken for treatment. The treatment plant is located in Greenwich, Connecticut.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	6.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.04	Total	46
Manganese (Mn) .....	.00	Noncarbonate	26
Calcium (Ca)	14	Color	5
Magnesium (Mg)	2.7	pH	8.0
Sodium (Na)	3.8	Specific conductance	
Potassium (K)	1.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	124
Bicarbonate (HCO ₃)	24	Turbidity	5.4
Sulfate (SO ₄)	26	Temperature (F.).....	--
Chloride (Cl)	7.1	Date of collection	Jan. 22,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃) .....	.7		
Dissolved solids	79		

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.....	18	25	12	6.9	7.1	6.7	32	36	28	1	1	0
Finished water...	25	35	18	8.5	8.8	8.0	40	50	38	1	1	0

POUGHKEEPSIE
(Population, 41,023)

Ownership: Municipal; also supplies Fairview and several outside water districts.

Total population supplied, about 56,000.

Source: Hudson River.

Treatment: Prechlorination, coagulation, sedimentation, rapid sand filtration, aeration, slow sand filtration, corrosion control with lime, postchlorination, or dechlorination.

Rated capacity of treatment plant: 9,500,000 gpd.

Raw-water storage: None.

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)	5.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	71
Manganese (Mn) .....	.00	Noncarbonate	30
Calcium (Ca)	23	Color	2
Magnesium (Mg)	3.4	pH	7.6
Sodium (Na)	3.4	Specific conductance	
Potassium (K) .....	.8	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	170
Bicarbonate (HCO ₃)	50	Turbidity .....	.8
Sulfate (SO ₄)	28	Temperature (F.).....	--
Chloride (Cl)	6.0	Date of collection	Feb. 12,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃)	1.2		
Dissolved solids	102		

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.....	43	60	20	7.3	7.6	7.1	50	70	40	28	400	8
Finished water...	50	60	25	8.0	8.3	7.7	70	80	50	0	0	0

ROCHESTER
(Population, 332,488)

Ownership: Municipal. Supplies about 312,000 people in Rochester. The New York Water Service Corp., Rochester Division, supplies about 20,500 people.
 Source: Municipal: Hemlock and Canadice Lakes. New York Water Service Corp., Rochester Division: Lake Ontario.
 Treatment: Municipal: Chlorination, and ammoniation at the gatehouse at Hemlock Lake.
 Rated capacity of treatment plant: 42,000,000 gpd.
 Raw-water storage: --
 Finished-water storage: 234,000,000 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)	3.5	1.4	Hardness as CaCO ₃ :		
Iron (Fe) .....	.30	.18	Total	79	130
Manganese (Mn) .....	.00	.00	Noncarbonate.....	--	41
Calcium (Ca)	22	38	Color	5	3
Magnesium (Mg).....	5.8	8.6	pH	7.4	7.4
Sodium (Na)	3.0	9.6	Specific conductance		
Potassium (K)	2.4	1.4	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	170	295
Bicarbonate (HCO ₃)	59	109	Turbidity	--	.9
Sulfate (SO ₄)	26	30	Temperature (F.)...	--	--
Chloride (Cl)	5.0	20	Date of collection...	June 20,	Mar. 19,
Fluoride (F) .....	.0	.0		1951	1952
Nitrate (NO ₃)	1.0	.7			
Dissolved solids.....	101	176			

^a Hemlock Lake.

^b Lake Ontario.

ROCKVILLE CENTRE

(Population, 22,362)

Ownership: Municipal.

Source: 3 wells (N48, N52, N72) 538, 550, and 616 ft deep; yield reported to be 1,233, 1,500, and 1,300 gpm.

Treatment: Aeration, and addition of lime.

Rated capacity of treatment plant: --

Raw-water storage: None.

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

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	7.1	Hardness as CaCO ₃ :	
Iron (Fe) .....	.63	Total	14
Manganese (Mn) .....	.01	Noncarbonate	0
Calcium (Ca)	4.8		
Magnesium (Mg) .....	.4	Color	0
Sodium (Na)	3.8	pH	7.4
Potassium (K) .....	.4	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	18	25 C.).....	46.3
Sulfate (SO ₄)	3.5	Turbidity	--
Chloride (Cl)	1.2	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	Jan. 15,
Nitrate (NO ₃) .....	.2		1952
Dissolved solids	36		

ROME
(Population, 41,682)

Ownership: Municipal.

Source: East Branch of Fish Creek impounded.

Treatment: Ammoniation and chlorination before water enters storage reservoirs for sedimentation, and rechlorination at time of distribution.

Rated capacity of treatment plant: 25,000,000 gpd.

Raw-water storage: 66,000,000 gal.

Finished-water storage: --

ANALYSES

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

	Finished water	Finished water		Finished water	Finished water
Silica (SiO ₂)	2.6	5.5	Hardness as CaCO ₃ :		
Iron (Fe) .....	.25	.00	Total	37	32
Manganese (Mn)	--	.00	Noncarbonate.....	10	11
Calcium (Ca)	11	8.0	Color	35	18
Magnesium (Mg).....	2.3	3.0	pH	7.0	7.2
Sodium (Na)	2.5	.6	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	0	0	25 C.)	81.6	66.4
Bicarbonate (HCO ₃)	33	26	Turbidity	--	4.5
Sulfate (SO ₄)	7.2	8.5	Temperature (F.)...	68	42
Chloride (Cl)	5.1	1.9	Date of collection...	Aug. 28, 1951	Jan. 15, 1952
Fluoride (F) .....	.0	.1			
Nitrate (NO ₃) .....	.7	1.0			
Dissolved solids.....	63	45			

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.....	--	--	--	7	7.5	6.6	--	--	--	2	10	< 2
Finished water...	--	--	--	7		6.6	--	--	--	2	5	< 2

SCHENECTADY
(Population, 91,785)

Ownership: Municipal; also supplies about 1,400 people outside the city limits.

Total population supplied, about 93,200.

Source: 10 wells (1 to 10) 68, 66, 70, 70, 63, 58, 69, 70, 68, and 71 ft deep;
yield reported to be 2,100, 3,600, 3,555, 3,570, 3,515, 3,540, 3,540, 3,570,
3,555, and 3,880 gpm.

Treatment: Occasional chlorination.

Storage: 20,000,000 gal.

ANALYSES

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

	Well 2	Wells (city tap)		Well 2	Wells (city tap)
Silica (SiO ₂)	7.0	7.0	Hardness as CaCO ₃ :		
Iron (Fe) .....	.00	.09	Total	141	160
Manganese (Mn) .....	.00	--	Noncarbonate.....	21	24
Calcium (Ca)	43	49			
Magnesium (Mg).....	8.3	9.1	Color.....	2	2
Sodium (Na)	4.7	9.6	pH.....	7.8	7.7
Potassium (K)	1.0		Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	147	165	25 C.).....	290	342
Sulfate (SO ₄)	24	31	Turbidity.....	9.5	--
Chloride (Cl)	4.9	9.0	Temperature (F.)...	51	--
Fluoride (F) .....	.0	.1	Date of collection...	Jan. 16,	Oct. 7,
Nitrate (NO ₃)	1.4	.2		1952	1948
Dissolved solids.....	170	197			

SYRACUSE
(Population, 220,583)

Ownership: Municipal; also supplies about 11,500 people outside the city limits.

Total population supplied, about 232,000.

Source: Lake Skaneateles. Emergency connection to New York Water Service

Company to the extent of a few million gallons per day.

Treatment: Chlorination.

Raw-water storage: Lake.

Finished-water storage: 249,000,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	2.2	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	109
Manganese (Mn) .....	.01	Noncarbonate	15
Calcium (Ca)	34		
Magnesium (Mg)	5.8	Color	2
Sodium (Na)	1.5	pH	7.8
Potassium (K) .....	.8	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	114	25 C.).....	222
Sulfate (SO ₄)	14	Turbidity	1.4
Chloride (Cl)	2.2	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	Mar. 24,
Nitrate (NO ₃)	1.6		1953
Dissolved solids	128		

TROY
(Population, 72,311)

Ownership: Municipal; also supplies about 1,000 people outside the city limits.

Total population supplied, about 73,300.

Source: Tomhannock Reservoir 6 miles northeast of Troy, 70 percent of supply;
Grafton Reservoir on Quacken Kill Creek 7 miles east of Troy, 30 percent of
supply. Auxiliary or emergency supply, Frear Park Lake (used once in 1951).

Treatment: Chlorination.

Raw-water storage: 14,000,000,000 gal.

The distribution of the water is completely by gravity with the Grafton supply split
between upper high and high service by Vanderhyden Reservoir and pressure
reduction.

ANALYSIS

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

	Finished water ^a		Finished water ^a
Silica (SiO ₂)	3.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.08	Total	40
Manganese (Mn) .....	.00	Noncarbonate	13
Calcium (Ca)	12		
Magnesium (Mg)	2.5	Color	4
Sodium (Na)	2.2	pH	6.9
Potassium (K)	1.2	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	33	25 C.).....	98.6
Sulfate (SO ₄)	14	Turbidity	6.1
Chloride (Cl)	3.1	Temperature (F.).....	45
Fluoride (F) .....	.1	Date of collection	Jan. 23,
Nitrate (NO ₃)	1.3		1952
Dissolved solids	61		

^a Tomhannock Reservoir.

UTICA
(Population, 101,531)

Ownership: Municipal; also supplies about 25,000 people in other communities.

Total population supplied, about 126,000.

Source: West Canada Creek-Hinckley Reservoir, 97 percent of supply; Springs, 3 percent of supply.

Treatment: Chlorination and ammoniation.

Raw-water storage: 656,989,000 gal.

Finished-water storage: --

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	6.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.17	Total	16
Manganese (Mn) .....	.01	Noncarbonate	10
Calcium (Ca)	4.8		
Magnesium (Mg)	1.0	Color	32
Sodium (Na) .....	.5	pH	6.5
Potassium (K) .....	.3	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	8	25 C.).....	40.8
Sulfate (SO ₄)	6.0	Turbidity	5.8
Chloride (Cl)	2.4	Temperature (F.).....	39
Fluoride (F) .....	.1	Date of collection	Jan. 15,
Nitrate (NO ₃) .....	.7		1952
Dissolved solids	35		

VALLEY STREAM
(Population, 26, 854)

Ownership: Long Island Water Corp., Lynbrook, N. Y.; also supplies Cedarhurst, East Rockaway, Hewlett, Inwood, Lake View, Lawrence, Lynbrook, Malverne, Woodmere, and a number of other communities. Total population supplied, about 164,000.

Source: Wells in several well fields: Valley Stream, main pumping station 51 wells 150 ft deep and 40 wells 20 to 40 ft deep connected to a common suction line; well N3327 (W. Valley Stream) 451 ft deep, reported to yield 1,400 gpm; well N1603 (Lake View) 551 ft deep, reported to yield 1,215 gpm. At any one time about 40 wells are in use.

Treatment: Water from main station (Valley Stream): aeration, addition of lime, filtration, and chlorination. Water from other wells: addition of lime, and chlorination.

Rated capacity of treatment plant: --

Raw-water storage: --

Finished-water storage: 6,700,000 gal.

ANALYSES

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

	Suction wells		Well N3327		Well N1603
	Raw water	Finished water	Raw water	Finished water	(finished water)
Silica (SiO ₂)	8.5	13	10	14	11
Iron (Fe)	2.2	.20	.13	.18	.17
Manganese (Mn)	--	.01	--	.00	.00
Calcium (Ca)	--	16	--	13	18
Magnesium (Mg)	--	1.4	--	1.3	1.7
Sodium (Na)	6.0	4.9	3.9	3.7	4.3
Potassium (K) .....		.8		.5	.6
Carbonate (CO ₃)	0	4	0	3	0
Bicarbonate (HCO ₃)	11	44	12	38	62
Sulfate (SO ₄)	7	7.5	4	3.5	6.0
Chloride (Cl)	6	5.8	3	4.1	4.5
Fluoride (F)	--	.1	--	.0	.0
Nitrate (NO ₃) .....	.3	.6	.2	.1	.1
Dissolved solids	--	75	--	61	74
Hardness as CaCO ₃ :					
Total	12	46	10	38	52
Noncarbonate	3	3	0	2	1
Color	5	0	5	0	0
pH	5.9	8.7	6.1	8.6	8.2
Specific conductance (micromhos at 25 C.)	56.2	114	41.0	84.3	115
Turbidity	--	1.6	--	1.7	1.1
Temperature (F.)	--	--	--	--	--
Date of collection	Jan. 18, 1952	Jan. 18, 1952	Jan. 18, 1952	Jan. 18, 1952	Jan. 18, 1952

WATERTOWN
(Population, 34,350)

Ownership: Municipal; also supplies about 250 people outside the city limits, and an Air Force installation. Total population supplied, about 35,000.

Source: Black River impounded.

Treatment: Aeration, prechlorination, coagulation with alum, chlorine dioxide, sedimentation, rapid sand filtration, and adjustment of pH with soda ash.

Rated capacity of treatment plant: 9,000,000 gpd.

Raw-water storage: 60,000,000 gal.

