

GEOLOGICAL SURVEY CIRCULAR 197



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

By E. W. Lohr, G. A. Billingsley, J. W. Geurin, and W. L. Lamar

UNITED STATES DEPARTMENT OF THE INTERIOR

Oscar L. Chapman, Secretary

GEOLOGICAL SURVEY

W. E. Wrather, Director

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Washington, D. C., 1952

Free on application to U. S. Geological Survey, Washington 25, D. C.

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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 first of the series and includes data for the States of Alabama, Kentucky, Mississippi, and Tennessee. (See fig. 1). The report gives the population (1950) of the city, population supplied, ownership, sources and treatment of supplies, capacity of treatment plants, storage facilities for both raw and finished waters, and chemical analyses of the water, for 19 cities in Alabama, 16 in Kentucky, 17 in Mississippi, and 15 in Tennessee. 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 Alabama, Mississippi, and Tennessee were compiled under the direction of G. A. Billingsley, district chemist, Fayetteville, Ark., and in Kentucky by W. L. Lamar, district chemist, Columbus, Ohio. Review and final assembly of the data were made by E. W. Lohr in the Washington office, under the supervision of S. K. Love, Chief, Quality of Water Branch.

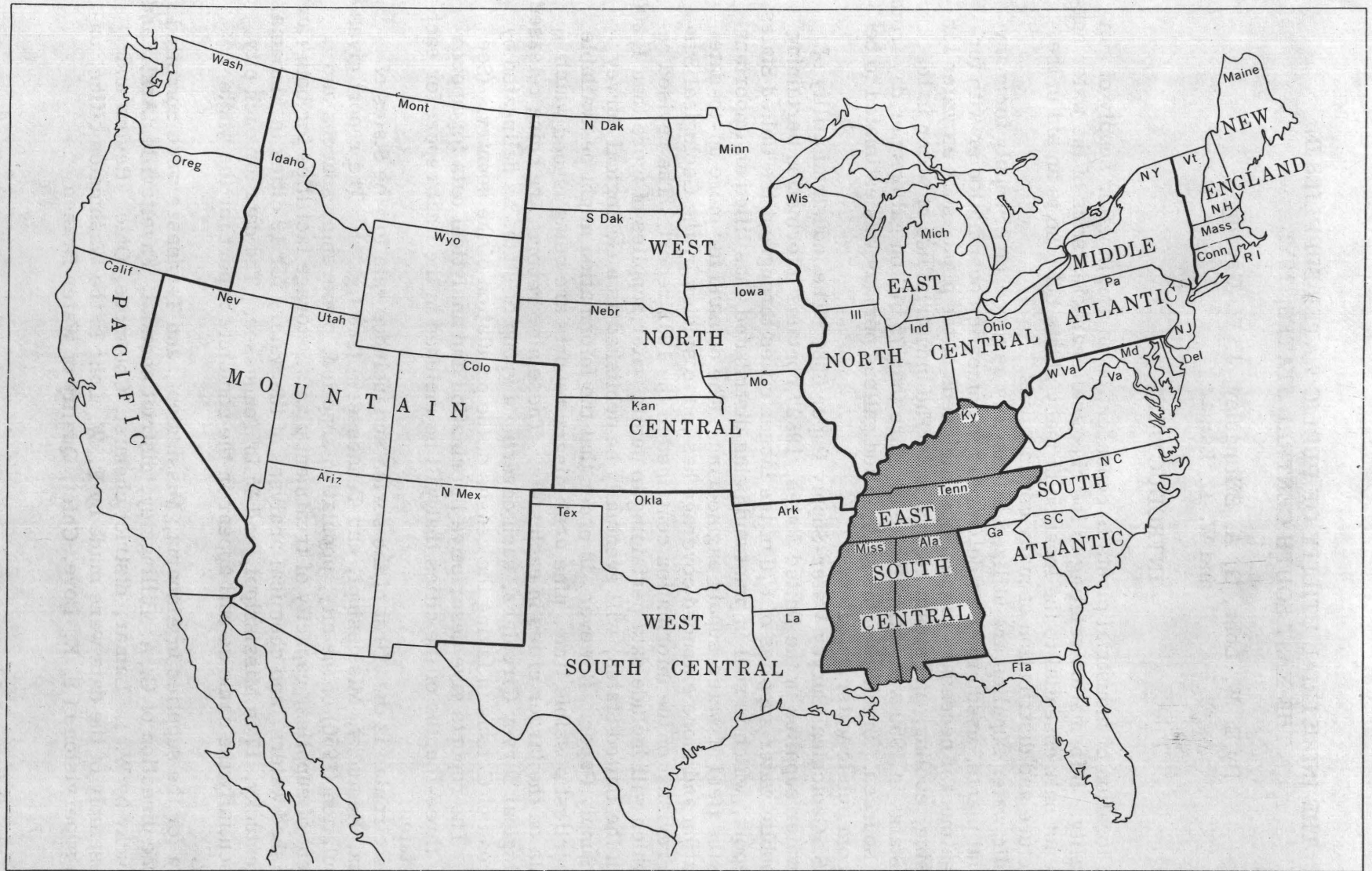


Figure 1.—Map of the United States showing sections covered by the nine circulars on the industrial utility of public water supplies of the United States, 1952. The shaded portion represents the section of the country covered by this circular.

ALABAMA
ANNISTON
(Population, 31, 066)

Ownership: Municipal; supplies unincorporated communities of Oxford and Blue Mountain, and other suburban districts. Total population supplied, about 58, 600.

Source: Cold Water Spring, about 7 miles southwest of the city.

Treatment: Chlorination.

Raw-water storage: None.

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

ANALYSIS

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

	Tap sample		Tap sample
Silica (SiO ₂)	13	Hardness as CaCO ₃ : Total	104
Iron (Fe) .....	.25		
Manganese (Mn) .....	.00	Noncarbonate	3
Calcium (Ca)	22	Color	5
Magnesium (Mg)	12	pH	7.5
Sodium (Na)	2.1	Specific conductance (micromhos at 25 C.).....	191
Potassium (K)	1.6		
Carbonate (CO ₃)	0	Turbidity	2
Bicarbonate (HCO ₃)	124	Temperature (F.).....	70
Sulfate (SO ₄)	2.8	Date of collection	10/18/51
Chloride (Cl)	2.2		
Fluoride (F) .....	.0		
Nitrate (NO ₃) .....	.9		
Dissolved solids	118		

AUBURN
(Population, 12, 939)

Ownership: Municipal.

Source: Moores Mill Creek, impounded, and 2 wells, one of which flows into the water plant and furnishes 6 percent of the supply. Chewacla Creek, impounded, auxiliary supply.

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

Rated capacity of treatment plant: 1, 440, 000 gpd.

Raw-water storage: --

Finished-water storage: 825, 000 gal.

The treatment plant is 2½ miles southeast of the city.

ANALYSES

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

	Moores 1/Mill Creek	Finished water (comp.)		Moores 1/Mill Creek	Finished water (comp.)
Silica (SiO ₂)	6.5	6.1	Hardness as CaCO₃:		
Iron (Fe)94	.02		Total	14	49
Manganese (Mn) .....	.02	.00	Noncarbonate.....	0	18
Calcium (Ca)	3.2	16	Color.....	25	5
Magnesium (Mg).....	1.5	2.1	pH.....	6.8	8.7
Sodium (Na)	2.9	2.9	Specific conductance		
Potassium (K)	2.7	2.7	(micromhos at		
Carbonate (CO ₃)	0	--	25 C.).....	45.0	110
Bicarbonate (HCO ₃)	20	2/37	Turbidity.....	2	1
Sulfate (SO ₄)	2.2	13	Temperature (F.)...	70	71
Chloride (Cl)	3.2	7.2	Date of collection ...	10/22/51	10/22/51
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃) .....	.5	.7			
Dissolved solids.....	34	70			

1/Raw water.

2/Includes the equivalent of less than 5 ppm of carbonate (CO₃).

BESSEMER
(Population, 28, 445)

Ownership: (See Birmingham). Supplies about 2, 700 people outside the city limits. Total population supplied, about 31, 150.

BIRMINGHAM
(Population, 326, 037)

Ownership: Municipal; supplies also Bayview, Bessemer and its suburban area, Edgewater, Fairfield, Fultondale, Graysville, Homewood, Mountain Brook, Tarrant City, and number of other communities. Total population supplied, about 426, 000.

Source: Domestic supply: Cahaba River, Little Cahaba River with impounded reservoir (Lake Purdy) and Inland Lake (owned by Birmingham Industrial Water System from which raw water is purchased).

Industrial supply: Blackburn Fork of the Black Warrior River impounded in Inland Lake (21 billion gal capacity).

Treatment: Domestic supply: Cahaba River and Lake Purdy (Shades Mountain plant) plain sedimentation, prechlorination, coagulation with alum, sedimentation, rapid sand filtration, postchlorination, and lime for adjustment of pH to 8.2 to 8.4. Inland Lake purchased water, (Birmingham Station plant) prechlorination, coagulation with alum, lime for manganese removal, sedimentation, rapid sand filtration, and postchlorination. Industrial supply: Inland Lake-chlorination (approximately 1.0 ppm of chlorine), and application of soda ash (approximately 3.0 ppm).

Rated capacity of treatment plants: Shades Mountain plant, 55, 000, 000 gpd; Birmingham Station plant, 12, 000, 000 gpd.

Raw-water storage: 5, 682, 000, 000 gal.

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

The Shades Mountain plant is located 5 miles south of the city on the Cahaba River, and the Birmingham Station plant, about 7 miles northeast of the center of the city.

The Birmingham Industrial Water System serves 52 industrial consumers, some consumers taking water at more than one location, in and around Birmingham. In 1951 the total volume of water delivered to the industrial consumers amounted to 17, 541, 335, 000 gal.

ANALYSES

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

	Cahaba Riv- er (raw water)	Cahaba Riv- er (finished water)	Inland Lake (raw water)	Inland Lake (finished water)
Silica (SiO ₂)	7.8	6.1	5.0	4.5
Iron (Fe).....	.06	.06	.07	.03
Manganese (Mn) .....	.00	.00	.00	.00
Calcium (Ca)	26	27	1.8	9.2
Magnesium (Mg)	5.9	5.7	1.2	1.1
Sodium (Na).....	5.1	4.8	2.4	2.9
Potassium (K)	2.0	1.8	1.3	1.1
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	95	89	9	29
Sulfate (SO ₄)	16	21	2.9	7.5
Chloride (Cl).....	2.8	4.2	2.2	2.2
Fluoride (F) .....	.2	.2	.3	.1
Nitrate (NO ₃)	1.2	1.3	1.6	1.5
Dissolved solids	116	118	26	46
Hardness as CaCO₃:				
Total	89	91	9	27
Noncarbonate	11	18	2	4
Color.....	7	8	23	7
pH.....	7.3	7.2	6.2	8.4
Specific conductance (micromhos at 25 C.)	189	193	29.3	72.6
Turbidity	2	2	1	2
Temperature (F.)	69	69	55	57
Date of collection.....	10/18/51	10/18/51	10/19/51	10/19/51

Regular determinations at treatment plant, 1950 1/

	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.....	--	95	22	7.4	7.9	7.0	--	--	--	--	380	15
Finished water...	--	105	29	8.3	8.5	8.0	--	100	40	0	0	0

Regular determinations at treatment plant, 1950 2/

	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.....	12	16	10	7.2	7.3	7.1	12	12	12	--	30	15
Finished water...	--	48	19	9.0	9.1	8.9	30	36	24	0	0	0

1/Shades Mountain plant.

2/Birmingham plant.

DECATUR
(Population, 19, 974)

Ownership: Municipal; supplies also Austinville and other suburban districts.

Total population supplied, about 26, 100.

Source: Tennessee River.

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

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

Raw-water storage: None.

Finished-water storage: Clear well, 130, 000 gal; elevated tanks 3, 300, 000 gal.

The treatment plant is 1½ miles east of the city.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	5.6	6.1	Hardness as CaCO₃:		
Iron (Fe)06	.10		Total	78	92
Manganese (Mn) .....	.00	.00	Noncarbonate.....	23	29
Calcium (Ca)	23	29	Color.....	30	6
Magnesium (Mg).....	4.9	4.9		pH.....	6.9	7.5
Sodium (Na)	7.0	7.0	Specific conductance		
Potassium (K)	1.5	1.4		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	192	209
Bicarbonate (HCO ₃)	67	77	Turbidity.....	4	2
Sulfate (SO ₄)	14	20	Temperature (F.)...	69	70
Chloride (Cl)	15	17	Date of collection...	10/17/51	10/17/51
Fluoride (F) .....	.3	.0			
Nitrate (NO ₃)	3.9	.8			
Dissolved solids.....	113	118			

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	7.6	7.0	--	--	--	50	228	20
Finished water...	--	--	--	7.9	8.1	7.7	--	--	--	0	0	0

DOTHAN
(Population, 21, 584)

Ownership: Municipal.

Source: 9 wells (1 to 4 and 6 to 10). The depths of the wells are reported to be 625-640 (1, 2, and 3), 315, 326, 335, 680, 760, and 760 ft. The yield of the wells is reported to be 200 (1, 2, and 3), 240, 500, 640, 560, 620, and 600 gpm, respectively.

Treatment: Chlorination of wells 4 and 5; aeration of well 6; and addition of phosphate for corrosion correction of well 7.

Raw-water storage: None.

Finished-water storage: 1, 950, 000 gal.

The wells are not pumped as unit. Well 5 has been abandoned.

ANALYSES

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

	Well 7 (raw water)	Well 9	Well 10	Wells, Fin- ished water (composite)
Silica (SiO ₂)	8.3	15	13	7.4
Iron (Fe).....	.01	.06	.05	.07
Manganese (Mn) .....	.00	.00	.00	.00
Calcium (Ca)	7.8	33	32	8.0
Magnesium (Mg)	1.3	7.7	7.7	1.5
Sodium (Na).....	3.3	25	26	2.9
Potassium (K) .....	.7	3.1	2.8	.7
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	27	181	180	28
Sulfate (SO ₄)	1.4	12	11	1.8
Chloride (Cl).....	3.8	4.8	4.5	4.5
Fluoride (F) .....	.0	.0	.0	.0
Nitrate (NO ₃)	2.8	.2	.2	3.4
Dissolved solids	44	190	186	48
Hardness as CaCO ₃ :				
Total	25	114	112	26
Noncarbonate	3	0	0	3
Color.....	7	5	6	4
pH.....	6.3	7.7	7.9	6.4
Specific conductance (micromhos at 25 C.)	65.7	294	291	68.7
Turbidity	1	1	1	0
Temperature (F.)	70	74	--	74
Date of collection	10/23/51	10/23/51	10/23/51	10/23/51
Depth (feet)	335	760	760	
Diameter (inches)	24-16	18	18	
Date drilled	1945	1947	1951	
Percent of supply	--	--	--	

FAIRFIELD
(Population, 13,177)

Ownership: (See Birmingham).

FLORENCE
(Population, 23,879)

Ownership: Municipal. Total population supplied, 23,929.

Source: Cypress Creek.

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

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

Raw-water storage: None.

Finished-water storage: Underground storage, 250,000 gal; elevated tanks, 1,030,000 gal.

The treatment plant is about 3 miles north of the city.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	7.2	6.8	Hardness as CaCO₃:		
Iron (Fe)03	.17		Total	61	75
Manganese (Mn) .....	.00	.00	Noncarbonate.....	3	18
Calcium (Ca)	21	26	Color.....	6	14
Magnesium (Mg).....	2.1	2.5		pH.....	7.1	7.7
Sodium (Na) .....	.5	1.8	Specific conductance		
Potassium (K)6	.8		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	114	151
Bicarbonate (HCO ₃)	71	70	Turbidity.....	2	2
Sulfate (SO ₄)	1.9	15	Temperature (F.)...	59	--
Chloride (Cl)	1.8	3.5	Date of collection ...	10/17/51	10/17/51
Fluoride (F) .....	.0	.1			
Nitrate (NO ₃) .....	.7	1.3			
Dissolved solids.....	72	94			

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.....	45	56	8	6.8	7.4	6.0	--	--	--	--	--	--
Finished water...	30	50	18	8.6	8.8	8.2	--	--	--	--	--	--

GADSDEN
(Population, 55, 725)

Ownership: Municipal; supplies also Attalla and Rainbow City. Total population supplied, about 64, 900.

Source: Coosa River.

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

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

Raw-water storage: None.

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

The treatment plant is located about a mile northeast of the city. There is some variation in the chemical character of the water throughout the year.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	6.5	6.6	Hardness as CaCO₃: Total Noncarbonate.....	60 4	72 15
Iron (Fe) .....	.17	.04		
Manganese (Mn) .....	.00	.00		
Calcium (Ca)	15	20	Color pH Specific conductance (micromhos at 25 C.) Turbidity Temperature (F.)... Date of collection...	15 7.5 127 3 70 10/18/51	5 8.2 148 2 70 10/18/51
Magnesium (Mg).....	5.5	5.5			
Sodium (Na)	5.2	5.2			
Potassium (K)	1.3	1.2			
Carbonate (CO ₃)	0	0			
Bicarbonate (HCO ₃)	68	70			
Sulfate (SO ₄)	9.0	15			
Chloride (Cl)	3.5	4.5			
Fluoride (F) .....	.0	.0		
Nitrate (NO ₃)	1.6	1.6			
Dissolved solids.....	84	96			

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.....	30	54	16	7.0	8.3	6.3	42	54	30	--	700	25
Finished water...	52	67	25	8.3	8.5	8.0	56	72	38	--	--	--

HOMEWOOD
(Population, 12, 866)

Ownership: (See Birmingham).

HUNTSVILLE
(Population, 16,437)

Ownership: Municipal; supplies West Huntsville and other suburban areas. Total population supplied, about 25,000.

Source: 2 springs (Big Spring and Braham Spring). Lincoln Mills supply may be used in case of emergency.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 600,000 gal.

Big Spring is located in downtown Huntsville. Braham Spring is located 2 miles south of Huntsville.