Finished-water storage: 8,000,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	7.0	Hardness as CaCO ₃ :	
Iron (Fe) .....	.00	Total	78
Manganese (Mn) .....	.01	Noncarbonate	19
Calcium (Ca)	27	Color	8
Magnesium (Mg)	2.5	pH	7.2
Sodium (Na)	8.8	Specific conductance	
Potassium (K)	1.0	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	201
Bicarbonate (HCO ₃)	71	Turbidity	3.9
Sulfate (SO ₄)	32	Temperature (F.).....	47
Chloride (Cl)	4.4	Date of collection	Jan. 15,
Fluoride (F) .....	.1		1952
Nitrate (NO ₃)	2.5		
Dissolved solids	124		

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.....	40	65	16	7.0	7.4	6.7	54	96	41	3	45	1
Finished water...	36	60	14	7.1	7.3	6.9	52	96	38	0	0	0

WHITE PLAINS
(Population, 43,466)

Ownership: Municipal; also purchases water wholesale from the New York Water Service Corp.

Source: Municipal supply: 4 dug wells (1 to 4, on Orchard St.) 20, 23, 15, and 23 ft deep, 8.6 percent of supply; 2 Orchard St. reservoirs (small streams impounded) 15.7 percent of supply; New York Water Service Corp. supply: 17 wells (4 to 20) 58 to 118 ft deep on common suction and reported to yield 545 gpm, 21.6 percent of supply. Auxiliary supply, Catskill supply of New York City. (See New York.) New York City furnished 54.1 percent of supply in 1951.

Treatment: Chlorination.

Raw-water storage: Upper Orchard St. reservoir, 90,000,000 gal; lower Orchard St. reservoir, 120,000,000 gal.

Finished-water storage: Standpipe at Orchard St., 9,000,000 gal.

ANALYSES

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

	Dug well 2 (raw water)	Raw water ^a	16 wells ^b (raw water)
Silica (SiO ₂)	13	8.0	15
Iron (Fe) .....	.03	.03	.06
Manganese (Mn) .....	.00	.00	.00
Calcium (Ca)	30	6.5	48
Magnesium (Mg)	12	1.9	23
Sodium (Na)	3.7	2.9	7.4
Potassium (K)	1.9	1.5	2.7
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃)	113	9	200
Sulfate (SO ₄)	29	15	50
Chloride (Cl)	6.2	5.0	10
Fluoride (F) .....	.1	.2	.1
Nitrate (NO ₃)	1.4	.5	4.2
Dissolved solids	158	49	268
Hardness as CaCO ₃ :			
Total	124	24	214
Noncarbonate	32	17	50
Color	2	2	2
pH	7.6	6.4	7.5
Specific conductance (micromhos at 25 C.)	258	77.3	425
Turbidity	5.1	5.4	5.1
Temperature (F.)	58	--	52
Date of collection	Jan. 28, 1952	Jan. 28, 1952	Jan. 28, 1952
Depth (feet)	23	--	--
Diameter (feet)	30	--	--
Date dug	1886	--	--
Percent of supply	--	--	--

^a Lower Orchard Street reservoir.

^b New York Water Service Corp.

YONKERS
(Population, 152, 798)

Ownership: Municipal.

Source: Saw Mill River and Grassy Sprain Reservoir 65 percent of supply; Catskill supply, New York City (Hillview Reservoir) 35 percent of supply.

Treatment: Saw Mill River: slow sand filtration, and chlorination; Grassy Sprain Reservoir: chlorination.

Rated capacity of treatment plant: 16,000,000 gpd (Saw Mill River plant).

Raw-water storage: 1,000,000,000 gal (Grassy Sprain Reservoir).

Finished-water storage: 61,000,000 gal.

ANALYSES

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

	Saw Mill River (finished water)	Grassy Sprain Reservoir (finished water)	Hillview Reservoir ^a (finished water)
Silica (SiO ₂)	10	8.1	3.2
Iron (Fe) .....	.04	.10	.20
Manganese (Mn) .....	.02	.04	.02
Calcium (Ca)	27	15	5.0
Magnesium (Mg).....	8.5	6.4	1.8
Sodium (Na).....	11	12	1.3
Potassium (K)	4.0	2.3	.6
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	80	29	11
Sulfate (SO ₄).....	33	28	11
Chloride (Cl)	20	27	2.5
Fluoride (F) .....	.0	.1	.1
Nitrate (NO ₃)	3.6	1.5	.6
Dissolved solids	164	123	35
Hardness as CaCO ₃ :			
Total	102	64	20
Noncarbonate	37	40	11
Color	1	1	2
pH.....	7.4	6.8	6.8
Specific conductance (micromhos at 25 C.).....	272	206	53.3
Turbidity .....	.6	.8	2.3
Temperature (F.)	--	--	--
Date of collection	Feb. 19, 1952	Feb. 19, 1952	Feb. 19, 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 ^b	120	126	64	7.4	8.5	7.2	120	180	90	--	>100	--
Finished water ^b	120	126	64	7.4	8.5	7.2	120	180	90	--	5	--
Finished water ^c	60	--	--	7.2	7.3	7.2	75	80	70	--	10	--

^a Catskill supply, N. Y. City.

^b Sawmill River.

^c Grassy Sprain Reservoir.

ABINGTON township
(Population, 28,988)

Ownership: Philadelphia Suburban Water Company. (See Upper Darby.) Also supplies Cheltenham township and adjacent communities. Total population supplied, about 52,000.

Source: Neshaminy Creek.

Treatment: Prechlorination, coagulation with alum (and lime when necessary), taste and odor control with activated carbon, sedimentation, rapid sand filtration, postchlorination, ammoniation, and adjustment of pH with hydrated lime.

Rated capacity of treatment plant: 13,000,000 gpd.

Raw-water storage: 650,000,000 gal.

Finished-water storage: --

The water supplied to Abington and Cheltenham townships is treated at the Neshaminy Creek plant.

ANALYSES

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

	Neshaminy Creek ^a (raw water)	Finished water ^b	Finished water ^c
Silica (SiO ₂)	9.1	5.8	5.5
Iron (Fe) .....	.06	.06	.05
Manganese (Mn)	--	--	--
Calcium (Ca)	17	15	16
Magnesium (Mg).....	6.3	4.5	2.5
Sodium (Na).....	9.0	17	19
Potassium (K)			
Carbonate (CO ₃)	--	0	0
Bicarbonate (HCO ₃).....	37	48	48
Sulfate (SO ₄).....	36	30	30
Chloride (Cl)	12	13	12
Fluoride (F) .....	.2	.0	.0
Nitrate (NO ₃)	3.2	5.1	4.9
Dissolved solids	134	113	117
Hardness as CaCO ₃ :			
Total	68	56	50
Noncarbonate	38	17	11
Color	3	3	3
pH.....	7.0	7.6	7.6
Specific conductance (micromhos at 25 C.).....	--	205	205
Turbidity .....	.25	--	--
Temperature (F.)	--	77	78
Date of collection	June 13, 1951	Aug. 29, 1951	Aug. 29, 1951

^a Analysis by Philadelphia Suburban Water Company.

^b Tap sample, Abington township.

^c Tap sample, Cheltenham township.

ALIQUIPPA
(Population, 26, 132)

Ownership: Woodlawn Water Company.

Source: 5 wells (6, 7, 8, 14, and 16) 85, 88, 88, 90, and 91 ft deep.

Treatment: Prechlorination (chlorine dioxide). Split treatment: about $\frac{1}{4}$ of supply, coagulation with lime and soda ash, sedimentation, rapid sand filtration; about $\frac{3}{4}$ of supply, softening with zeolite. The mixed treated waters are post-chlorinated.

Rated capacity of treatment plant: 4,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 3,775,000 gal.

ANALYSES

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

	Raw water	Finished water (city tap)		Raw water	Finished water (city tap)
Silica (SiO ₂)	--	14	Hardness as CaCO ₃ :		
Iron (Fe)	--	. 14	Total	299	118
Manganese (Mn)	--	--	Noncarbonate.....	202	14
Calcium (Ca)	--	32			
Magnesium (Mg).....	--	9. 2	Color	5	3
Sodium (Na)	39	127	pH	8.0	8.0
Potassium (K)			Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	119	126	25 C.)	733	804
Sulfate (SO ₄)	226	219	Turbidity	--	--
Chloride (Cl)	34	41	Temperature (F.)...	76	76
Fluoride (F)	--	. 0	Date of collection...	Aug. 30,	Aug. 30,
Nitrate (NO ₃)	3. 2	5. 3		1951	1951
Dissolved solids.....	--	525			

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	110	102	7. 3	7. 4	7. 2	270	280	248	0	0	0
Finished water...	116	120	106	7. 6	7. 8	7. 5	72	78	68	0	0	0

ALLENTOWN
(Population, 106,756)

Ownership: Municipal; also supplies about 900 people outside the city limits.

Total population supplied, about 107,700.

Source: Little Lehigh River (about 30 percent of supply), Shantz and Crystal Springs (about 69 percent of supply); and wells (about 1 percent of supply).

Treatment: Spring water: chlorination; Little Lehigh River: coagulation with alum, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 10,000,000 gpd.

Raw-water storage: 5,000,000 gal (spring basins).

Finished-water storage: 40,000,000 gal.

A treatment plant of 20 million gpd capacity is under construction; to be completed during 1952.

ANALYSES

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

	Wells (raw water)	Shantz Spring (raw water)	Raw water ^a	Finished water
Silica (SiO ₂)	--	10	4.1	11
Iron (Fe).....	--	.06	.59	.08
Manganese (Mn)	--	--	--	--
Calcium (Ca)	--	44	34	35
Magnesium (Mg)	--	14	17	17
Sodium (Na).....	8.5	1.9	2.0	2.6
Potassium (K)		1.3	1.8	1.8
Carbonate (CO ₃)	7	6	3	3
Bicarbonate (HCO ₃).....	214	152	152	140
Sulfate (SO ₄)	39	23	18	26
Chloride (Cl).....	11	5.1	5.1	6.5
Fluoride (F)	--	.1	.0	.1
Nitrate (NO ₃)	14	14	11	10
Dissolved solids	--	205	184	196
Hardness as CaCO ₃ :				
Total	236	167	155	157
Noncarbonate	49	33	25	38
Color.....	3	2	4	3
pH.....	8.1	8.2	8.1	8.0
Specific conductance (micromhos at 25 C.)	479	348	317	324
Turbidity	--	--	--	--
Temperature (F.)	59	55	70	67
Date of collection	June 28, 1951	June 28, 1951	June 28, 1951	June 28, 1951

^a Little Lehigh River.

ALLENTOWN--Continued

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.....	120	140	65	7.6	8.0	7.4	170	188	160	25	500	7
Finished water...	116	138	60	7.7	7.9	7.4	170	188	160	9	4	0

ALTOONA
(Population, 77,177)

Ownership: Municipal; also supplies about 2,500 people outside the city limits.

Total population supplied, about 79,700.

Source: Mountain streams impounded.

Treatment: Chlorination.

Rated capacity of treatment plant: 6,500,000 gpd.

Raw-water storage: 1,238,000,000 gal.

Finished-water storage: 9,485,000 gal.

ANALYSES

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

	Raw water ^a	Finished water (city tap)		Raw water ^a	Finished water (city tap)
Silica (SiO ₂)	13	10	Hardness as CaCO ₃ :		
Iron (Fe) .....	.70	.38	Total	260	228
Manganese (Mn)	5.9	3.6	Noncarbonate.....	260	228
Calcium (Ca)	22	20			
Magnesium (Mg).....	22	19	Color	4	6
Sodium (Na)	14	2.5	pH	3.45	3.90
Potassium (K)			Specific conductance		
Carbonate (CO ₃)	^b 0	^c 0	(micromhos at		
Bicarbonate (HCO ₃)	0	0	25 C.).....	615	398
Sulfate (SO ₄)	260	170	Turbidity	--	--
Chloride (Cl)	14	2.6	Temperature (F.)...	59	--
Fluoride (F) .....	.2	.2	Date of collection...	July 28, 1951	July 28, 1951
Nitrate (NO ₃) .....	.1	.0			
Dissolved solids..... ^d	457	^e 306			

^a Glen White Stream.

^b Total acidity as H₂SO₄, 136 ppm.

^c Total acidity as H₂SO₄, 74 ppm.

^d Includes 18 ppm of Aluminum (Al).

^e Includes 11 ppm of Aluminum (Al).

BEAVER FALLS
(Population, 17,375)

Ownership: Municipal; also supplies East Rochester, Eastvale, Fallston, Freedom, New Brighton, Patterson Heights, Rochester, West Bridgewater, West Mayfield; and Chippewa, Daugherty, Patterson, Pulaski, Rochester, and White townships. Total population supplied, about 60,000.

Source: Beaver River.

Treatment: (At plants at Eastvale and New Brighton) prechlorination (chlorine dioxide), coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, and postchlorination (chlorine dioxide).

Rated capacity of treatment plants: Eastvale Plant, 6,000,000 gpd; New Brighton Plant, 4,000,000 gpd.

Raw-water storage: --

Finished-water storage: 11,300,000 gal.