ANALYSES

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

	Big Spring <u>1</u> /	Braham Spring <u>1</u> /		Big Spring <u>1</u> /	Braham Spring <u>1</u> /
Silica (SiO ₂)	8.3	7.7	Hardness as CaCO₃:		
Iron (Fe)15	.07		Total	126	103
Manganese (Mn) .....	.00	.00	Noncarbonate.....	12	11
Calcium (Ca)	42	34	Color.....	5	5
Magnesium (Mg).....	5.2	4.4		pH.....	7.1	7.0
Sodium (Na)	1.2	1.8	Specific conductance		
Potassium (K)5	.8		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	239	196
Bicarbonate (HCO ₃)	139	112	Turbidity.....	2	1
Sulfate (SO ₄)	4.2	3.1	Temperature (F.)...	62	62
Chloride (Cl)	3.0	3.2	Date of collection...	10/17/51	10/17/51
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃)	7.7	7.2			
Dissolved solids.....	141	118			

1/Raw water.

MOBILE
(Population, 129,009)

Ownership: Municipal; supplies also suburban districts. Total population supplied, about 149,000.

Source: Clear Creek furnishes 80 percent of supply; Threemile Creek furnishes 20 percent; Eightmile Creek furnishes 4,000,000 gpd as auxiliary supply.

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

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

Raw-water storage: None.

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

The treatment plant is 8 miles northwest of the city.

A new source of supply (Big Creek) is being developed. Clear Creek and Three Mile Creek will be abandoned as sources of supply after 1952.

ANALYSES

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

	Clear Cr. and Threemile Cr. (raw water)	Clear Cr. and Threemile Cr. (finished water)	Big Creek (raw water)
Silica (SiO ₂)	6.8	6.1	5.0
Iron (Fe) .....	.69	.12	.03
Manganese (Mn) .....	.00	.00	.00
Calcium (Ca)	1.6	6.4	.8
Magnesium (Mg).....	.9	1.0	.8
Sodium (Na).....	2.2	2.3	1.8
Potassium (K)	1.0	.5	.5
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	8	12	5
Sulfate (SO ₄).....	.9	6.7	.7
Chloride (Cl)	3.5	5.2	2.8
Fluoride (F) .....	.0	.0	.1
Nitrate (NO ₃)	1.0	1.7	.6
Dissolved solids	31	38	20
Hardness as CaCO ₃ :			
Total	8	20	5
Noncarbonate	1	10	1
Color	50	5	27
pH.....	6.4	7.0	6.2
Specific conductance (micromhos at 25 C.).....	26.2	53.7	17.7
Turbidity	6	1	1
Temperature (F.).....	75	76	70
Date of collection	10/24/51	10/24/51	10/24/51

Regular determinations at treatment plant, 1951 1/

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Temperature		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	5	6	3	6.3	6.5	6.0	8	10	6	67	78	50
Finished water...	11	12	7	8.9	9.3	8.5	36	40	20	67	78	50

1/Oct. 1, 1950 to Sept. 30, 1951.

MONTGOMERY
(Population, 106,525)

Ownership: Municipal; supplies also a population of about 14,000 outside of the city limits. Total population supplied, about 120,500.

Source: 32 wells, regular supply; 13 (airlift) wells, auxiliary supply. The depth of the wells ranges from 64 to 740 ft. The depth of the greater number of the wells is around 600 ft. The yield of the wells (data on 27 wells) ranges from 120 (well 17) to 650 gpm (well 27), and averages 419 gpm.

Treatment: Chlorination.

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

Finished-water storage: 2,250,000 gal.

An additional 4,000,000 gal storage tank will be completed in 1951.

There are two pumping stations, one on Court Street, and the other on Day Street.

Each station pumps 16 wells. The Day Street Station pumps wells 21 to 36 inclusive.

ANALYSES

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

	<u>1/Wells</u>	<u>2/Wells</u>	Well 2	Well 8	Well 14
Silica (SiO ₂)	15	29	15	13	15
Iron (Fe) .....	.15	.35	.25	.02	.18
Manganese (Mn) .....	.01	.05	.03	.00	.00
Calcium (Ca)	4.6	23	1.8	3.2	1.4
Magnesium (Mg)	1.5	2.4	.9	1.2	.8
Sodium (Na)	57	30	2.9	84	2.1
Potassium (K)	1.7	1.7	1.6	1.0	1.4
Carbonate (CO ₃)	0	0	0	16	0
Bicarbonate (HCO ₃)	143	128	7	165	8
Sulfate (SO ₄)	12	13	.8	14	1.5
Chloride (Cl)	11	10	4.2	8.5	2.8
Fluoride (F) .....	.4	.2	.0	.5	.0
Nitrate (NO ₃)	3.3	4.6	6.1	1.7	.4
Dissolved solids	185	180	41	228	34
Hardness as CaCO ₃ :					
Total	18	67	8	13	7
Noncarbonate	0	0	2	0	0
Color	4	3	4	5	5
pH	7.5	7.0	5.7	8.9	5.5
Specific conductance (micromhos at 25 C.)	283	257	38.6	341	32.1
Turbidity	2	1	1	2	1
Temperature (F.)	71	77	69	71	68
Date of collection	10/21/51	10/20/51	10/20/51	10/21/51	10/20/51
Depth (feet)			78	497	650
Diameter (inches)			24	18	14
Date drilled			1918	1921	1937
Percent of supply			--	--	--

1/Finished water, composite sample, collected at Court Street pumping plant.

2/Finished water, composite sample, collected at Day Street pumping plant.

	Well 15	Well 23	Well 24S	Well 27	Well 31
Silica (SiO ₂)	13	31	37	33	11
Iron (Fe) .....	.25	.16	.08	.73	.19
Manganese (Mn) .....	.00	.00	.08	.06	.00
Calcium (Ca)	1.2	25	28	19	3.0
Magnesium (Mg) .....	.5	2.1	2.0	1.7	.8
Sodium (Na)	105	15	9.0	39	104
Potassium (K)	1.1	2.6	1.7	1.5	1.4
Carbonate (CO ₃)	32	0	0	0	9
Bicarbonate (HCO ₃)	183	24	106	150	211
Sulfate (SO ₄)	16	28	6.2	8.6	9.3
Chloride (Cl)	10	30	3.0	6.5	28
Fluoride (F) .....	.6	.0	.1	.5	.9
Nitrate (NO ₃) .....	.2	18	.2	.3	1.1
Dissolved solids	272	192	142	186	274
Hardness as CaCO ₃ :					
Total	5	71	78	54	11
Noncarbonate	0	51	0	0	0
Color	6	5	5	25	3
pH	9.1	5.8	6.9	7.4	8.6
Specific conductance (micromhos at 25 C.)	424	241	183	261	443
Turbidity	1	0	1	2	2
Temperature (F.)	72	69	69	68	68
Date of collection	10/20/51	10/20/51	10/20/51	10/20/51	10/20/51
Depth (feet)	81	140	166	598	636
Diameter (inches)	14	18	18	18	18
Date drilled	1937	1942	1948	1943	1949
Percent of supply	--	--	--	--	--

OPELIKA
(Population, 12, 295)

Ownership: Municipal.

Source: Sougahatchee Creek impounded in Sougahatchee Lake.

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

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

Raw-water storage: Impounding reservoir.

Finished-water storage: 1, 243, 000 gal.

The treatment plant is about 5½ miles northeast of Opelika.

Raw water is furnished to Pepperell Mill which has its own filter plant having a rated capacity of 2, 000, 000 gpd.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.8	4.6	Hardness as CaCO₃:		
Iron (Fe)06	.13		Total	15	35
Manganese (Mn) .....	.00	.00	Noncarbonate.....	0	12
Calcium (Ca)	3.3	11	Color	20	5
Magnesium (Mg).....	1.6	1.8	pH	6.9	8.4
Sodium (Na)	3.5	3.5	Specific conductance		
Potassium (K)	2.2	1.7	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	50.5	89.0
Bicarbonate (HCO ₃)	22	28	Turbidity	2	2
Sulfate (SO ₄)	1.3	9.3	Temperature (F.)...	71	71
Chloride (Cl)	2.8	7.0	Date of collection...	10/22/51	10/22/51
Fluoride (F) .....	.1	.0			
Nitrate (NO ₃) .....	.2	.1			
Dissolved solids.....	31	57			

PHENIX CITY
(Population, 23, 305)

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

Total population supplied, about 23, 600.

Source: Chattahoochee River. Emergency connections can be made with the municipal supply of Columbus, Ga.

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

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

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

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

The treatment plant is located 1 mile north of the city.

There is some variation in the chemical character of the water throughout the year, but the dissolved solids are usually low.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water	
Silica (SiO ₂)	8.3	8.5	Hardness as CaCO₃:			
Iron (Fe)67	.01		Total	19	30
Manganese (Mn)00	.00		Noncarbonate.....	1	11
Calcium (Ca)	4.2	9.0	Color.....	70	4	
Magnesium (Mg).....	2.0	1.8		pH.....	7.1	7.2
Sodium (Na)	6.0	6.0	Specific conductance			
Potassium (K)	2.2	2.2		(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	63.8	90.2	
Bicarbonate (HCO ₃)	22	23	Turbidity.....	6	1	
Sulfate (SO ₄)	4.6	12	Temperature (F.)...	71	71	
Chloride (Cl)	5.0	7.8	Date of collection...	10/22/51	10/22/51	
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃)	2.5	1.7				
Dissolved solids.....	53	60				

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.....	14	17	12	7.2	8.8	6.9	18	22	14	50	400	10
Finished water...	17	21	16	8.4	8.9	8.4	30	36	28	.2	.3	.1

PRICHARD
(Population, 19, 014)

Ownership: Municipal; supplies also Chickasaw and Whistler. Total population supplied, about 33, 000.