ANALYSES

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

	Raw water ^a	Raw water ^b	Finished water ^b
Silica (SiO ₂)	--	--	4.5
Iron (Fe)	--	--	.09
Manganese (Mn)	--	--	--
Calcium (Ca)	--	--	60
Magnesium (Mg).....	--	--	12
Sodium (Na).....	24	23	20
Potassium (K)			
Carbonate (CO ₃)			
Bicarbonate (HCO ₃).....	0	0	0
Sulfate (SO ₄).....	13	34	40
Chloride (Cl)	161	158	157
Fluoride (F)	26	25	28
Nitrate (NO ₃)	--	--	.1
Dissolved solids	6.6	7.7	8.1
Hardness as CaCO ₃ :	--	--	353
Total	168	184	199
Noncarbonate	157	156	166
Color	12	15	8
pH.....	7.0	7.2	7.5
Specific conductance (micromhos at 25 C.).....	481	499	558
Turbidity	--	--	--
Temperature (F.)	81	81	85
Date of collection	Aug. 30, 1951	Aug. 30, 1951	Aug. 30, 1951

^a At New Brighton plant.

^b At Eastvale plant.

BEAVER FALLS--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.....	60	100	15	7.0	8.0	6.3	160	250	75	60	8000	15
Finished water...	65	110	15	7.3	8.2	7.0	165	260	80	0	3	0

BETHLEHEM
(Population, 66,340)

Ownership: Municipal; supplies also Fountainhill, Freemansburg, Miller Heights, and Salisbury township. Total population supplied, about 78,300.

Source: Wild Creek impounded in Wild Creek Reservoir about 27 mi north of Bethlehem. The water is pumped to Illicks Mill Reservoir and from there direct to consumers. Auxiliary or emergency supplies, Lehigh River; 1 deep well in Freemansburg; and 2 deep wells in Miller Heights.

Treatment: Chlorination when needed, and Calgon for corrosion control.

Raw-water storage: 4,100,000,000 gal.

Finished-water storage: 21,000,000 gal.

ANALYSES

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

	Raw water ^a	Finished water (city tap)		Raw water ^a	Finished water (city tap)
Silica (SiO ₂)	--	5.1	Hardness as CaCO ₃ :		
Iron (Fe) .....	.51	.19	Total	15	6
Manganese (Mn)	--	--	Noncarbonate.....	5	2
Calcium (Ca)	3.0	1.6			
Magnesium (Mg).....	1.4	.6	Color.....	5	4
Sodium (Na)	8.9	2.0	pH.....	6.0	7.1
Potassium (K) .....		.4	Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	12	6	25 C.).....	--	22.1
Sulfate (SO ₄)	20	3.5	Turbidity.....	3.6	--
Chloride (Cl)	2.4	1.6	Temperature (F.)...	53	59
Fluoride (F)	--	.0	Date of collection...	May 23,	June 28,
Nitrate (NO ₃)	--	.5		1951	1951
Dissolved solids.....	--	22			

^a Wild Creek; analysis by City Chemist, Bethlehem.

BETHLEHEM--Continued

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.....	5.4	--	--	6.0	--	--	6.0	--	--	3.6	--	--
Finished water...	5.5	--	--	6.1	--	--	6.1	--	--	2.7	--	--

BRADFORD

(Population, 17,354)

Ownership: Municipal; also supplies about 2,000 people outside the city limits.

Total population supplied, about 19,400.

Source: Gilbert Run impounded in No. 2 Reservoir; Marilla Brook impounded in No. 3 Reservoir. Auxiliary supply, four Layne wells, yield rated at 500 gpm each. The wells are used only during dry periods when the surface supplies are inadequate.

Treatment: Chlorination.

Raw-water storage: No. 2 Reservoir, 206,000,000 gal; No. 3 Reservoir, 120,000,000 gal.

Finished-water storage: None.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	5.6	Hardness as CaCO ₃ :	
Iron (Fe) .....	.10	Total	62
Manganese (Mn)	--	Noncarbonate	41
Calcium (Ca)	14		
Magnesium (Mg)	6.6	Color	8
Sodium (Na)	34	pH	7.4
Potassium (K)		Specific conductance	
Carbonate (CO ₃)		(micromhos at	
Bicarbonate (HCO ₃)	0	25 C.).....	720
Sulfate (SO ₄)	26	Turbidity	--
Chloride (Cl)	65	Temperature (F.).....	60
Fluoride (F) .....	.0	Date of collection	Aug. 28,
Nitrate (NO ₃) .....	.4		1951
Dissolved solids	179		

BUTLER
(Population, 23,482)

Ownership: American Water Works Service Company; supplies also parts of Butler, Center, and Summit townships; borough of East Butler, and village of Lyndora. Total population supplied, about 31,400.

Source: Connoquenessing Creek, 80 percent of supply; Thorn Run Creek, 20 percent of supply.

Treatment: Coagulation with alum, activated carbon, sedimentation, rapid sand filtration, chlorination, ammoniation, and pH control with lime.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: 869,000,000 gal.

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

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	4.6	Hardness as CaCO₃:		
Iron (Fe) .....	.07	.11	Total	54	98
Manganese (Mn)	--	--	Noncarbonate.....	29	70
Calcium (Ca)	--	27			
Magnesium (Mg).....	--	7.5	Color.....	7	3
Sodium (Na)	18	31	pH	7.0	7.7
Potassium (K)			Specific conductance		
Carbonate (CO ₃)			(micromhos at		
Bicarbonate (HCO ₃)	0	0	25 C.).....	210	398
Sulfate (SO ₄)	31	35	Turbidity	--	--
Chloride (Cl)	21	26	Temperature (F.)...	67	70
Fluoride (F)	31	78	Date of collection...	Aug. 27, 1951	Aug. 27, 1951
Nitrate (NO ₃)	--	.1			
Dissolved solids.....	1.7	.7			
	--	243			

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.	20	31	9	6.7	7.2	6.3	--	--	--	20	60	3
Finished water...	29	37	13	7.9	8.4	7.2	61	84	40	0	0	0

CHAMBERSBURG
(Population, 17,212)

Ownership: Municipal; also supplies about 1,400 people outside the city limits.

Total population supplied, about 18,600.

Source: Conococheague Creek (head waters).

Treatment: Chlorination, and adjustment of pH with caustic soda.

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

Raw-water storage: 387,000,000 gal.

Finished-water storage: 2,200,000 gal.

ANALYSES

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

	Raw water	Finished water (city tap)		Raw water	Finished water (city tap)
Silica (SiO ₂)	--	5.7	Hardness as CaCO ₃ :		
Iron (Fe)	--	.10	Total	5	7
Manganese (Mn)	--	--	Noncarbonate.....	5	0
Calcium (Ca)	--	1.4			
Magnesium (Mg).....	--	.8	Color.....	8	5
Sodium (Na)	--	2.7	pH.....	6.8	7.8
Potassium (K)	--		Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	6	8	25 C.).....	15.6	23.6
Sulfate (SO ₄)	3.5	2.2	Turbidity	--	--
Chloride (Cl)	1.1	2.5	Temperature (F.)...	62	69
Fluoride (F)	--	.0	Date of collection...	Sept.19,	Sept. 19,
Nitrate (NO ₃) .....	.0	.4		1951	1951
Dissolved solids.....	--	22			

CHARLEROI
(Population, 9,872)

Ownership: Municipal; also supplies Donora, Monessen, N. Charleroi, Speers, and parts of adjacent townships. Total population supplied, about 44,000.

Source: Monongahela River.

Treatment: Coagulation with alum and lime, ammoniation, chlorination, sedimentation, rapid (anthrafilt) filtration, and postchlorination.

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

Raw-water storage: None.

Finished-water storage: 10 reservoirs and 3 standpipes, 13,000,000 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	Hardness as CaCO ₃ :		
Iron (Fe)	--	.02	Total	^a 175	231
Manganese (Mn)	--	--	Noncarbonate.....	175	224
Calcium (Ca)	--	71	Color.....	5	5
Magnesium (Mg).....	--	13	pH.....	3.5	7.0
Sodium (Na)	--	33	Specific conductance		
Potassium (K)	--		(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	704	630
Bicarbonate (HCO ₃)	0	8.0	Turbidity.....	--	--
Sulfate (SO ₄)	285	276	Temperature (F.)...	--	75
Chloride (Cl)	8.4	5.4	Date of collection...	Aug. 23, 1951	Aug. 23, 1951
Fluoride (F)	--	.1			
Nitrate (NO ₃) .....	.6	1.2			
Dissolved solids.....	--	450			

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.....	b-13	b-23	b-1	4.4	6.0	3.4	133	192	82	20	2000	5
Finished water...	18	29	11	8.8	9.5	8.2	140	219	85	00	0	0

^a Versenate.

^b Acidity. Methyl orange indicator.

CHELTENHAM township
(Population, 22,854)

Ownership: Supplied by Philadelphia Suburban Water Company. (See Abington township and Upper Darby.)

CHESTER
(Population, 66,039)

Ownership: Chester Municipal Authority.

Source: Octoraro Creek impounded in Chester-Octoraro Lake about 38 miles from the city.

Treatment: Aeration, prechlorination, coagulation with alum, addition of activated carbon (Nuchar), sedimentation, rapid sand filtration, postchlorination, and adjustment of pH with lime.

Rated capacity of treatment plant: 12,500,000 gpd.

Raw-water storage: Chester-Octoraro Lake, 2,500,000,000 gal.

Finished-water storage: 15,000,000 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) .....	.04	Total	54
Manganese (Mn)	--	Noncarbonate	33
Calcium (Ca)	16		
Magnesium (Mg)	3.4	Color	3
Sodium (Na)	1.4	pH	7.3
Potassium (K)	0	Specific conductance	
Carbonate (CO ₃)	25	(micromhos at	
Bicarbonate (HCO ₃)	17	25 C.)	136
Sulfate (SO ₄)	7.5	Turbidity	--
Chloride (Cl) .....	.2	Temperature (F.)	60
Fluoride (F)	9.3	Date of collection	Jan. 8,
Nitrate (NO ₃)	86		1952
Dissolved solids			

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	29	42	18	6.5	6.6	6.4	80	128	49	140	168	108
Finished water...	41	61	26	8.2	8.3	8.1	106	147	66	0	0	0

CLAIRTON
(Population, 19,652)

Ownership: Monongahela Valley Water Corporation; also supplies Dravosburg, Elizabeth, Glassport, and West Elizabeth. Total population supplied, about 36,100.

Source: Monongahela River.

Treatment: Coagulation with lime and alum, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 3,600,000 gpd.

Raw-water storage: None.

Finished-water storage: 2,330,000 gal.

The treatment plant is located at Elizabeth.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	3.0	Hardness as CaCO ₃ :		
Iron (Fe)	--	.18	Total	^a 184	251
Manganese (Mn)	--	--	Noncarbonate.....	184	236
Calcium (Ca)	--	76	Color.....	8	5
Magnesium (Mg).....	--	15	pH.....	3.5	7.8
Sodium (Na)	--	42	Specific conductance		
Potassium (K)	--		(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	724	698
Bicarbonate (HCO ₃)	0	19	Turbidity.....	--	--
Sulfate (SO ₄)	304	293	Temperature (F.)...	79	80
Chloride (Cl)	9.6	12	Date of collection...	Aug. 31, 1951	Aug. 31, 1951
Fluoride (F)	--	.0			
Nitrate (NO ₃) .....	.8	6.1			
Dissolved solids.....	--	474			

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.....	^b -1	10	^b -24	--	--	--	108	214	60	55	400	5
Finished water...	18	28	8	8.9	9.6	7.8	120	234	58	0	10	0

^a Versenate.

^b Acidity.

DUNMORE
(Population, 20,305)

Ownership: Scranton-Spring Brook Water Service Company. (See Scranton.)
 Source: Dunmore No. 1 Reservoir, NayAu Well, and Williams Bridge Reservoir.
 Treatment: Chlorination.
 Raw-water storage: 412,000,000 gal.
 Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	1.0	Hardness as CaCO ₃ :	
Iron (Fe) .....	.03	Total	10
Manganese (Mn)	--	Noncarbonate	1
Calcium (Ca)	1.0		
Magnesium (Mg)	1.7	Color	3
Sodium (Na)	7.8	pH	7.0
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	10	25 C.).....	57.2
Sulfate (SO ₄)	11	Turbidity	--
Chloride (Cl)	4.4	Temperature (F.).....	72
Fluoride (F) .....	.0	Date of collection	Sept. 12,
Nitrate (NO ₃) .....	.6		1951
Dissolved solids	40		

DUQUESNE
(Population, 17,620)

Ownership: Municipal.

Source: 7 wells (A, B, C, E, F, G, H) 130, 139, 117, 74, 87, 105, and 75 ft deep; yield reported to be 250, 300, 200, 200, 400, 200, and 200 gpm.

Treatment: Addition of lime, sedimentation, rapid sand filtration, and chlorination (in emergencies).

Rated capacity of treatment plant: 2,500,000 gpd.

Raw-water storage: None.

Finished-water storage: reservoir, 2,070,000 gal; standpipe, 450,000 gal.