Source: Eight Mile Creek.

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

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

Raw-water storage: None.

Finished-water storage: 500, 000 gal.

The treatment plant is about 1½ miles northwest of Prichard.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water	
Silica (SiO ₂)	4.5	4.5	Hardness as CaCO₃:			
Iron (Fe)15	.02		Total	7	33
Manganese (Mn)00	.00		Noncarbonate.....	1	16
Calcium (Ca)	1.1	12	Color.....	60	4	
Magnesium (Mg).....	1.1	.8		pH.....	6.1	9.2
Sodium (Na)	2.1	1.9	Specific conductance (micromhos at 25 C.).....	22.9	78.3	
Potassium (K)	1.2	.5		Turbidity	6	1
Carbonate (CO ₃)	0	4		Temperature (F.)...	71	71
Bicarbonate (HCO ₃)	8	13	Date of collection...	10/24/51	10/24/51	
Sulfate (SO ₄)	1.2	12				
Chloride (Cl)	3.5	6.8				
Fluoride (F) .....	.1	.0			
Nitrate (NO ₃) .....	.7	.7			
Dissolved solids.....	32	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.....	3	4	2	5.8	6.0	5.6	--	--	--	--	--	--
Finished water...	15	17	14	8.3	8.4	8.2	--	--	--	--	--	--

SELMA
(Population, 22, 840)

Ownership: Municipal; supplies also suburban districts. Total population supplied, about 23, 340.

Source: 3 wells (1 to 3) 460, 460, and 465 ft deep, and reported to yield 1, 500, 1, 500, and 1, 800 gpm, respectively. Equal quantities of water are pumped from each well.

Treatment: Aeration, coagulation (lime), sedimentation, chlorination, and rapid sand filtration.

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

Raw-water storage: None.

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

ANALYSES

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

	Well 2	Finished water		Well 2	Finished water
Silica (SiO ₂)	14	12	Hardness as CaCO₃: Total Noncarbonate.....	67 0	71 0
Iron (Fe)	1.4	.11			
Manganese (Mn) .....	.00	.00			
Calcium (Ca)	20	21	Color.....	33	5
Magnesium (Mg).....	4.1	4.5			
Sodium (Na)	3.2	2.7	pH.....	7.1	8.0
Potassium (K)	6.9	6.9			
Carbonate (CO ₃)	0	0	Specific conductance (micromhos at	159	162
Bicarbonate (HCO ₃)	89	93				25 C.).....
Sulfate (SO ₄)	4.8	5.8	Turbidity.....	4	1
Chloride (Cl)	3.0	4.5	Temperature (F.)...	70	69
Fluoride (F) .....	.0	.0	Date of collection...	10/20/51	10/21/51
Nitrate (NO ₃) .....	.3	.0			
Dissolved solids.....	102	104			
Depth (feet)				460	
Diameter (inches)				12	
Date drilled				1946	
Percent of supply				--	

TALLADEGA
(Population, 13, 134)

Ownership: Municipal; supplies also suburban districts. Total population supplied, about 14, 500.

Source: Talladega Creek.

Treatment: Coagulation with alum and lime, chlorination, sedimentation, rapid sand filtration, polyphosphate (Calgon) for corrosion control, and ammonia-tion.

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

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

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

The treatment plant is about 3 miles south of Talledega.

The rated capacity of the treatment plant will be increased to 4, 000, 000 gpd in 1952.

The storage facilities for the raw and finished waters are being increased to 3, 000, 000 and 2, 250, 000 gal, respectively.

There is some variation in the chemical character of the water throughout the year, but the amount of the dissolved solids is usually low.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water	
Silica (SiO ₂)	12	7.6	Hardness as CaCO₃:			
Iron (Fe)26	.26		Total	17	48
Manganese (Mn)00	.00		Noncarbonate.....	3	29
Calcium (Ca)	3.9	15	Color.....	15	6	
Magnesium (Mg).....	1.8	2.5		pH.....	6.6	8.1
Sodium (Na)	2.4	1.5	Specific conductance			
Potassium (K)	1.1	.6		(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	46.3	113	
Bicarbonate (HCO ₃)	17	23	Turbidity.....	2	2	
Sulfate (SO ₄)	6.2	27	Temperature (F.)...	70	68	
Chloride (Cl)	1.8	4.8	Date of collection ...	10/18/51	10/18/51	
Fluoride (F) .....	.1	.2			
Nitrate (NO ₃)	1.2	.4				
Dissolved solids.....	39	75				

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.....	12	15	10	6.6	6.9	6.6	13	18	8	--	--	--
Finished water...	14	16	12	9.2	9.3	9.0	45	52	38	--	--	--

TUSCALOOSA
(Population, 46,396)

Ownership: Municipal; supplies Northport and other suburban districts. Total population supplied, about 55,300.

Source: Yellow Creek impounded.

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

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

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

Finished-water storage: 2,300,000 gal.

The treatment plant is about 3½ miles northeast of Tuscaloosa.

Rated capacity of the treatment plant will be increased to 12,000,000 gpd in 1952.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water			
Silica (SiO ₂)	5.7	5.2	Hardness as CaCO₃: Total	8	21			
Iron (Fe)42	.18				Noncarbonate.....	3	7
Manganese (Mn)03	.00						
Calcium (Ca)	2.0	6.3	Color	35	4			
Magnesium (Mg)8	1.4				pH	6.2	7.9
Sodium (Na)	1.0	3.2	Specific conductance (micromhos at 25 C.)	20.4	54.7			
Potassium (K)5	.5				Turbidity	3	2
Carbonate (CO ₃)	0	0	Temperature (F.) ...	68	69			
Bicarbonate (HCO ₃)	6	18				Date of collection ...	10/19/51	10/19/51
Sulfate (SO ₄)	2.6	4.3						
Chloride (Cl)	2.0	4.5						
Fluoride (F) .....	.1	--					
Nitrate (NO ₃) .....	.6	.6					
Dissolved solids.....	24	40						

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	11	9	5.9	6.2	5.5	--	--	--	25	40	8
Finished water...	16	18	14	8.9	9.1	8.7	--	--	--	0	0	0

KENTUCKY

ASHLAND
(Population, 31, 131)

Ownership: Municipal; supplies also Russell (which supplies Worthington, Flatwoods, Bellefonte, Westwood, and Raceland) and about 600 people outside the city limits. Total population supplied, about 39, 800.

Source: Ohio River.

Treatment: Aeration, prechlorination, coagulation with alum and lime, ammonia-tion, activated carbon, sedimentation, rapid sand filtration, and postchlorination.

Rated capacity of treatment plant: 4, 700, 000 gpd.

Raw-water storage: 25, 000, 000 gal.

Finished-water storage: 6, 500, 000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	5.4	Hardness as CaCO ₃ :	
Iron (Fe) .....	.21	Total	93
Manganese (Mn) .....	.00	Noncarbonate	56
Calcium (Ca)	26	Color	0
Magnesium (Mg)	6.6	pH	7.2
Sodium (Na)	10	Specific conductance	
Potassium (K)	1.5	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	245
Bicarbonate (HCO ₃)	44	Turbidity	--
Sulfate (SO ₄)	60	Temperature (F.).....	--
Chloride (Cl)	11	Date of collection	5/8/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	1.5		
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.....	32	52	17	7.0	7.7	6.2	90	156	43	176	2000	25
Finished water...	41	59	24	8.3	8.7	7.2	107	170	72	--	--	--

BOWLING GREEN
(Population, 18,347)

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

Total population supplied, about 19,800.

Source: Barren River.

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

Rated capacity of treatment plant: 4,500,000 gpd.

Raw-water storage: None.

Finished-water storage: 2,150,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	5.3	Hardness as CaCO₃:	
Iron (Fe) .....	.20	Total	102
Manganese (Mn) .....	.00	Noncarbonate	16
Calcium (Ca)	32		
Magnesium (Mg)	5.3	Color	0
Sodium (Na)	2.2	pH	7.8
Potassium (K) .....	.7	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	104	25 C.).....	202
Sulfate (SO ₄)	13	Turbidity	--
Chloride (Cl)	5.0	Temperature (F.).....	--
Fluoride (F) .....	.0	Date of collection	4/17/51
Nitrate (NO ₃)	3.4		
Dissolved solids	114		

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.....	104	134	58	7.8	8.2	7.3	102	140	54	139	2100	5
Finished water...	103	142	58	7.9	8.2	7.4	112	142	72	--	--	--

COVINGTON
(Population, 64,452)

Ownership: Municipal; supplies also Edgewood, Elsmere, Erlanger, Florence, Fort Thomas, Highland Heights, Ludlow, Park Hills, South Fort Mitchell, and a number of smaller communities. Total population supplied, about 105,000.

Source: Ohio River. The intake and pumping station is about 7 miles upstream from Covington. The treatment plant is on Alexandria Pike, 3 miles south-east of Covington.

Treatment: Plain sedimentation with addition of copper sulfate for algae control, prechlorination, coagulation with alum or ferric sulfate and lime, ammonia-tion, sedimentation, rapid sand filtration, and postchlorination.