The wells are located in the immediate vicinity of the waterworks plant. It is reported that there is considerable variation in the chemical composition of the water from the individual wells.

ANALYSES

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

	Wells (raw water)	Finished water		Wells (raw water)	Finished water
Silica (SiO ₂)	--	10	Hardness as CaCO ₃ :		
Iron (Fe)	--	.14	Total	314	256
Manganese (Mn)	--	--	Noncarbonate.....	278	242
Calcium (Ca)	--	73	Color	5	4
Magnesium (Mg).....	--	18	pH	6.3	8.9
Sodium (Na)	53	35	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)		4	25 C.).....	719	693
Bicarbonate (HCO ₃)	44	9	Turbidity	--	--
Sulfate (SO ₄)	297	270	Temperature (F.)...	80	80
Chloride (Cl)	22	24	Date of collection...	Aug. 21, 1951	Aug. 21, 1951
Fluoride (F)	--	.1			
Nitrate (NO ₃)	6.6	3.9			
Dissolved solids.....	--	493			

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.....	43	45	40	6.5	7.2	6.2	--	--	--	--	--	--
Finished water...	20	24	15	9.0	9.2	8.8	--	--	--	--	--	--

EASTON
(Population, 35,632)

Ownership: Municipal; supplies also about 24,000 people outside the city limits.

Total population supplied, about 59,600.

Source: Delaware River about 81 percent of supply; 4 wells (2, 3, 5, 6) 70, 347, 92, and 92 ft deep, about 18 percent of supply; springs about 1 percent of supply.

Treatment: Coagulation, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 15,500,000 gal.

One half of the southern part of Easton is supplied by wells and springs. The well water is chlorinated at the source and pumped into the distribution system.

Should the consumer use be less than the output of the wells, the excess well water is pumped to a reservoir, which is also fed by springs. Water from this reservoir is used if the consumer demand exceeds the output of the wells.

ANALYSES

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

	Wells, composite ^a (raw water)	Delaware River ^a (raw water)	Delaware River (finished water)
Silica (SiO ₂)	16	2.2	4.2
Iron (Fe) .....	.25	.07	.06
Manganese (Mn)	--	--	--
Calcium (Ca)	35	16	21
Magnesium (Mg).....	22	3.5	3.0
Sodium (Na).....	26	2.7	4.8
Potassium (K)			1.0
Carbonate (CO ₃)	0	1	0
Bicarbonate (HCO ₃).....	207	41	40
Sulfate (SO ₄).....	41	11	30
Chloride (Cl)	15	9.5	8.2
Fluoride (F) .....	.1	.05	0
Nitrate (NO ₃)	--	--	.7
Dissolved solids	296	103	98
Hardness as CaCO ₃ :			
Total	178	54	65
Noncarbonate	8	16	32
Color	3	3	3
pH	7.3	8.6	7.9
Specific conductance (micromhos at 25 C.).....	--	--	161
Turbidity .....	.1	.2	--
Temperature (F.)	58	73	77
Date of collection	July, 1951	July, 1951	July 28, 1951

^a Analysis by Easton Water Department.

EASTON--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.....	27	39	15	7.0	7.6	6.5	--	--	--	18	450	4.0
Finished water...	32	42	20	8.6	9.0	8.0	67	78	48	.6	1.3	.2

ERIE

(Population, 130,803)

Ownership: Municipal; also supplies a population of about 20,000 outside the city limits. Total population supplied, about 150,000.

Source: Lake Erie.

Treatment: (Both plants) coagulation with alum, activated carbon, sedimentation, rapid sand filtration, ammoniation, and chlorination.

Rated capacity of treatment plants: West Side Plant, 28,000,000 gpd; Chestnut St. Plant, 32,000,000 gpd.

Raw-water storage: --

Finished-water storage: 43,400,485 gal.

ANALYSES

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

	Raw water ^a	Finished water ^b		Raw water ^a	Finished water ^b
Silica (SiO ₂)	1.2	1.5	Hardness as CaCO ₃ :		
Iron (Fe) .....	.03	.11	Total	125	129
Manganese (Mn)	--	--	Noncarbonate.....	34	40
Calcium (Ca)	36	37			
Magnesium (Mg).....	8.5	8.9	Color.....	2	2
Sodium (Na)	8.0	9.4	pH.....	7.5	7.8
Potassium (K)	1.2	.6	Specific conductance		
Carbonate (CO ₃)	--	0	(micromhos at		
Bicarbonate (HCO ₃)	111	108	25 C.).....	--	300
Sulfate (SO ₄)	24	24	Turbidity.....	0	--
Chloride (Cl)	19	20	Temperature (F.)...	70	73
Fluoride (F) .....	.0	.0	Date of collection...	July 15,	July 26,
Nitrate (NO ₃)	--	.4		1951	1951
Dissolved solids.....	172	177			

^a Analysis by Erie Bureau of Water.

^b At Chestnut Street treatment plant.

GREENSBURG
(Population, 16,923)

Ownership: Municipal Authority of Westmoreland County; also supplies Apollo, Irwin, Jeannette, Leechburg, Mt. Pleasant, Scottsdale, Vandergrift, and a number of other places. Total population supplied, about 68,000.

Source: Beaver Run impounded in Beaver Run Reservoir, 50 percent of supply; collected surface runoff into interconnected Immel and Unity Reservoirs, 50 percent of supply; Greenlick and Bridgeport Reservoirs.

Treatment: Beaver Run supply: coagulation with alum, aeration, addition of lime and carbon, sedimentation, rapid sand filtration, and chlorination. Unity Reservoir supply: Copper sulfate for control of algae, and chlorination.

Rated capacity of treatment plant: Beaver Run supply, 10,000,000 gpd.

Raw-water storage: Beaver Run Reservoir, 9,180,000,000 gal; Immel and Unity Reservoirs, 180,000,000 and 365,000,000 gal, respectively.

Finished-water storage: Irwin reservoir, 45,000,000 gal; Jeanette reservoir, 1,500,000 gal.

Ruffsedale, Mt. Pleasant, and Scottsdale are supplied from Greenlick and Bridgeport Reservoirs.

ANALYSES

(Analyses, in parts per million, by Municipal Authority of Westmoreland County)

	Beaver Run (raw water)	Beaver Run (finished water)	Unity Reservoir
Silica (SiO ₂)	--	--	--
Iron (Fe) .....	.10	.00	.10
Manganese (Mn)	1.4	.00	.05
Calcium (Ca)	26	34	8.0
Magnesium (Mg).....	8.6	7.7	6.2
Sodium (Na).....	3.2	7.0	--
Potassium (K)			
Carbonate (CO ₃)	0	--	0
Bicarbonate (HCO ₃).....	17	^a 28	13
Sulfate (SO ₄).....	80	85	18
Chloride (Cl)	8.4	14	8.4
Fluoride (F) .....	.2	.2	--
Nitrate (NO ₃)	--	--	--
Dissolved solids	146	162	63
Hardness as CaCO ₃ :			
Total	103	116	45
Noncarbonate	89	94	35
Color	2	0	--
pH.....	7.2	8.6	7.0
Specific conductance (micromhos at 25 C.).....	--	--	--
Turbidity	2.5	0	6.5
Temperature (F.)	--	--	--
Date of collection	1953	1953	Feb. 24, 1953

^a Total alkalinity as bicarbonate (HCO₃).

HARRISBURG
(Population, 89,544)

Ownership: Municipal; also supplies about 17,000 people outside the city limits.

Total population supplied, about 106,500.

Source: Clark Creek impounded in DeHart Reservoir. Auxiliary or emergency supply, Susquehanna River (with 20,000,000 gpd treatment plant).

Treatment: Natural sedimentation, pH control with lime, and chlorination.

Rated capacity of treatment plant: 22,000,000 gpd.

Raw-water storage: 5,260,000,000 gal.

Finished-water storage: 51,000,000 gal.

ANALYSES

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

	Raw water	Finished water (city tap)		Raw water	Finished water (city tap)
Silica (SiO ₂)	--	2.6	Hardness as CaCO ₃ :		
Iron (Fe)	--	.08	Total	12	13
Manganese (Mn)	--	--	Noncarbonate.....	4	5
Calcium (Ca)	--	3.6			
Magnesium (Mg).....	--	.9	Color	5	3
Sodium (Na)	2.7	1.7	pH	7.0	7.1
Potassium (K)			Specific conductance		
Carbonate (CO ₃)			(micromhos at		
Bicarbonate (HCO ₃)			25 C.).....	38.2	33.5
Sulfate (SO ₄)	5.2	4.2	Turbidity	--	--
Chloride (Cl)	3	3.4	Temperature (F.)...	71	72
Fluoride (F)	--	.0	Date of collection...	Sept. 19,	Sept. 19,
Nitrate (NO ₃) .....	.0	.0		1951	1951
Dissolved solids.....	--	24			

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.....	6	8	5	6.4	6.6	6.0	20	33	16	3.4	7.0	3.0
Finished water...	11	17	6	8.1	9.0	6.8	33	42	26	3.0	3.0	3.0

PENNSYLVANIA

HAVERFORD township
(Population, 39,641)

Ownership: Philadelphia Suburban Water Company. (See Upper Darby.)

Source: Pickering Creek. Emergency supply, Perkiomen Creek.

Treatment: Prechlorination, coagulation with alum (also lime when necessary), taste and odor control with activated carbon, sedimentation, rapid sand filtration, postchlorination, ammoniation, and adjustment of pH with lime.

Rated capacity of treatment plant: 16,000,000 gpd.

Raw-water storage: 350,000,000 gal.

Finished-water storage: --

ANALYSES

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

	Raw water ^a	Finished water ^b		Raw water ^a	Finished water ^b
Silica (SiO ₂)	11	5.2	Hardness as CaCO ₃ :		
Iron (Fe) .....	.10	.02	Total	67	79
Manganese (Mn)	--	--	Noncarbonate.....	25	34
Calcium (Ca)	18	21	Color	3	5
Magnesium (Mg)	5.4	6.5	pH	7.0	7.7
Sodium (Na)	8.8	5.8	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	--	0	25 C.)	--	208
Bicarbonate (HCO ₃)	51	55	Turbidity	0.25	--
Sulfate (SO ₄)	30	32	Temperature (F.)...	--	80
Chloride (Cl)	8.0	8.3	Date of collection...	May 28,	Aug. 30,
Fluoride (F) .....	.1	.0		1951	1951
Nitrate (NO ₃)	2.0	2.2			
Dissolved solids.....	133	122			

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	--	--	7.3	8.8	6.6	--	--	--	24	800	2
Finished water...	32	--	--	7.0	--	--	--	--	--	.34	--	--

^a Pickering Creek. Analysis by Philadelphia Suburban Water Company.^b Tap sample, South Ardmore, Pa.

HAZLETON
(Population, 35,491)

Ownership: Municipal; also supplies West Hazleton and other communities.

Total population supplied, about 47,500.

Source: Reservoirs (Drek Creek, Wolf Run, and other streams impounded) 97 percent of supply; wells, 3 percent of supply.

Treatment: Chlorination.

Raw-water storage: --

Finished-water storage: 572,412,000 gal.

ANALYSES

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

	Raw water ^a	Raw water ^b	Raw water ^c	Finished water ^d	Finished water ^e
Silica (SiO ₂)	--	--	--	2.1	2.1
Iron (Fe)	--	--	--	.06	.13
Manganese (Mn)	--	--	--	--	--
Calcium (Ca)	--	--	--	1.6	1.2
Magnesium (Mg)	--	--	--	1.0	.6
Sodium (Na)	1.4	--	--	1.2	1.6
Potassium (K)		--	--		
Carbonate (CO ₃)		0	0	0	0
Bicarbonate (HCO ₃)	9	4	2	3	5
Sulfate (SO ₄)	2.6	--	--	5.8	2.1
Chloride (Cl)	1.2	1.0	1.0	1.6	1.9
Fluoride (F)	--	--	--	.0	.0
Nitrate (NO ₃) .....	.4	.4	.4	.0	.0
Dissolved solids	--	--	--	19	16
Hardness as CaCO ₃ :					
Total	9	9	4	8	5
Noncarbonate	2	4	2	6	1
Color	5	5	5	5	8
pH	6.8	6.5	6.0	6.3	6.9
Specific conductance (micromhos at 25 C.)	24.7	22.6	14.5	23.2	18.1
Turbidity	--	--	--	--	--
Temperature (F.)	68	68	71	67	68
Date of collection	Sept. 11, 1951	Sept. 11, 1951	Sept. 11, 1951	Sept. 11, 1951	Sept. 11, 1951

^a Mt. Pleasant Reservoir; supply for part of Hazleton and West Hazleton.

^b Composite: well water, Wolf Run, and Barnes Run.

^c Barnes Reservoir.

^d West Hazleton, city tap.

^e Hazleton, city tap.

JOHNSTOWN
(Population, 63,232)

Ownership: Johnstown Water Company; also supplies about 35,000 people outside the city limits. Total population supplied, about 98,000.

Source: Mountain streams impounded in 5 reservoirs (Salt Lick, North Fork, Mill Creek, Laurel Run, and Dalton Run).