Rated capacity of treatment plant: 36,000,000 gpd.

Raw-water storage: 72,000,000 gal.

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

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	4.5	Hardness as CaCO ₃ :	
Iron (Fe) .....	.21	Total	112
Manganese (Mn) .....	.00	Noncarbonate	68
Calcium (Ca)	33	Color	2
Magnesium (Mg)	7.3	pH	7.1
Sodium (Na)	9.5	Specific conductance	
Potassium (K)	1.7	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	280
Bicarbonate (HCO ₃)	54	Turbidity	--
Sulfate (SO ₄)	77	Temperature (F.).....	--
Chloride (Cl)	10	Date of collection	5/16/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	1.8		
Dissolved solids	173		

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	39	14	7.4	8.1	7.0	129	196	90	241	1200	5
Finished water...	39	49	27	8.1	9.0	7.2	136	198	110	0	0	0

FORT THOMAS
(Population, 10,870)

Ownership: Municipal. Supplied by Covington (See Covington).

FRANKFORT
(Population, 11, 916)

Ownership: Municipal; supplies also about 3, 500 people outside the city limits.

Total population supplied, about 15, 400.

Source: Kentucky River. The pumping station and treatment plant are one mile upstream from the center of Frankfort.

Treatment: Prechlorination, coagulation with alum, sedimentation, rapid sand filtration, lime, and postchlorination. Finished water from reservoirs is rechlorinated during summer months.

Rated capacity of treatment plant: 7, 500, 000 gpd.

Raw-water storage: 900, 000 gal.

Finished-water storage: 6, 800, 000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	6.3	Hardness as CaCO ₃ :	
Iron (Fe) .....	.29	Total	74
Manganese (Mn) .....	.00	Noncarbonate	32
Calcium (Ca)	23	Color	5
Magnesium (Mg)	4.1	pH	7.7
Sodium (Na)	4.9	Specific conductance	
Potassium (K)	1.7	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	181
Bicarbonate (HCO ₃)	52	Turbidity	--
Sulfate (SO ₄)	30	Temperature (F.).....	--
Chloride (Cl)	7.5	Date of collection	5/14/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	1.4		
Dissolved solids	114		

Regular determinations at treatment plant, 1947

	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.....	56	77	30	7.3	7.4	6.8	120	142	89	25	3000	20
Finished water...	62	83	26	7.5	7.7	7.0	130	155	95	--	--	--

HENDERSON
(Population, 16,837)

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

Total population supplied, about 18,300.

Source: Ohio River.

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

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

Raw-water storage: None.

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

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	5.1	Hardness as CaCO₃:	
Iron (Fe) .....	.15	Total	112
Manganese (Mn) .....	.00	Noncarbonate	48
Calcium (Ca)	35	Color	0
Magnesium (Mg)	5.8	pH	7.9
Sodium (Na)	6.0	Specific conductance	
Potassium (K)	1.2	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	259
Bicarbonate (HCO ₃)	77	Turbidity	--
Sulfate (SO ₄)	52	Temperature (F.).....	--
Chloride (Cl)	7.5	Date of collection	4/19/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	3.2		
Dissolved solids	162		

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	7.6	6.4	--	--	--	150	800	100
Finished water...	63	80	58	7.2	7.4	7.0	121	127	117	5	7	2

HOPKINSVILLE
(Population, 12, 526)

Ownership: Municipal; supplies also about 4, 000 people outside the city limits.

Total population supplied, about 16, 500.

Source: Little River. Auxiliary supply is from two artificial lakes on tributaries of Little River.

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

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

Raw-water storage: 450, 000, 000 gal.

Finished-water storage: 800, 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) .....	.15	Total	124
Manganese (Mn) .....	.00	Noncarbonate	38
Calcium (Ca)	42	Color	0
Magnesium (Mg)	4.4	pH	7.8
Sodium (Na)	4.1	Specific conductance	
Potassium (K) .....	.3	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	257
Bicarbonate (HCO ₃)	104	Turbidity	--
Sulfate (SO ₄)	40	Temperature (F.).....	67
Chloride (Cl)	4.5	Date of collection	4/30/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	1.5		
Dissolved solids	155		

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	76	120	56	7.1	7.8	6.0	77	116	48	177	1500	10
Finished water...	88	124	60	7.7	8.7	6.8	122	144	76	--	--	--

LEXINGTON
(Population, 55, 534)

Ownership: Lexington Water Co. ; supplies also about 25, 600 people outside the city limits. Total population supplied, about 81, 100.

Source: East Hickman Creek and West Hickman Creek, impounded in 4 reservoirs. The impounding reservoirs and treatment plant are 1 mile south-east of Lexington on U. S. Highway 25.

Treatment: Copper sulfate for algae control in impounding reservoirs, aeration, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 18, 000, 000 gpd.

Raw-water storage: 1, 750, 000, 000 gal.

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

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	0.8	Hardness as CaCO ₃ :	
Iron (Fe) .....	.26	Total	110
Manganese (Mn) .....	.00	Noncarbonate	24
Calcium (Ca)	36	Color	4
Magnesium (Mg)	4.6	pH	7.3
Sodium (Na)	1.4	Specific conductance	
Potassium (K)	1.1	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	224
Bicarbonate (HCO ₃)	104	Turbidity	--
Sulfate (SO ₄)	21	Temperature (F.).....	--
Chloride (Cl)	3.2	Date of collection	5/1/51
Fluoride (F) .....	.0		
Nitrate (NO ₃)	4.1		
Dissolved solids	128		

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	84	114	52	7.5	8.4	7.2	80	101	64	49	240	10
Finished water...	76	110	42	7.4	8.0	7.2	84	108	63	24	2.4	1

LOUISVILLE
(Population, 369, 129)

Ownership: Municipal; supplies also St. Matthews, Shively, Middletown, Jeffersontown, Anchorage, and Jefferson County (which supplies other places). Total population supplied, about 450, 000.

Source: Ohio River.

Treatment: Plain sedimentation, prechlorination, coagulation with alum (sometimes with sodium aluminate, activated carbon) softening with lime and soda ash, clarification, recarbonation, rapid sand filtration, postchlorination, ammoniation, and adjustment of pH (when not softening) with lime. When it is necessary, for taste and odor control, activated carbon and chlorine dioxide are used. Fluoridation (with sodium silicofluoride) is planned in the near future.

Rated capacity of treatment plant: 80, 000, 000 gpd (capacity of softening plant; 120, 000, 000 gpd, capacity of filters).

Raw-water storage: 131, 000, 000 gal (only in connection with treatment processes).

Finished-water storage: 57, 750, 000 gal.

The treatment plant is in the northeast section of the city on Frankfort Avenue. The raw water intake and pumping station are located about 1. 8 miles upstream from the treatment plant.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water			
Silica (SiO ₂)	6.4	6.4	Hardness as CaCO₃: Total	101	90			
Iron (Fe)06	.24				Noncarbonate.....	51	54
Manganese (Mn)00	.00						
Calcium (Ca)	26	21	Color	0	3			
Magnesium (Mg).....	8.5	9.2				pH	7.2	7.7
Sodium (Na)	8.0	15	Specific conductance (micromhos at 25 C.).....	246	251			
Potassium (K)	1.6	1.7				Turbidity	--	--
Carbonate (CO ₃)	0	0	Temperature (F.) ...	--	--			
Bicarbonate (HCO ₃)	60	44				Date of collection ...	5/9/51	5/10/51
Sulfate (SO ₄)	48	60						
Chloride (Cl)	9.0	13						
Fluoride (F) .....	.1	.1					
Nitrate (NO ₃)	3.0	2.1						
Dissolved solids.....	142	146						

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	99	27	7.4	8.2	6.7	115	165	62	155	875	5
Finished water...	40	88	26	9.0	10.0	7.0	97	140	70	0	3	0

MADISONVILLE
(Population, 11, 132)

Ownership: Municipal; supplies also about 3, 000 people outside the city limits.
 Total population supplied, about 14, 000.
 Source: 2 lakes (impounded streams). Auxiliary supply from lakes (impounded streams) near Earlington.
 Treatment: Prechlorination, coagulation with alum and lime, sedimentation, rapid sand filtration, postchlorination, and addition of polyphosphate (Calgon).
 Rated capacity of treatment plant: 2, 000, 000 gpd.
 Raw-water storage: --
 Finished-water storage: 550, 000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	2.7	Hardness as CaCO₃:	
Iron (Fe) .....	.17	Total	56
Manganese (Mn) .....	.00	Noncarbonate	38
Calcium (Ca)	15	Color	4
Magnesium (Mg)	4.4	pH	6.9
Sodium (Na)	5.1	Specific conductance	
Potassium (K)	1.0	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	147
Bicarbonate (HCO ₃)	22	Turbidity	--
Sulfate (SO ₄)	41	Temperature (F.).....	55
Chloride (Cl)	4.0	Date of collection	4/18/51
Fluoride (F) .....	.1		
Nitrate (NO ₃) .....	.0		
Dissolved solids	87		

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Temperature		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	16	20	8	7.1	7.3	6.8	--	--	--	--	91	34
Finished water...	20	25	12	8.0	8.1	7.9	--	--	--	--	--	--

MIDDLESBORO
(Population, 14,482)

Ownership: Kentucky Water Service Co., Inc.; supplies also about 100 people outside the city limits. Total population supplied, about 14,600.