Treatment: Chlorination on supply line from each reservoir.

Raw-water storage: --

Finished-water storage: --

ANALYSES

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

	Raw water ^a	Raw water ^b	Raw water ^c	Raw water ^d	Finished water (city tap)
Silica (SiO ₂)	--	--	--	--	3.8
Iron (Fe)	--	--	--	--	.10
Manganese (Mn)	--	--	--	--	--
Calcium (Ca)	--	--	--	--	4.1
Magnesium (Mg)	--	--	--	--	1.7
Sodium (Na)	3.4	2.4	1.1	5.4	2.3
Potassium (K)					
Carbonate (CO ₃)					
Bicarbonate (HCO ₃)	0	0	0	0	0
Sulfate (SO ₄)	6	6	11	11	7
Chloride (Cl)	11	11	23	11	8.4
Fluoride (F)	2.0	1.2	1.8	4.2	2.1
Nitrate (NO ₃)	--	--	--	--	.0
Dissolved solids	4.1	1.4	2.3	1.8	5.8
Hardness as CaCO ₃ :	--	--	--	--	37
Total	15	14	35	16	17
Noncarbonate	10	9	26	7	12
Color	10	9	8	8	3
pH	6.8	7.1	7.1	6.9	6.9
Specific conductance (micromhos at 25 C.)	46.0	42.2	90.6	45.5	46.9
Turbidity	--	--	--	--	--
Temperature (F.)	48	60	63	66	61
Date of collection	Aug. 22, 1951	Aug. 22, 1951	Aug. 22, 1951	Aug. 22, 1951	Aug. 22, 1951

^a North Fork Reservoir.

^b Dalton Run Reservoir.

^c Salt Lick Reservoir.

^d Mill Creek Reservoir.

JOHNSTOWN--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.....	--	--	--	--	--	--	--	--	--	--	--	--
Finished water...	6.3	10	3.5	6.1	6.4	5.0	21	33	17	5	13	5

KINGSTON

(Population, 21,096)

Ownership: Scranton-Spring Brook Water Service Company. (See Scranton.)

Source: Hillside and Spring Brook Reservoirs (creeks impounded).

Treatment: 50 percent of supply: coagulation with alum and lime, sedimentation, filtration, and chlorination. 50 percent of supply: chlorination.

Rated capacity of treatment plant: --

Raw-water storage: --

Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	--	Hardness as CaCO ₃ :	
Iron (Fe)	--	Total	a 26
Manganese (Mn)	--	Noncarbonate	16
Calcium (Ca)	--		
Magnesium (Mg)	--	Color	5
Sodium (Na)	--	pH	6.9
Potassium (K)	3.2	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	12	25 C.).....	75.1
Sulfate (SO ₄)	17	Turbidity	--
Chloride (Cl)	3.4	Temperature (F.).....	67
Fluoride (F)	--	Date of collection	Sept. 12,
Nitrate (NO ₃) .....	.8		1951
Dissolved solids	--		

a Versenate.

LANCASTER
(Population, 63,774)

Ownership: Municipal; also supplies about 20,000 people outside the city limits.

Total population supplied, about 84,000.

Source: Conestoga River.

Treatment: Coagulation with alum, sedimentation, rapid sand filtration, ammoniation, chlorination, and aeration.

Rated capacity of treatment plant: 16,000,000 gpd.

Raw-water storage: 30,000,000 gal.

Finished-water storage: 13,000,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	4.5	Hardness as CaCO ₃ :		
Iron (Fe)	--	.05	Total	180	177
Manganese (Mn)	--	--	Noncarbonate.....	31	62
Calcium (Ca)	--	43	Color	8	5
Magnesium (Mg).....	--	17	pH	8.1	7.9
Sodium (Na)	4.6	3.4	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	8	0	25 C.)	364	358
Bicarbonate (HCO ₃)	166	141	Turbidity	--	--
Sulfate (SO ₄)	21	45	Temperature (F.)...	71	71
Chloride (Cl)	6.5	6.6	Date of collection...	Aug. 7,	Aug. 7,
Fluoride (F)	--	.0	1951	1951	1951
Nitrate (NO ₃)	12	16			
Dissolved solids.....	--	232			

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.....	115	160	30	7.6	8.1	6.3	--	--	--	57	650	8
Finished water...	106	148	38	7.1	7.4	6.4	155	205	85	.0	1.0	.0

LEBANON
(Population, 28,156)

Ownership: Municipal; also supplies about 2,000 people outside the city limits.

Total population supplied, about 30,200.

Source: Fishing Creek and Gold Mine Run impounded in High Bridge Reservoir, 20 miles north of Lebanon.

Treatment: Chlorination, Calgon and lime for pH and corrosion control.

Rated capacity of treatment plant: 9,000,000 gpd.

Raw-water storage: 370,000,000 gal.

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)	--	5.8	Hardness as CaCO ₃ :		
Iron (Fe)	--	.16	Total	10	22
Manganese (Mn)	--	--	Noncarbonate.....	8	14
Calcium (Ca)	--	6.1			
Magnesium (Mg).....	--	1.6	Color	8	5
Sodium (Na)	1.7	1.4	pH	6.3	7.5
Potassium (K)			Specific conductance		
Carbonate (CO ₃)			(micromhos at		
Bicarbonate (HCO ₃)	0	0	.25 C.)	30.5	58.8
Sulfate (SO ₄)	8.8	8.8	Turbidity	--	--
Chloride (Cl)	1.0	5.1	Temperature (F.)...	69	68
Fluoride (F)	--	.1	Date of collection...	Aug. 7, 1951	Aug. 7, 1951
Nitrate (NO ₃) .....	.8	.0			
Dissolved solids.....	--	42			

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.....	3	--	--	6.0	--	--	10	--	--	2	--	--
Finished water...	6	--	--	6.8	--	--	16	--	--	2	--	--

LOWER MERION township
(Population, 48,745)

Ownership: Philadelphia Suburban Water Company. (See Upper Darby.)

ANALYSIS

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

	Finished water ^a		Finished water ^a
Silica (SiO ₂)	7.3	Hardness as CaCO ₃ :	
Iron (Fe) .....	.01	Total	80
Manganese (Mn)	--	Noncarbonate	34
Calcium (Ca)	22		
Magnesium (Mg)	6.2	Color	5
Sodium (Na)	8.5	pH	7.8
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	57	25 C.).....	211
Sulfate (SO ₄)	37	Turbidity	--
Chloride (Cl)	8.5	Temperature (F.).....	81
Fluoride (F) .....	.0	Date of collection	Aug. 30,
Nitrate (NO ₃)	2.1		1951
Dissolved solids	130		

^a Tap sample, Bryn Mawr, Pa.

McKEESPORT
(Population, 51,502)

Ownership: Municipal; also supplies Eden Park, Liberty, Port Vue, Versailles, and White Oak; and part of North Versailles township. Total population supplied, about 68,300.

Source: Youghiogheny River about 75 percent of supply (1950); Monongahela River about 25 percent of supply (1950).

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

Rated capacity of treatment plant: 10,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 7,725,000 gal.

McKEESPORT--Continued

ANALYSES

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

	Raw water ^a	Raw water ^b	Finished water
Silica (SiO ₂)	--	--	7.3
Iron (Fe) .....	.25	--	.30
Manganese (Mn)	--	--	--
Calcium (Ca)	--	--	70
Magnesium (Mg).....	--	--	21
Sodium (Na).....	--	--	28
Potassium (K)	--	--	6
Carbonate (CO ₃)	0	0	14
Bicarbonate (HCO ₃).....	0	0	275
Sulfate (SO ₄).....	278	368	10
Chloride (Cl)	9.8	12	.1
Fluoride (F)	--	--	1.0
Nitrate (NO ₃)	2.3	2.3	460
Dissolved solids	--	--	
Hardness as CaCO ₃ :			
Total	^c 184	^c 233	261
Noncarbonate	184	233	240
Color	6	5	4
pH	3.8	3.7	9.3
Specific conductance (micromhos at 25 C.).....	665	753	653
Turbidity	--	--	--
Temperature (F.)	75	70	75
Date of collection	Aug. 24, 1951	Aug. 24, 1951	Aug. 24, 1951

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.....	2	11	^d 19	4.6	7.0	3.4	103	224	48	55	1500	5
Finished water...	19	29	11	9.2	9.9	8.3	108	176	63	0	0	0

^a Monongahela and Youghiogheny Rivers at treatment plant.^b Monongahela River at McKeesport.^c Versenate.^d Acidity.

McKEES ROCKS
(Population, 16,241)

Ownership: Municipal Authority of the Borough of West View; also supplies Avalon, Bellevue, Ben Avon, Ben Avon Heights, Emsworth, and West View; Kennedy, Kilbuck, McCandless, Neville, Reserve, Ross, and Stowe townships, and 1,500 people in the 28th ward of Pittsburgh. Total population supplied, about 93,300.

Source: 30 wells about 38 ft deep in the main channel of the Ohio River, near Neville Island, yield reported to be about 1,500,000 gpd; 19 wells about 35 ft deep in the back channel of the Ohio River near Neville Island, yield reported to be about 2,800,000 gpd; 3 gravel packed wells (1 to 3) on Neville Island, 65, 60, and 72 ft deep, reported to yield 500,000, 400,000, and 1,000,000 gpd, respectively; 3 gravel packed wells 54 to 58 ft deep on Davis Island, yield reported to be 1,200,000, 1,000,000, and 700,000 gpd, respectively; and 1 Ranney well 60 ft deep on Neville Island, yield reported to be 2,500,000 gpd. The 30 main channel wells are pumped through a common suction line by a centrifugal pump; the 19 back channel wells are connected to one common suction header and are pumped by centrifugal pumps; wells 1, 2, 3, and the Ranney well are each equipped with deep well turbine pumps; wells 4, 5, and 6 are pumped with submersible type well pumps.

Treatment: Prechlorination, and zeolite softening (four pressure type and four gravity type softeners).

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

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	Hardness as CaCO ₃ :		
Iron (Fe)	--	.08	Total	234	156 ^a
Manganese (Mn)	--	--	Noncarbonate.....	146	76
Calcium (Ca)	--	46	Color	5	3
Magnesium (Mg)	--	10	pH	7.7	7.6
Sodium (Na)	33	73	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	0	0	25 C.)	612	569
Bicarbonate (HCO ₃)	108	98	Turbidity	--	--
Sulfate (SO ₄)	168	168	Temperature (F.)...	65	68
Chloride (Cl)	28	38	Date of collection...	Aug. 30,	Aug. 30,
Fluoride (F)	--	.0		1951	1951
Nitrate (NO ₃)	3.5	7.7			
Dissolved solids.....	--	422			

^a Average hardness of treated water, 90 ppm.

MEADVILLE
(Population, 18,972)

Ownership: Municipal.

Source: 7 wells (1 to 7) 80, 78, 81, 81, 95, 79, and 60 ft deep; yield reported to be 700, 700, 1,100, 1,100, 1,800, 2,200, and 1,450 gpm.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 4,500,000 gal.

ANALYSES

(Analyses, in parts per million, by Meadville Water Bureau)

	Well 1	Well 5	Well 6	Well 7	Finished water (city tap)
Silica (SiO ₂)	--	--	--	--	--
Iron (Fe) .....	.1	.3	.1	.1	.1
Manganese (Mn) .....	.1	.0	--	.2	.0
Calcium (Ca)	--	--	--	--	--
Magnesium (Mg)	--	--	--	--	--
Sodium (Na)	--	--	--	--	--
Potassium (K)	--	--	--	--	--
Carbonate (CO ₃)	--	--	--	--	--
Bicarbonate (HCO ₃)	185	170	190	190	160
Sulfate (SO ₄)	--	--	--	--	--
Chloride (Cl)	4	7	13	9	11
Fluoride (F) .....	.0	.0	.0	.0	.0
Nitrate (NO ₃) .....	.0	.0	.0	.0	.0
Dissolved solids	280	290	445	285	360
Hardness as CaCO ₃ :					
Total	244	220	320	240	245
Noncarbonate	--	--	--	--	--
Color	0	5	0	0	0
pH	7.5	7.5	7.5	8.0	8.0
Specific conductance (micromhos at 25 C.)	--	--	--	--	--
Turbidity	5	5	0	0	0
Temperature (F.)	--	--	--	--	--
Date of collection	Oct. 27, 1952	Oct. 27, 1952	Oct. 27, 1952	Oct. 27, 1952	Oct. 27, 1952
Depth (feet)	80	95	79	60	
Diameter (inches)	12	16	16	16	
Date drilled	1926	--	--	1947	
Percent of supply	--	--	--	--	

PENNSYLVANIA

MONESSEN
(Population, 17,896)

Ownership: Supplied by Charleroi. (See Charleroi.)

MOUNT LEBANON township
(Population, 26,604)

Ownership: Supplied by South Pittsburgh Water Company. (See Pittsburgh.)

NANTICOKE
(Population, 20,160)

Ownership: Scranton-Spring Brook Water Service Company. (See Scranton.)
Source: Pike's Creek, Harveys Creek, and Plymouth Relief Creek impounded.
Treatment: Chlorination.
Raw-water storage: 3,012,000,000 gal.
Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	--	Hardness as CaCO ₃ :	
Iron (Fe)	--	Total	17
Manganese (Mn)	--	Noncarbonate	8
Calcium (Ca)	--		
Magnesium (Mg)	--	Color	5
Sodium (Na)	} 3.2	pH	6.9
Potassium (K)		Specific conductance	
Carbonate (CO ₃)		(micromhos at	
Bicarbonate (HCO ₃)		25 C.).....	77.2
Sulfate (SO ₄)		Turbidity	--
Chloride (Cl)	3.0	Temperature (F.).....	68
Fluoride (F)	--	Date of collection	Sept. 12,
Nitrate (NO ₃) .....	.6		1951
Dissolved solids	--		

NEW CASTLE
(Population, 48,834)

Ownership: City of New Castle Water Company; also supplies about 18,400 people outside the city limits. Total population supplied, 67,200.

Source: Shenango River.

Treatment: Preammoniation, prechlorination, coagulation with alum, aeration, sedimentation, rapid sand filtration, postammoniation, and postchlorination (chlorine dioxide).

Rated capacity of treatment plant: 8,000,000 gpd.

Raw-water storage: --

Finished-water storage: 8,200,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	2.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.12	Total	112
Manganese (Mn)	--	Noncarbonate	76
Calcium (Ca)	35		
Magnesium (Mg)	5.9	Color	5
Sodium (Na)	7.3	pH	7.8
Potassium (K)	0	Specific conductance (micromhos at 25 C.)	274
Carbonate (CO ₃)	43	Turbidity	--
Bicarbonate (HCO ₃)	63	Temperature (F.)	69
Sulfate (SO ₄)	15	Date of collection	Sept. 3, 1951
Chloride (Cl) .....	.0		
Fluoride (F)	6.7		
Nitrate (NO ₃)	171		
Dissolved solids			

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	54	10	7.0	8.4	6.5	--	--	--	62	180	7
Finished water	32	52	14	7.5	7.7	7.3	86	107	58	0	1.5	0

NEW KENSINGTON
(Population, 25,146)

Ownership: Municipal; supplies also Arnold, and Lower Burrell township. Total population supplied, about 42,000.

Source: Allegheny River.

Treatment: Prechlorination, coagulation with lime, alum, and sodium silicate, activated carbon for taste control, sedimentation, rapid sand filtration, and postchlorination (chlorine dioxide).

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

Raw-water storage: --

Finished-water storage: 10,000,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	5.6	Hardness as CaCO ₃ :		
Iron (Fe)	--	.13	Total	166	219
Manganese (Mn)	--	--	Noncarbonate.....	166	206
Calcium (Ca)	--	58	Color	4	4
Magnesium (Mg)	--	18	pH	4.5	7.9
Sodium (Na)	--	19	Specific conductance		
Potassium (K)	--	19	(micromhos at		
Carbonate (CO ₃)	^a 0	0	25 C.)	546	549
Bicarbonate (HCO ₃)	0	16	Turbidity	--	--
Sulfate (SO ₄)	185	190	Temperature (F.)...	76	76
Chloride (Cl)	29	34	Date of collection...	Aug. 27, 1951	Aug. 27, 1951
Fluoride (F)	--	.1			
Nitrate (NO ₃)	2.1	1.2			
Dissolved solids.....	--	376			

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	5	14	b-9	5.5	6.8	3.7	98	185	68	40	600	3
Finished water...	18	22	14	8.2	8.8	8.0	120	200	86	0	0	0

^a Total acidity as H₂SO₄ 23 ppm.

^b Acidity.

NORRISTOWN
(Population, 38,126)

Ownership: Norristown Water Company; also supplies Bridgeport, Lower Providence, and West Norristown. Total population supplied, about 54,700.

Source: Schuylkill River.

Treatment: Prechlorination, coagulation with alum, lime, activated carbon, sedimentation, rapid sand filtration, postchlorination, and adjustment of pH with lime.

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

Raw-water storage: None.

Finished-water storage: 20,000,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	6.4	Hardness as CaCO ₃ :		
Iron (Fe)	--	.12	Total	163	182
Manganese (Mn)	--	--	Noncarbonate.....	143	162
Calcium (Ca)	--	40			
Magnesium (Mg).....	--	20	Color	5	3
Sodium (Na)	9.6	6.0	pH	7.4	7.6
Potassium (K)			Specific conductance		
Carbonate (CO ₃)			(micromhos at		
Bicarbonate (HCO ₃)	24	24	25 C.)	382	419
Sulfate (SO ₄)	145	151	Turbidity	--	--
Chloride (Cl)	7.5	11	Temperature (F.)...	75	75
Fluoride (F)	--	.0	Date of collection...	Aug. 7, 1951	Aug. 7, 1951
Nitrate (NO ₃)	3.3	3.3			
Dissolved solids.....	--	276			

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	57	9	7.2	8.1	6.1	140	165	116	44	1500	10
Finished water...	38	64	12	7.8	9.3	6.3	133	165	128	.5	8	0

OIL CITY
(Population, 19,581)

Ownership: Municipal; supplies also about 5,000 people outside the city limits.

Total population supplied, about 24,600.

Source: 2 dug wells (1, 2) 40 and 44 ft deep and 13 drilled wells. Nine of the drilled wells are 50 ft deep and are pumped by suction; the remaining four wells are deeper and are pumped with electric pumps.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 5,500,000 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) .....	.06	Total	83
Manganese (Mn)	--	Noncarbonate	23
Calcium (Ca)	26		
Magnesium (Mg)	4.5	Color	3
Sodium (Na)	15	pH	7.6
Potassium (K)	1.0	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	74	25 C.).....	242
Sulfate (SO ₄)	12	Turbidity	--
Chloride (Cl)	28	Temperature (F.).....	62
Fluoride (F) .....	.0	Date of collection	July 27,
Nitrate (NO ₃) .....	.0		1951
Dissolved solids	140		

PHILADELPHIA
(Population, 2,071,605)

Ownership: Municipal. Total population supplied, about 2,092,000.

Source: Schuylkill River about 52 percent of supply; Delaware River about 48 percent of supply.

Treatment: Schuylkill River water is treated at all of the plants except the Torresdale Plant, which treats Delaware River water. Belmont Plant: $\frac{1}{2}$ of water, coagulation with alum (when necessary), sedimentation, slow sand filtration, chlorination, and addition of metaphosphates; $\frac{1}{2}$ of water, ozonation, coagulation with alum and lime, chlorination, sedimentation, rapid sand filtration, postchlorination, and addition of metaphosphates. Upper and Lower Roxborough Plants: Coagulation with alum, sedimentation, slow sand filtration, chlorination, and addition of metaphosphates. Queen Lane Plant: $\frac{1}{2}$ of water, prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, slow sand filtration, postchlorination, and addition of metaphosphates; $\frac{1}{2}$ of water, coagulation with alum and lime, activated carbon, chlorination, sedimentation, rapid sand filtration, postchlorination, and addition of metaphosphates. Torresdale Plant: prechlorination, coagulation with alum and lime, rapid sand filtration, slow sand filtration, postchlorination, and addition of metaphosphates.

Rated capacity of treatment plants: Belmont Plant, 70,000,000 gpd; Upper and Lower Roxborough Plants, 30,000,000 gpd; Queen Lane Plant, 100,000,000 gpd; Torresdale Plant, 200,000,000 gpd.

Raw-water storage: None.

Finished-water storage: From each of the treatment plants: Belmont Plant, 17,000,000 gal; Upper and Lower Roxborough Plants, 11,000,000 gal; Queen Lane Plant, 40,000,000 gal; Torresdale Plant, 50,000,000 gal. The city has two reservoirs: East Park and Oak Lane, 688,000,000 gal and 70,000,000 gal, respectively. East Park reservoir stores water from the Queen Lane Plant and Oak Lane stores water from Torresdale Plant. However, on occasion East Park reservoir may receive water from the Torresdale Plant, and Oak Lane, water from Queen Lane Plant.

Finished water from the treatment plants is distributed in different sections of the city. Water from the Belmont Plant is supplied to the area west of the Schuylkill River, called West Philadelphia; water from the Roxborough Plants, to the area above Erie Avenue and west of Broad Street extending to the Schuylkill River and north, and in conjunction with the Queen Lane Plant, to the area between Erie and Allegheny Avenues; water from the Queen Lane Plant in addition to that named above, to the area west of Broad Street above Market to the Schuylkill River; water from the Torresdale Plant, to the area east of Broad Street to Market Street and all of South Philadelphia between the Delaware and Schuylkill Rivers.

The central part of the city is furnished high pressure fire service with water pumped directly from the Delaware River at the foot of Race Street.

PHILADELPHIA--Continued

ANALYSES

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

	Schuylkill River				
	at Belmont Filters			Finished water	
	raw water ^a	raw water ^b	raw water ^c	city tap ^d	city tap ^e
Silica (SiO ₂)	6.6	7.7	8.3	8.6	8.9
Iron (Fe) .....	.01	.06	.05	.24	.29
Manganese (Mn)	--	--	--	--	--
Calcium (Ca)	45	17	31	23	24
Magnesium (Mg)	22	7.6	14	9.2	8.8
Sodium (Na)	19	6.9	9.0	2.7	3.4
Potassium (K)					
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	57	21	46	25	31
Sulfate (SO ₄)	163	58	95	64	57
Chloride (Cl)	17	5.1	9.8	6.6	11
Fluoride (F) .....	.1	.1	.1	.0	.0
Nitrate (NO ₃)	5.2	4.6	6.2	5.9	4.0
Dissolved solids	331	130	213	147	151
Hardness as CaCO ₃ :					
Total	203	74	135	95	96
Noncarbonate	156	56	98	75	71
Color	5	5	4	5	5
pH	7.8	6.9	7.2	8.1	8.0
Specific conductance (micromhos at 25 C.)	510	203	332	228	238
Turbidity	--	--	--	--	--
Temperature (F.)	--	--	--	50	50
Date of collection	Sept. 21- 30, 1951	Nov. 26- 30, 1951	-- 1951	Feb. 6, 1952	Feb. 6, 1952

Regular determinations at treatment plant, 1951--Belmont Plant.

	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	40	60	18	7.2	7.8	6.5	153	247	84	33	1000	3
Finished water f.	32	60	5	6.7	7.1	6.0	153	233	94	0.2	0.5	.0
Finished water g	31	56	13	6.6	7.3	6.1	151	226	97	.1	1	.0

^a Composite of daily samples with maximum dissolved solids for the year 1951.^b Composite of daily samples with minimum dissolved solids for the year 1951.^c Average of analyses of 10-day composites of daily samples for the year 1951.^d Represents water from the Belmont Plant.^e Represents water from the Queen Lane Plant.^f Rapid sand filters.^g Slow sand filters.

PHILADELPHIA--Continued

ANALYSES

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

	Delaware River			Finished water d
	at Morrisville, Pa.			
	(raw water)a	(raw water) b	(raw water)c	
Silica (SiO ₂)	5.9	5.8	4.7	3.1
Iron (Fe).....	.02	.10	.06	.10
Manganese (Mn)	--	--	--	--
Calcium (Ca)	19	8.8	14	14
Magnesium (Mg)	5.9	2.8	4.7	4.2
Sodium (Na).....	6.4	1.0	4.4	2.2
Potassium (K)				
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	54	20	38	12
Sulfate (SO ₄)	28	14	21	33
Chloride (Cl).....	6.6	2.1	4.6	7
Fluoride (F) .....	.2	.1	.1	.1
Nitrate (NO ₃)	2.8	1.9	2.8	3.2
Dissolved solids	119	53	84	84
Hardness as CaCO ₃ :				
Total	72	33	54	52
Noncarbonate	27	17	23	42
Color.....	8	9	7	3
pH.....	7.3	7.2	7.1	7.2
Specific conductance (micromhos at 25 C.)	184	81.4	137	145
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	--
Date of collection.....	Oct.11-20, 1951	Apr. 1-10, 1951	1951	Mar. 27, 1952

Regular determinations at treatment plant, 1951--Torresdale Plant

	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	59	11	6.9	7.3	6.5	59	94	37	23	330	6
Finished water...	22	44	6	6.2	6.6	6.0	52	88	32	0.0	0.0	0.0

a Composite of daily samples with maximum dissolved solids for the year 1951.

b Composite of daily samples with minimum dissolved solids for the year 1951.

c Average of analyses of 10-day composites of daily samples for the year 1951.

d City tap; represents water from the Torresdale Plant.

PITTSBURGH

(Population, 676, 806)

Ownership: Municipal; also supplies Blawnox, Homestead, and parts of the townships of O'Hara and Reserve. Total population supplied, about 692,000.

South Pittsburgh Water Co.; supplies a population of about 100,000 in Pittsburgh and in addition the boroughs of Bethel, Brentwood, Bridgeville, Carnegie, Castle Shannon, Crafton, Dormont, Dravosburg, Green Tree, Heidelberg, Ingram, Mt. Oliver, Munhall, Pleasant Hills, Rosslyn Farms, Thornburg, West Mifflin, Whitaker, and Whitehall; and the townships of Baldwin, Collier, Jefferson, Mt. Lebanon, Robinson, Scott, Snowden, South Fayette, and Upper St. Clair. Total population supplied, about 315,000.