Source: Little Yellow Creek impounded in Fern Lake, 1 mile south of Middlesboro.

Treatment: Chlorination.

Raw-water storage: (Impounding reservoir).

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

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	5.3	Hardness as CaCO₃:	
Iron (Fe) .....	.73	Total	12
Manganese (Mn) .....	.17	Noncarbonate	2
Calcium (Ca)	1.6		
Magnesium (Mg)	1.0	Color	2
Sodium (Na) .....	.9	pH	7.2
Potassium (K)	1.0	Specific conductance	
Carbonate (CO ₃)	0	(b micromhos at	
Bicarbonate (HCO ₃)	8	25 C.).....	20.5
Sulfate (SO ₄)	4.0	Turbidity	--
Chloride (Cl) .....	.9	Temperature (F.)	--
Fluoride (F) .....	.0	Date of collection	5/11/51
Nitrate (NO ₃) .....	.1		
Dissolved solids	19		

NEWPORT
(Population, 31, 044)

Ownership: Municipal; supplies also Bellevue and Dayton. Total population supplied, about 49, 100.

Source: Ohio River. The pumping station is about 5 miles upstream from Newport. The treatment plant is half a mile west of the pumping station.

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

Rated capacity of treatment plant: 6, 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		Finished water
Silica (SiO ₂)	4.7	Hardness as CaCO ₃ :	
Iron (Fe) .....	.42	Total	110
Manganese (Mn) .....	.00	Noncarbonate	68
Calcium (Ca)	33	Color	5
Magnesium (Mg)	6.8	pH	7.0
Sodium (Na)	10	Specific conductance	
Potassium (K)	1.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	281
Bicarbonate (HCO ₃)	52	Turbidity	--
Sulfate (SO ₄)	69	Temperature (F.).....	--
Chloride (Cl)	13	Date of collection	5/16/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	2.5		
Dissolved solids	172		

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	44	36	7.8	8.0	7.5	--	132	126	286	600	120
Finished water...	38	40	36	7.7	8.0	7.5	--	--	--	--	--	--

OWENSBORO
(Population, 33,651)

Ownership: Municipal; supplies also about 3,000 people outside the city limits.
 Total population supplied, about 36,700.
 Source: 18 wells (1 and 5 to 21) 110 to 132 ft deep; yield reported to be 100 to 500 gpm.
 Treatment: Chlorination, lime.
 Raw-water storage: None.
 Finished-water storage: 5,000,000 gal.

A treatment plant of 10,000,000 gpd capacity is under construction (1951).

ANALYSES

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

	Well 1 (raw water)	All wells (compo- site) ^{1/}		Well 1 (raw water)	All wells (compo- site) ^{1/}
Silica (SiO ₂)	4.3	12	Hardness as CaCO₃:		
Iron (Fe)50	.15		Total	126	108
Manganese (Mn) .....	.00	.00	Noncarbonate.....	41	61
Calcium (Ca)	41	18	Color.....	0	0
Magnesium (Mg).....	5.8	15	pH.....	7.7	8.1
Sodium (Na)	8.0	8.9	Specific conductance		
Potassium (K)	1.3	.9	(micromhos at		
Carbonate (CO ₃)	0	6	25 C.).....	289	263
Bicarbonate (HCO ₃)	104	44	Turbidity	--	--
Sulfate (SO ₄)	49	63	Temperature (F.)...	72	61
Chloride (Cl)	9.0	13	Date of collection...	4/18/51	4/18/51
Fluoride (F) .....	.1	.2			
Nitrate (NO ₃) .....	.1	2.4			
Dissolved solids.....	174	169			
Depth (feet)				124	
Diameter (inches)				8	
Date drilled				1931	
Percent of supply				--	

Regular determinations at treatment plant, 1951

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	--	--	--	7.4	7.5	7.2	350	385	166	54	--	--
Finished water...	--	--	--	8.8	9.2	8.6	116	122	108	54	--	--

^{1/}Finished water.

PADUCAH
(Population, 32,828)

Ownership: Municipal; supplies also about 4,520 people outside the city limits.

Total population supplied, about 37,300.

Source: Ohio River.

Treatment: Prechlorination, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, postchlorination, ammoniation, and final adjustment of pH to about 8.3.

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

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

Finished-water storage: 5,740,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	3.3	Hardness as CaCO ₃ :	
Iron (Fe) .....	.26	Total	102
Manganese (Mn) .....	.00	Noncarbonate	47
Calcium (Ca)	34	Color	3
Magnesium (Mg)	4.4	pH	7.5
Sodium (Na)	4.4	Specific conductance	
Potassium (K)	1.4	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	226
Bicarbonate (HCO ₃)	68	Turbidity	--
Sulfate (SO ₄)	41	Temperature (F.).....	--
Chloride (Cl)	6.5	Date of collection	5/14/51
Fluoride (F) .....	.0		
Nitrate (NO ₃)	1.6		
Dissolved solids	134		

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.....	65	88	50	7.4	7.8	6.8	66	90	54	150	700	30
Finished water...	68	90	58	8.3	8.6	7.8	72	101	62	5	8	0

RICHMOND
(Population, 10,268)

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

Total population supplied, about 10,800.

Source: Otter Creek, impounded. Emergency supply from Blue Grass Ordnance Depot, 4 miles southwest of Richmond. The treatment plant and impounding reservoirs are 2 miles east of Richmond on State Highway 52.

Treatment: Copper sulfate for algae control in reservoirs, coagulation with alum and lime, activated carbon, sedimentation, rapid sand filtration, ammonia-tion, and postchlorination.

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

Raw-water storage: 325,000,000 gal.

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

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	1.4	Hardness as CaCO₃:	
Iron (Fe) .....	.43	Total	132
Manganese (Mn) .....	.00	Noncarbonate	35
Calcium (Ca)	34	Color	4
Magnesium (Mg)	11	pH	7.3
Sodium (Na)	1.8	Specific conductance	
Potassium (K) .....	.3	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	269
Bicarbonate (HCO ₃)	116	Turbidity	--
Sulfate (SO ₄)	28	Temperature (F.).....	--
Chloride (Cl)	5.2	Date of collection	5/1/51
Fluoride (F) .....	.1		
Nitrate (NO ₃) .....	.5		
Dissolved solids	154		

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	119	157	70	8.1	8.4	7.5	77	92	62	21	165	10
Finished water...	108	138	60	7.6	8.1	7.5	80	94	68	0	0	0

WINCHESTER
(Population, 9,226)

Ownership: Municipal; supplies also about 2,000 people outside the city limits.
Total population supplied, about 11,200.

Source: Lower Howards Creek, impounded in two reservoirs. The impounding reservoirs and treatment plant are 4.5 miles southwest of Winchester on U. S. Highway 227. Emergency supply from Kentucky River.

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

Rated capacity of treatment plant: 1,250,000 gpd.

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

Finished-water storage: 775,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	1.3	Hardness as CaCO₃:	
Iron (Fe) .....	.57	Total	148
Manganese (Mn) .....	.00	Noncarbonate	45
Calcium (Ca)	45	Color	5
Magnesium (Mg)	8.7	pH	7.1
Sodium (Na)	4.7	Specific conductance	
Potassium (K) .....	.8	(b micromhos at	
Carbonate (CO ₃)	0	25 C.).....	287
Bicarbonate (HCO ₃)	126	Turbidity	--
Sulfate (SO ₄)	38	Temperature (F.)	--
Chloride (Cl)	7.0	Date of collection	5/1/51
Fluoride (F) .....	.1		
Nitrate (NO ₃)	1.0		
Dissolved solids	166		

Regular determinations at treatment plant, 1947

	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.....	192	--	--	8.2	8.4	7.6	--	--	--	25	--	--
Finished water...	185	--	--	7.4	8.0	7.0	--	--	--	2	--	--

MISSISSIPPI

BILOXI

(Population, 37,425)

Ownership: Municipal.

Source: 6 wells. North well, Main St. Station; Main St. Station well; Porter St. well, each 1,200 ft deep; and 3 wells in First St. well field. The yield of North well, Main St. Station well and Porter St. well is reported to be 1,200, 1,100, and 900 gpm, respectively.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 920,000 gal.

ANALYSES

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

	North 1/Well	Main St. Station 1/Well	Porter St. 1/Well	3 Wells 2/1st St. Well Field	3/Wells
Silica (SiO ₂)	20	18	21	19	17
Iron (Fe) .....	.09	.03	.08	.04	.06
Manganese (Mn) .....	.0	.0	.0	.0	.0
Calcium (Ca)	1.5	6.5	2.8	2.6	5.4
Magnesium (Mg) .....	.8	1.0	1.0	.7	1.5
Sodium (Na)	138	391	212	220	330
Potassium (K)	6.2	14	6.7	1.9	13
Carbonate (CO ₃)	8	0	0	0	0
Bicarbonate (HCO ₃)	251	335	294	309	306
Sulfate (SO ₄)	5.8	.4	1.6	.5	3.7
Chloride (Cl)	56	432	170	166	345
Fluoride (F) .....	.2	.3	.3	.3	.3
Nitrate (NO ₃)	1.8	1.2	2.0	1.3	1.3
Dissolved solids	364	1,030	559	573	880
Hardness as CaCO ₃ :					
Total	7	20	11	10	20
Noncarbonate	0	0	0	0	0
Color	18	40	15	17	80
pH	8.4	8.0	7.2	7.9	7.7
Specific conductance (micromhos at 25 C.)	583	1,850	958	968	1,540
Turbidity	1	0	1	1	2
Temperature (F.)	83	87	85	86	85
Date of collection	6/14/51	6/14/51	6/14/51	6/14/51	6/14/51
Depth (feet)	1,200	1,200	1,200		
Diameter (inches)	--	--	--		
Date drilled	1951	1942	1945		
Percent of supply	--	--	--		

1/Raw water.