Wilkinsburg Penn Joint Water Authority; supplies a population of about 14,000 in Pittsburgh. (See Wilkinsburg.)

Municipal Authority of the Borough of West View; supplies a population of about 1,500 in Pittsburgh. (See McKees Rocks.)

Source: Municipal, Allegheny River; South Pittsburgh Water Co., Monongahela River.

Treatment: Municipal: plain sedimentation, slow sand filtration, chlorination, and adjustment of pH with soda ash when necessary; South Pittsburgh Water Company: lime at raw water intake when necessary, aeration, softening with lime and soda ash, recarbonation when necessary, coagulation with alum, activated carbon and sodium chlorite at times for taste and odor control, sedimentation, rapid sand filtration, chlorination, and adjustment of pH to about 7.4 with lime.

Rated capacity of treatment plants: Municipal, 140,000,000 gpd; South Pittsburgh Water Company, 53,000,000 gpd.

Raw-water storage: Municipal, 100,000,000 gal; South Pittsburgh Water Company, none.

Finished-water storage: Municipal, 500,000,000 gal; South Pittsburgh Water Company: tank (West Mifflin) 7,250,000 gal; tank (Green Tree) 2,500,000 gal; tank (Bethel) 2,500,000 gal; reservoir (Crafton) 2,500,000 gal; tank (Mt. Lebanon) 2,000,000 gal; tank (Lincoln Place) 767,000 gal; tank (West Pittsburgh) 735,000 gal; tank (West Homestead) 634,000 gal; tank (Rosslyn Farms) 100,000 gal. Total, 18,986,000 gal.

PITTSBURGH--Continued

ANALYSES

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

	Allegheny River				Monongahela River
	Raw water	Finished water ac	Finished water bc	Finished water	Finished water
Silica (SiO ₂)	--	1.0	6.6	5.4	8.4
Iron (Fe)	--	.10	.3	.14	.15
Manganese (Mn)	--	.0	1.3	--	--
Calcium (Ca)	--	11	60	46	40
Magnesium (Mg)	--	4.0	18	1.9	16
Sodium (Na)	--	5.0	49	58	94
Potassium (K)	--				
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	0	2.1	17	2	46
Sulfate (SO ₄)	199	37	248	190	298
Chloride (Cl)	32	8	58	32	14
Fluoride (F)	--	--	--	.0	.1
Nitrate (NO ₃)	2.4	.4	2.7	6.3	3.6
Dissolved solids	--	80	507	373	554
Hardness as CaCO ₃ :					
Total	^d 180	44	227	123	166
Noncarbonate	180	42	213	121	128
Color	5	--	--	5	6
pH	4.0	--	--	6.1	7.6
Specific conductance (micromhos at 25 C.)	562	--	--	569	822
Turbidity	--	--	--	--	--
Temperature (F.)	79	--	--	80	86
Date of collection	Aug. 30, 1951	^e 1951	1951	Aug. 30, 1951	Aug. 24, 1951

Regular determinations at treatment plant, 1950^c

	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	9	43	^f 21	6.5	6.8	5.3	76	208	30	29	500	3
Finished water...	7	26	0	6.3	6.8	5.8	75	172	33	0	5	0

^a Weekly composite of daily samples with minimum dissolved solids.^b Weekly composite of daily samples with maximum dissolved solids.^c Analyses by Pittsburgh Water Works laboratory.^d Versenate method.^e In 1951, 13 composite samples were acid (Aug. 19-Nov. 11, 1951).^f Acidity.

POTTSTOWN
(Population, 22, 589)

Ownership: Municipal; supplies also about 7,000 people outside the city limits.

Total population supplied, about 29,600.

Source: Schuylkill River.

Treatment: Coagulation with alum, addition of activated carbon, sedimentation, rapid sand filtration, chlorination, and adjustment of pH with lime.

Rated capacity of treatment plant: 6,000,000 gpd.

Raw-water storage: --

Finished-water storage: 12,000,000 gal.

ANALYSES

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

	Raw water ^a	Finished water (city tap)		Raw water ^a	Finished water (city tap)
Silica (SiO ₂)	7.6	6.5	Hardness as CaCO ₃ :		
Iron (Fe) .....	.03	.20	Total	142	172
Manganese (Mn) .....	.03	--	Noncarbonate.....	113	133
Calcium (Ca)	34	41	Color.....	5	5
Magnesium (Mg).....	14	17	pH.....	--	7.5
Sodium (Na)	9.8	2.5	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	--	0	25 C.).....	337	413
Bicarbonate (HCO ₃)	36	48	Turbidity	--	--
Sulfate (SO ₄)	115	137	Temperature (F.)...	55	78
Chloride (Cl)	6.9	11	Date of collection...	1945-1946	June 28, 1951
Fluoride (F) .....	.1	.2			
Nitrate (NO ₃)	5.5	5.2			
Dissolved solids.....	223	280			

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.....	40	50	30	7.1	7.2	7.0	180	--	--	100	--	--
Finished water...	35	45	25	6.9	6.8	7.0	175	250	100	--	--	--

^a Average of analyses of 10-day composites of daily samples of Schuylkill River at Pottstown for the year Oct. 1, 1945 to Sept. 30, 1946.

POTTSVILLE
(Population, 23,640)

Ownership: Pottsville Water Company; supplies also Port Carbon, St. Clair, Schuylkill Haven, and E. Norwegian and North Manheim townships. Total population supplied, about 42,800.

Source: Eisenhuth Run impounded in Eisenhuth Reservoir near Frackville; Kaufman Run, Tar Run, and Wolf Creek impounded in reservoirs of the same name near St. Clair; Indian Run impounded in Indian Run Reservoir, near Pottsville. Auxiliary or emergency supply, Mud Run (tributary to Stoney Creek) impounded.

Treatment: Chlorination.

Rated capacity of treatment plant: 20,000,000 gpd.

Raw-water storage: 1,475,000,000 gal.

Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	2.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.02	Total	5
Manganese (Mn)	--	Noncarbonate	2
Calcium (Ca)	1.0		
Magnesium (Mg) .....	.6	Color	5
Sodium (Na)	1.8	pH	6.1
Potassium (K)	0	Specific conductance	
Carbonate (CO ₃)	3	(micromhos at	
Bicarbonate (HCO ₃)	4.0	25 C.)	21.4
Sulfate (SO ₄)	1.4	Turbidity	--
Chloride (Cl) .....	.0	Temperature (F.)	66
Fluoride (F) .....	.5	Date of collection	Sept. 11,
Nitrate (NO ₃)	19		1951
Dissolved solids			

READING
(Population, 109,320)

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

Total population supplied, about 124,300.

Source: Maiden Creek impounded in Lake Ontelaunee about 93 percent of the supply; Antietam Creek impounded in Antietam Lake about 7 percent of supply.

Treatment: The Maiden Creek Plant: coagulation, sedimentation, rapid sand filtration, aeration, and chlorination. The Antietam Creek Plant: Slow sand filtration and chlorination.

Rated capacity of treatment plants: Maiden Creek Plant, 20,000,000 gpd; Antietam Creek Plant, 2,000,000 gpd.

Raw-water storage: 3,980,000,000 gal.

Finished-water storage: 38,000,000 gal (elevated).

ANALYSES

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

	Maiden Creek (raw water)	Antietam Creek (raw water)	Maiden Cr. (finished water)	Maiden Cr. (finished water) ^a	Maiden Cr. (finished water) ^a
Silica (SiO ₂)	--	--	5.0	4.7	6.9
Iron (Fe)	--	--	.06	.07	.04
Manganese (Mn)	--	--	--	--	--
Calcium (Ca)	--	--	25	20	35
Magnesium (Mg)	--	--	6.2	4.8	6.5
Sodium (Na)	4.3	3.9	1.9	1.2	5.8
Potassium (K)					
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	73	34	70	48	93
Sulfate (SO ₄)	16	14	24	22	33
Chloride (Cl)	4.8	2.5	5.4	3.0	4.6
Fluoride (F)	--	--	--	--	--
Nitrate (NO ₃)	4.0	1.8	2.6	7	12
Dissolved solids	--	--	115	102	152
Hardness as CaCO ₃ :					
Total	77	34	88	70	114
Noncarbonate	17	6	31	30	38
Color	5	10	5	1	1
pH	7.5	7.8	8.0	8.1	8.1
Specific conductance (micromhos at 25 C.)	173	99.4	204	--	--
Turbidity	--	--	--	.1	.1
Temperature (F.)	72	67	71	39	48
Date of collection	Aug. 7, 1951	Aug. 7, 1951	Aug. 7, 1951	January, 1949	November, 1949

^a Monthly composite of daily samples. Analyses (by Reading Water Department) showing minimum and maximum dissolved solids.

READING--Continued

Regular determinations at treatment plant, 1949--Maiden Creek

	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...	60	76	39	8.0	8.2	7.9	87	114	70	0.1	--	--

SCRANTON

(Population, 125,536)

Ownership: Scranton-Spring Brook Water Service Company. The company serves 57 civil divisions extending roughly from Forest City on the north through Newport township on the south, a distance of about 70 miles, including Carbondale, Dunmore, Kingston, Nanticoke, Plains township, Scranton, and Wilkes-Barre. Total population supplied, about 600,000.

Source: Reservoirs: No. 5, No. 7, Lake Scranton, Williams Bridge, and Chinchilla.

Treatment: Chlorination.

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

Finished-water storage: --

The company has 76 reservoirs of a total capacity of about 19,500,000,000 gal.

The reservoirs supply water from 35 points of distribution.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	3.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.02	Total	26
Manganese (Mn)	--	Noncarbonate	21
Calcium (Ca)	7.8		
Magnesium (Mg)	1.5	Color	5
Sodium (Na)	1.3	pH	6.3
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	6	25 C.).....	69.5
Sulfate (SO ₄)	15	Turbidity	--
Chloride (Cl)	5.0	Temperature (F.).....	45
Fluoride (F) .....	.0	Date of collection	Nov. 25,
Nitrate (NO ₃)	1.0		1951
Dissolved solids	55		

SHARON
(Population, 26,454)

Ownership: Shenango Valley Water Company; supplies also Farrel, Wheatland, and Hickory township. Total population supplied, about 48,000.

Source: Shenango River.

Treatment: Prechlorination, sedimentation, coagulation with lime and alum, sedimentation, rapid sand filtration, and postchlorination.

Rated capacity of treatment plant: 8,500,000 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)	--	1.9	Hardness as CaCO ₃ :		
Iron (Fe)	--	.05	Total	66	84
Manganese (Mn)	--	--	Noncarbonate.....	28	35
Calcium (Ca)	--	26	Color.....	10	8
Magnesium (Mg).....	--	4.7	pH.....	7.1	7.8
Sodium (Na)	6.6	13	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	289	247
Bicarbonate (HCO ₃)	47	60	Turbidity.....	--	--
Sulfate (SO ₄)	31	47	Temperature (F.)...	81	--
Chloride (Cl)	3.6	9.9	Date of collection...	July 27, 1951	July 27, 1951
Fluoride (F)	--	--			
Nitrate (NO ₃)	5.7	.0			
Dissolved solids.....	--	145			

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.....	39	52	28	7.3	7.7	6.8	65	77	58	29	42	17
Finished water...	43	60	32	7.6	8.2	7.3	82	92	64	.2	.4	.1

STATE COLLEGE
(Population, 17,227)

Ownership: The Pennsylvania State College.

Source: 5 wells (1, 2, 3, 16, 17) 365, 333, 305, 230, and 336 ft deep; yield reported to be 700, 350, 350, 350, and 600 gpm, 83 percent of supply. Streams, 17 percent of supply.

Treatment: None.

Storage: 500,000 gal.

ANALYSES

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

	Musser's Gap stream	Well 17 (raw water)	Finished water Tap sample ^a
Silica (SiO ₂)	--	--	6.4
Iron (Fe)	--	--	.06
Manganese (Mn)	--	--	--
Calcium (Ca)	--	--	22
Magnesium (Mg)	--	--	13
Sodium (Na)	1.1	1.0	.5
Potassium (K)			
Carbonate (CO ₃)	0	0	6
Bicarbonate (HCO ₃)	8	138	108
Sulfate (SO ₄)	1.7	4.2	3.4
Chloride (Cl)	1.4	1.4	1.5
Fluoride (F)	--	--	.0
Nitrate (NO ₃) .....	.1	1.0	2.0
Dissolved solids	--	--	112
Hardness as CaCO ₃ :			
Total	8	118	108
Noncarbonate	1	5	10
Color	5	3	4
pH	7.1	7.7	8.0
Specific conductance (micromhos at 25 C.)	25.5	230	205
Turbidity	--	--	--
Temperature (F.)	61	51	51
Date of collection	Aug. 28, 1951	Aug. 28, 1951	Aug. 28, 1951

^a 88 percent well water; 12 percent stream water.

UNIONTOWN
(Population, 20,471)

Ownership: Municipal; also supplies about 10,100 people outside the city limits.

Total population supplied, about 30,600.

Source: Reservoirs, 85 percent of supply; Youghiogheny River, 15 percent of supply.

Treatment: Impounded supply: chlorination and addition of Calgon. Youghiogheny River water: coagulation with alum and lime, sedimentation, rapid sand filtration, and chlorination. Calgon is also applied at the outlet of the distribution reservoir.

Rated capacity of treatment plant: 1,500,000 gpd.

Raw-water storage: 181,800,000 gal.

Finished-water storage: Distribution reservoir, 6,000,000 gal; clear water basin, 40,000 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) .....	.27	Total	32
Manganese (Mn)	--	Noncarbonate	17
Calcium (Ca)	9.9	Color	8
Magnesium (Mg)	1.7	pH	7.9
Sodium (Na) .....	.5	Specific conductance	
Potassium (K)		(micromhos at	
Carbonate (CO ₃)	0	25 C.)	70.2
Bicarbonate (HCO ₃)	18	Turbidity	--
Sulfate (SO ₄)	13	Temperature (F.)	45
Chloride (Cl)	2.2	Date of collection	Feb. 13,
Fluoride (F) .....	.0		1952
Nitrate (NO ₃)	1.7		
Dissolved solids	48		

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 ^a	2	7	0	6.2	6.9	4.8	--	--	--	15	300	0
Finished water ^a	5	10	2	7.1	8.0	6.7	44	72	30	0	0	0
Raw water ^b	19	39	7	7.0	7.3	6.8	36	50	26	--	--	--
Finished water ^b	19	39	7	7.0	7.3	6.8	36	50	26	--	--	--

^a Youghiogheny River.

^b Cool Springs Reservoir.

UPPER DARBY township
(Population, 84,951)

Ownership: Philadelphia Suburban Water Company, 762 Lancaster Avenue, Bryn Mawr, Pa. This company supplies a number of places and townships in Chester, Delaware, and Montgomery counties, a suburban area of approximately 300 square miles, adjacent to the city of Philadelphia. Total population supplied, about 475,000.

Source: Crum Creek; Pickering Creek, supplemented with water from Perkiomen Creek; Neshaminy Creek, supplemented with water from Iron Works Creek. Reservoirs on these creeks store about 5,000,000,000 gal of water. About 80 percent of the supply of Upper Darby township is taken from Crum Creek, and about 20 percent from Pickering Creek.

Treatment: Coagulation with alum (and lime when necessary), activated carbon for taste and odor control, sedimentation, rapid sand filtration, postchlorination, ammoniation, and adjustment of pH with hydrated lime.

Rated capacity of treatment plants: Crum Creek Plant, 20,000,000 gpd; Pickering Creek Plant, 16,000,000 gpd.

Raw-water storage: Crum Creek, 3,500,000,000 gal; Pickering Creek, 350,000,000 gal.

Finished-water storage: --

The Philadelphia Suburban Water Company supplies Aldan, Bryn Athyn, Clifton Heights, Collingdale, Colwyn, Conshohocken, Darby, East Lansdowne, Eddystone, Folcroft, Glenolden, Jenkintown, Lansdowne, Millbourne, Morton, Narbeth, Norwood, Prospect Park, Rockledge, Rutledge, Sharon Hill, Swarthmore, West Conshohocken, Yeadon, and the following townships: Abington, Cheltenham, Darby, Easttown, East Whiteland, Haverford, Lower Merion, Lower Moreland, Marple, Newtown, Plymouth, Radnor, Ridley, Schuylkill, Springfield (Delaware Co.), Springfield (Montgomery Co.), Tinicum, Tredyffrin, Upper Darby, Upper Merion, Upper Moreland, White-marsh, and Willistown.

Finished water from the Neshaminy Creek plant is supplied to Abington and Cheltenham township; finished water from the Pickering Creek plant, to Haverford township on the main line; a mixture of water from Crum Creek and Pickering plants, to Lower Merion and Upper Darby townships. Certain parts of each township may receive water from either plant or various percentage mixtures of water from both plants.

UPPER DARBY township--Continued

ANALYSES

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

	Crum Creek (raw water) ^a	Pickering Creek (raw water) ^a	Finished water ^b
Silica (SiO ₂)	8.6	11	6.2
Iron (Fe) .....	.07	.10	.02
Manganese (Mn)	--	--	--
Calcium (Ca)	12	18	10
Magnesium (Mg).....	4.8	5.4	3.5
Sodium (Na).....	4.8	8.8	7.5
Potassium (K)			
Carbonate (CO ₃)	--	--	0
Bicarbonate (HCO ₃).....	33	51	32
Sulfate (SO ₄).....	22	30	20
Chloride (Cl)	5.6	8.0	5.2
Fluoride (F) .....	.1	.1	.0
Nitrate (NO ₃)	2.4	2.0	1.6
Dissolved solids	97	133	76
Hardness as CaCO ₃ :			
Total	50	67	39
Noncarbonate	23	25	13
Color	3	3	2
pH.....	7.4	7.0	7.0
Specific conductance (micromhos at 25 C.).....	--	--	122
Turbidity	0.25	0.25	--
Temperature (F.)	--	--	78
Date of collection	June 4, 1951	May 28, 1951	Aug. 30, 1951

^a Analysis by Philadelphia Suburban Water Company.^b Tap sample, Darby, Pa.

WASHINGTON
(Population, 26,280)

Ownership: The Citizens Water Company; also supplies East Washington, and parts of the townships of Amwell, Canton, Chartiers, North Franklin, and South Strabane. Total population supplied, about 39,500.

Source: 2 impounding reservoirs on branch of Chartiers Creek.

Treatment: Aeration, softening with lime, sedimentation, rapid sand filtration, ammoniation, and chlorination.

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

Raw-water storage: 1,182,000 gal.

Finished-water storage: 11,000,000 gal.

ANALYSES

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

	Raw water ^a	Finished water		Raw water ^a	Finished water
Silica (SiO ₂)	--	2.8	Hardness as CaCO ₃ :		
Iron (Fe)	--	.03	Total	101	60
Manganese (Mn)	--	--	Noncarbonate.....	31	40
Calcium (Ca)	--	17			
Magnesium (Mg).....	--	4.2	Color	5	5
Sodium (Na)	8.3	14	pH	7.5	7.4
Potassium (K)			Specific conductance		
Carbonate (CO ₃)	0	0	(micromhos at		
Bicarbonate (HCO ₃)	86	24	25 C.)	233	201
Sulfate (SO ₄)	34	53	Turbidity	--	--
Chloride (Cl)	9.0	11	Temperature (F.)...	--	74
Fluoride (F)	--	.1	Date of collection...	Aug. 23,	Aug. 23,
Nitrate (NO ₃) .....	.6	.4		1951	1951
Dissolved solids.....	--	124			

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	124	69	7.7	8.3	7.3	127	170	98	12	55	9
Finished water...	26	69	21	9.6	9.8	7.7	67	86	51	0	0	0

^a Reservoir 344.

WILKES-BARRE
(Population, 76,826)

Ownership: Scranton-Spring Brook Water Service Company. (See Scranton.)
 Source: Laurel Run, Plymouth Relief Creek, Pine Run, Gardners Creek, Mill
 Creek, Spring Brook, and Hillside.
 Treatment: Chlorination.
 Raw-water storage: 2,700,000,000 gal.
 Finished-water storage: --

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	2.2	Hardness as CaCO ₃ :	
Iron (Fe) .....	.0	Total	17
Manganese (Mn)	--	Noncarbonate	8
Calcium (Ca)	4.0		
Magnesium (Mg)	1.6	Color	3
Sodium (Na)	2.3	pH	7.1
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	10	25 C.).....	53.3
Sulfate (SO ₄)	8.5	Turbidity	--
Chloride (Cl)	3.0	Temperature (F.).....	68
Fluoride (F) .....	.0	Date of collection	Sept. 12,
Nitrate (NO ₃) .....	.5		1951
Dissolved solids	38		

WILKINSBURG
(Population, 31,418)

Ownership: Municipal; also supplies Braddock (4th ward), Braddock Hills, Chalfant, Churchill, East Pittsburgh, Edgewood, Forest Hills, North Braddock, Pitcairn, Pittsburgh (part of 13th ward), Swissvale, Trafford, Turtle Creek, and Wilmerding; the townships of North Versailles (part), Patton (part), Penn, and Wilkins; and redistributed in the boroughs of East McKeesport, Rankin, and Wall. Total population supplied, about 206,000.

Source: Allegheny River.

Treatment: Coagulation with alum and lime, potassium permanganate, chlorine dioxide, activated carbon, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 25,000,000 gpd.

Raw-water storage: None.

Finished-water storage: 3 open reservoirs; 1 covered reservoir; and 7 standpipes. Total, 44,730,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	--	7.6	Hardness as CaCO₃:		
Iron (Fe) .....	.39	.12	Total	206	269
Manganese (Mn)	--	--	Noncarbonate	206	253
Calcium (Ca)	--	78	Color	6	3
Magnesium (Mg).....	--	18	pH	4.15	7.3
Sodium (Na)	34	16	Specific conductance		
Potassium (K)			(micromhos at		
Carbonate (CO ₃)		0	25 C.).....	643	656
Bicarbonate (HCO ₃)	0	19	Turbidity	--	--
Sulfate (SO ₄)	250	238	Temperature (F.)...	84	83
Chloride (Cl)	23	28	Date of collection...	Aug. 21, 1951	Aug. 21, 1951
Fluoride (F)	--	.1			
Nitrate (NO ₃)	1.8	1.4			
Dissolved solids.....	--	463			

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	35	0	6.2	6.8	4.5	98	150	60	89	1200	20
Finished water...	30	50	18	7.4	8.8	7.2	125	175	85	0.5	3	0

^a Total acidity as sulfuric acid (H₂SO₄) 42 ppm.

WILLIAMSPORT
(Population, 45,047)

Ownership: Williamsport Municipal Water Authority; also supplies Duboistown, South Williamsport, and parts of Armstrong, Loyalsock, and Old Lycoming townships. Total population supplied, about 57,000.

Source: Mosquito Creek 61 percent of supply; Hagerman Run 26 percent of supply; and 8 wells (used during dry seasons) 13 percent of supply.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 25,200,000 gal.

ANALYSES

(Analyses, in parts per million, by South Pittsburgh Water Company)

	Mosquito Creek (raw water)	Hagerman Run (raw water)	Wells (raw water)	Finished water ^a (city tap)
Silica (SiO ₂)	--	--	--	2.1
Iron (Fe)	--	--	.2	.14
Manganese (Mn)	--	--	--	--
Calcium (Ca)	4.3	5.0	17	4.1
Magnesium (Mg)	2.0	2.1	3.5	1.5
Sodium (Na)	--	--	--	.8
Potassium (K)	--	--	--	
Carbonate (CO ₃)	--	--	--	0
Bicarbonate (HCO ₃)	12	5	24	10
Sulfate (SO ₄)	--	--	--	5.7
Chloride (Cl)	4.0	4.0	12	2.5
Fluoride (F) .....	.05	.05	.10	0
Nitrate (NO ₃)	--	--	--	.5
Dissolved solids	25	--	56	24
Hardness as CaCO ₃ :				
Total	14	20	100	16
Noncarbonate	--	--	--	8
Color	--	--	--	5
pH	6.8	6.8	6.2	6.7
Specific conductance (micromhos at 25 C.)	--	--	--	36.8
Turbidity	--	--	--	--
Temperature (F.)	--	--	--	42
Date of collection	1949	1949	1949	Feb. 19, 1952

^a Analysis by U. S. Geological Survey.

YORK
(Population, 59,953)

Ownership: The York Water Company; also supplies Manchester, Mt. Wolf, North York, Spring Garden township and other communities. Total population supplied, about 88,000.

Source: East and south branches of Codorus Creek impounded.

Treatment: Coagulation with alum and lime, sedimentation, rapid sand filtration, ammoniation, and chlorination.

Rated capacity of treatment plant: 21,000,000 gpd.

Raw-water storage: 953,000,000 gal.

Finished-water storage: 33,000,000 gal.

ANALYSIS

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

	Finished water (city tap)		Finished water (city tap)
Silica (SiO ₂)	4.2	Hardness as CaCO ₃ :	
Iron (Fe) .....	.02	Total	49
Manganese (Mn)	--	Noncarbonate	19
Calcium (Ca)	14		
Magnesium (Mg)	3.4	Color	5
Sodium (Na)	6.0	pH	7.2
Potassium (K)		Specific conductance	
Carbonate (CO ₃)		(micromhos at	
Bicarbonate (HCO ₃)	0	25 C.)	139
Sulfate (SO ₄)	36	Turbidity	--
Chloride (Cl)	13	Temperature (F.)	72
Fluoride (F)	9.4	Date of collection	Sept. 19,
Nitrate (NO ₃) .....	.1		1951
Dissolved solids	6.9		
	88		

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	21	20	20	6.4	6.6	6.3	60	--	--	40	2000	5
Finished water...	22	25	20	8.0	8.5	7.7	60	--	--	0	0	0