2/Raw water (composite).

3/Finished water (composite).

CLARKSDALE
(Population, 16,539)

Ownership: Municipal.

Source: 4 wells (1 to 4) 766, 760, and 758 ft deep. Depth of well 4, not reported.

The yield of the wells is reported to be 600, 1,000, 1,000, and 1,000 gpm.

The water from the wells is pumped directly into the distribution mains.

ANALYSIS

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

	Wells (composite)		Wells (composite)
Silica (SiO ₂)	27	Hardness as CaCO ₃ :	
Iron (Fe) .....	.14	Total	4
Manganese (Mn) .....	.0	Noncarbonate	0
Calcium (Ca) .....	.6	Color	22
Magnesium (Mg) .....	.7	pH	7.7
Sodium (Na)	165	Specific conductance	
Potassium (K)	1.8	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	683
Bicarbonate (HCO ₃)	350	Turbidity	2
Sulfate (SO ₄)	1.2	Temperature (F.).....	71
Chloride (Cl)	55	Date of collection	5/23/51
Fluoride (F) .....	.4		
Nitrate (NO ₃)	1.7		
Dissolved solids	446		

COLUMBUS
(Population, 17, 172)

Ownership: Municipal; population supplied outside of the city limits, about 3, 000.

Total population supplied, about 20, 200.

Source: Luxapalila Creek.

Treatment: Coagulation with alum and lime, sedimentation, rapid sand filtration, chlorination, and ammoniation. (Fluoridation to begin July 1, 1951.)

Rated capacity of treatment plant: 4, 000, 000 to 6, 000, 000 gpd.

Raw-water storage: None.

Finished-water storage: 1, 550, 000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	8.3	8.0	Hardness as CaCO₃:		
Iron (Fe) .....	.38	.08	Total	9	40
Manganese (Mn) .....	.0	.0	Noncarbonate.....	0	20
Calcium (Ca)	2.1	14	Color	45	8
Magnesium (Mg).....	1.0	1.2	pH	6.5	9.1
Sodium (Na)	1.6	1.4	Specific conductance		
Potassium (K)	1.8	1.4	(micromhos at		
Carbonate (CO ₃)	0	--	25 C.).....	28.6	95.2
Bicarbonate (HCO ₃)	11	1/24	Turbidity	7	2
Sulfate (SO ₄)	1.4	12	Temperature (F.)...	--	--
Chloride (Cl)	2.0	7.5	Date of collection...	5/21/51	5/21/51
Fluoride (F) .....	.1	.0			
Nitrate (NO ₃)	4.0	3.6			
Dissolved solids.....	38	77			

1/Includes the equivalent of less than 5 ppm of carbonate (CO₃).

CORINTH
(Population, 9,785)

Ownership: Peoples Water Service Co., Baltimore, Md. Population supplied outside of the city limits, about 3,000. Total population supplied, about 12,800.

Source: 4 wells (1 to 4) 320, 320, 320, and 200 ft deep. The yield of the wells is reported to be 750, 750, 400, and 200 gpm. Wells 1 and 2 are pumped alternately.

Treatment: Aeration (overflow trays), lime, sedimentation, rapid sand filtration, and chlorination.

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

Raw-water storage: 200,000 gal.

Finished-water storage: 400,000 gal.

ANALYSES

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

	Wells (composite) Finished water	Well 1 (raw water)	Well 4 (raw water)
Silica (SiO ₂)	13	19	8.3
Iron (Fe) .....	.09	.15	.11
Manganese (Mn) .....	.0	.14	.0
Calcium (Ca)	20	9.4	36
Magnesium (Mg).....	4.9	2.5	9.6
Sodium (Na).....	22	3.1	77
Potassium (K)	3.4	2.2	8.5
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	79	41	141
Sulfate (SO ₄).....	7.2	5.8	15
Chloride (Cl)	34	2.5	125
Fluoride (F) .....	.4	.2	.3
Nitrate (NO ₃) .....	.2	.3	.3
Dissolved solids	146	66	358
Hardness as CaCO ₃ :			
Total	70	34	130
Noncarbonate	5	0	14
Color	4	12	5
pH.....	8.0	6.2	7.6
Specific conductance (micromhos at 25 C.).....	244	87.0	637
Turbidity	2	5	1
Temperature (F.)	65	63	--
Date of collection	5/21/51	5/21/51	5/21/51
Depth (feet)		320	200
Diameter (inches)		12	10
Date drilled		1949	1922
Percent of supply		--	--

GREENVILLE
(Population, 29, 936)

Ownership: Municipal; population supplied outside of the city limits, about 5,000.
Total population supplied, about 34,900.

Source: 4 wells (Toombs Alley, 1 to 3) 500+, 526, 519, and 500+ ft deep. The yield of the wells is reported to be 1,500, 1,350, 1,050, and 1,500 gpm. The water from the wells is pumped to storage reservoirs where it is chlorinated.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 500,000 gal.

The water from all the wells is reported to be about the same chemical composition.

ANALYSES

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

	Wells 1/(com- posite)	Well 2		Wells 1/(com- posite)	Well 2
Silica (SiO ₂)	19	17	Hardness as CaCO₃:		
Iron (Fe) .....	.02	.03	Total	6	5
Manganese (Mn) .....	.0	.02	Noncarbonate.....	0	0
Calcium (Ca) .....	.9	1.2	Color	35	55
Magnesium (Mg).....	.9	.5	pH	7.9	8.5
Sodium (Na)	145	156	Specific conductance		
Potassium (K)	9.5	9.9	(micromhos at		
Carbonate (CO ₃)	0	5	25 C.).....	590	654
Bicarbonate (HCO ₃)	274	293	Turbidity	2	2
Sulfate (SO ₄)	3.3	2.3	Temperature (F.)...	--	70
Chloride (Cl)	70	68	Date of collection...	5/24/51	5/24/51
Fluoride (F) .....	.2	.2			
Nitrate (NO ₃) .....	.8	.8			
Dissolved solids.....	387	406			
Depth (feet)					519
Diameter (inches)					12
Date drilled					1931
Percent of supply					--

1/Finished water.

GREENWOOD
(Population 18, 061)

Ownership: Municipal.

Source: 10 wells (1 to 9, and Old Ice Plant well) each 800 ft deep, except wells 5 and 6 which are 1, 919 and 640 ft deep, respectively.

Treatment: Chlorinated as pumped from the wells.

Raw-water storage: None.

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

Wells 8 and 9 are pumped continuously into the mains. The yield is reported to be 500 and 1, 000 gpm, respectively. The other 8 wells are reported as flowing and the combined flow is reported to be 1, 400 gpm, but the wells are connected together and are pumped into a 1, 000, 000 gal storage reservoir.

ANALYSIS

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

	Finished water (composite)		Finished water (composite)
Silica (SiO ₂)	21	Hardness as CaCO₃:	
Iron (Fe) .....	.17	Total	7
Manganese (Mn) .....	.0	Noncarbonate	0
Calcium (Ca)	2.0		
Magnesium (Mg) .....	.6	Color	15
Sodium (Na)	83	pH	7.9
Potassium (K)	6.1	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	210	25 C.).....	347
Sulfate (SO ₄)	5.4	Turbidity	3
Chloride (Cl)	7.5	Temperature (F.).....	74
Fluoride (F) .....	.2	Date of collection	5/23/51
Nitrate (NO ₃)	1.2		
Dissolved solids	243		

GULFPORT
(Population, 22, 659)

Ownership: Municipal.

Source: 9 wells. Three wells (1, 2, and 3) located on U. S. Naval Base, 854, 1,196, and 761 ft deep. Three wells (2W, 3W, and 4W) located on Gulfport Airfield Base, 600 and 645 ft deep (not reported for well 4W). Three wells (West 2nd St., Gravelene, and Schoolyard) located in the city, 1,360, 900, and 1,200 ft deep.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: (Capacity not available).

The water from the wells is pumped into storage reservoirs and tanks before distribution in the city mains.

ANALYSES

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

	<u>1</u> /Wells	Well 1 U. S. Navy	Well 2 U. S. Navy	Well 3 U. S. Navy	Well 2W Airfield
Silica (SiO ₂)	21	20	24	34	42
Iron (Fe) .....	.12	.07	.09	.12	.30
Manganese (Mn) .....	.0	.0	.0	.0	.05
Calcium (Ca) .....	.6	.5	.6	.6	.4
Magnesium (Mg) .....	.1	.4	.5	.4	.5
Sodium (Na)	93	135	72	60	51
Potassium (K)	6.2	5.8	4.7	5.0	3.0
Carbonate (CO ₃)	16	18	9	0	0
Bicarbonate (HCO ₃)	193	300	151	144	120
Sulfate (SO ₄)	9.0	7.7	9.1	8.2	10
Chloride (Cl)	5.0	6.0	6.5	4.8	7.2
Fluoride (F) .....	.3	.5	.0	.0	.0
Nitrate (NO ₃)	3.1	1.7	2.8	2.5	2.4
Dissolved solids	251	349	205	191	177
Hardness as CaCO ₃ :					
Total	2	2	4	3	3
Noncarbonate	0	0	0	0	0
Color	15	30	6	5	5
pH	8.8	8.8	8.6	7.8	7.9
Specific conductance (micromhos at 25 C.)	382	539	296	249	214
Turbidity	2	2	2	2	2
Temperature (F.)	88	84	79	78	78
Date of collection	6/14/51	6/14/51	6/14/51	6/14/51	6/14/51
Depth (feet)		854	1,196	761	600
Diameter (inches)		12	12	12	--
Date drilled		1942	1942	1942	--
Percent of supply		--	--	--	--

1/Finished water (composite).

	Well 3W Airfield	Well 4W Airfield	West 2nd St. Well	Gravelene Well	Schoolyard Well
Silica (SiO ₂)	41	41	34	23	19
Iron (Fe) .....	.16	.23	.08	.06	.09
Manganese (Mn) .....	.0	.0	.0	.02	.0
Calcium (Ca) .....	.9	.8	.2	.5	.6
Magnesium (Mg) .....	.5	.2	.7	.5	.7
Sodium (Na)	53	55	64	80	124
Potassium (K)	2.4	4.3	5.6	2.7	5.1
Carbonate (CO ₃)	0	0	0	17	20
Bicarbonate (HCO ₃)	125	131	154	157	270
Sulfate (SO ₄)	9.1	9.3	8.8	11	8.5
Chloride (Cl)	5.2	5.2	5.5	5.0	6.8
Fluoride (F) .....	.0	.1	.1	.2	.5
Nitrate (NO ₃) .....	.7	2.7	.6	.3	2.5
Dissolved solids	176	188	197	219	322
Hardness as CaCO ₃ :					
Total	4	3	3	3	4
Noncarbonate	0	0	0	0	0
Color	6	7	7	8	23
pH	7.9	8.0	8.2	8.9	8.8
Specific conductance (micromhos at 25 C.)	219	235	265	329	500
Turbidity	1	3	2	2	2
Temperature (F.)	78	78	85	82	85
Date of collection	6/14/51	6/14/51	6/14/51	6/14/51	6/14/51
Depth (feet)	645	--	1,360	900	1,200
Diameter (inches)	--	--	--	--	--
Date drilled	--	--	--	--	--
Percent of supply	--	--	--	--	--

HATTIESBURG
(Population, 29,474)

Ownership: Municipal.

Source: 12 wells (data available for only 9 wells, namely, 2, 3, 4, and 9 to 14) 622, 610, 621, 353, 456, 635, 422, 400, and 610 ft deep. The yield of the wells is reported to be as follows: (2, not reported), 619, 137, 320 (flowing) and 950 (pumping), 306, 155 (flowing), 328 (flowing) and 950 (pumping), 240, and 135 (flowing) gpm.

Treatment: Aeration (contact trays), rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 4,500,000 gpd.

Raw-water storage: None.

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

ANALYSES

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

	Wells 1/(com- posite)	Wells 2/(com- posite)		Wells 1/(com- posite)	Wells 2/(com- posite)
Silica (SiO ₂)	20	21	Hardness as CaCO₃:		
Iron (Fe) .....	.66	.18	Total	28	29
Manganese (Mn) .....	.0	.0	Noncarbonate.....	0	0
Calcium (Ca)	6.6	8.0	Color	10	8
Magnesium (Mg).....	2.8	2.1	pH	6.5	7.3
Sodium (Na)	16	17	Specific conductance		
Potassium (K)	1.2	2.7	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	130	134
Bicarbonate (HCO ₃)	64	67	Turbidity	1	2
Sulfate (SO ₄)	8.9	9.2	Temperature (F.)...	70	71
Chloride (Cl)	3.5	3.0	Date of collection...	6/13/51	6/13/51
Fluoride (F) .....	.0	.1			
Nitrate (NO ₃) .....	.4	.4			
Dissolved solids.....	103	102			

1/Raw water.

2/Finished water.

JACKSON
(Population, 98,271)

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

Total population supplied, about 103,300.

Source: Pearl River.

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

Rated capacity of treatment plant: 14,000,000 gal.

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

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

There is some variation in the chemical character of the water throughout the year, but the dissolved solids is usually low.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	13	12	Hardness as CaCO₃:		
Iron (Fe)	1.2	.01		Total	26	47
Manganese (Mn) .....	.06	.07	Noncarbonate.....	1	16
Calcium (Ca)	7.5	15	Color.....	80	8
Magnesium (Mg).....	1.9	2.3	pH.....	7.0	8.8
Sodium (Na)	4.9	4.4	Specific conductance		
Potassium (K) .....	.8	.6	(micromhos at		
Carbonate (CO ₃)	0	--	25 C.).....	81.1	122
Bicarbonate (HCO ₃)	31	1/38	Turbidity.....	8	2
Sulfate (SO ₄)	4.0	16	Temperature (F.)...	--	--
Chloride (Cl)	6.2	6.5	Date of collection...	5/22/51	5/22/51
Fluoride (F) .....	.2	.1			
Nitrate (NO ₃) .....	.8	.6			
Dissolved solids.....	75	85			

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.....	16	24	8	6.6	7.9	6.0	35	48	6	60	1000	8
Finished water...	25	40	15	9.0	9.2	8.8	50	60	30	--	--	--

1/Includes the equivalent of less than 5 ppm of carbonate (CO₃).

LAUREL
(Population, 25, 038)

Ownership: Municipal.

Source: 7 wells (1, 2, 3A, and 4 to 7), each 400 ft deep (depth of well 2 not reported).

Treatment: Aeration and chlorination.

Rated capacity of treatment Plant: --

Raw-water storage: None.

Finished-water storage: 1, 120, 000 gal.

ANALYSES

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

	1/Wells	Well 1	Well 3A	Well 4	Well 7
Silica (SiO ₂)	41	35	60	49	29
Iron (Fe) .....	.09	.07	.09	.09	.10
Manganese (Mn) .....	.0	.0	.0	.0	.0
Calcium (Ca)	2.9	1.8	4.4	4.1	3.4
Magnesium (Mg)	3.8	1.1	2.2	1.2	2.1
Sodium (Na)	44	66	30	26	79
Potassium (K)	5.2	3.2	2.6	1.0	5.3
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	133	164	92	73	212
Sulfate (SO ₄)	12	9.4	11	9.6	8.2
Chloride (Cl)	4.2	4.0	3.5	3.8	3.8
Fluoride (F) .....	.2	.3	.0	.0	.5
Nitrate (NO ₃)	2.7	2.5	.5	.6	1.0
Dissolved solids	187	207	165	147	243
Hardness as CaCO ₃ :					
Total	23	9	20	15	17
Noncarbonate	0	0	0	0	0
Color	8	8	12	6	10
pH	7.7	7.6	6.9	7.1	7.9
Specific conductance (micromhos at 25 C.)	235	280	171	144	337
Turbidity	2	2	3	2	2
Temperature (F.)	--	73	80	83	79
Date of collection	6/13/51	6/13/51	6/13/51	6/13/51	6/13/51
Depth (feet)		400	400	400	400
Diameter (inches)		12	12	12	12
Date drilled		1926	1948	1950	1950
Percent of supply		--	--	--	--

1/Finished water (composite).

MCCOMB
(Population, 10,401)

Ownership: Municipal.

Source: 3 wells (1 to 3) 100, 500-600, and 600-700 ft deep. The yield of the wells is reported to be 500, 1,000, and 1,200 gpm.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 350,000 gal.

ANALYSES

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

	Finished water (composite)	Well 1	Well 2	Well 3
Silica (SiO ₂)	30	11	66	71
Iron (Fe).....	.12	.10	.50	.16
Manganese (Mn) .....	.02	.04	.0	.0
Calcium (Ca)	2.8	9.8	1.4	2.3
Magnesium (Mg)	1.1	4.2	.4	.6
Sodium (Na).....	24	13	27	27
Potassium (K)	1.3	1.9	1.6	2.5
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	53	7	67	67
Sulfate (SO ₄)	11	31	5.1	5.3
Chloride (Cl).....	7.0	16	4.0	4.8
Fluoride (F) .....	.1	.1	.1	.1
Nitrate (NO ₃)	1.8	11	.8	.5
Dissolved solids	133	111	147	150
Hardness as CaCO ₃ :				
Total	12	42	5	8
Noncarbonate	0	36	0	0
Color.....	7	3	7	6
pH	6.6	5.3	6.7	6.8
Specific conductance (micromhos at 25 C.)	135	168	127	127
Turbidity	1	0	0	0
Temperature (F.)	72	69	72	72
Date of collection	6/15/51	6/15/51	6/15/51	6/15/51
Depth (feet)		100	500-600	600-700
Diameter (inches)		8	12	12
Date drilled		--	--	--
Percent of supply		--	--	--

MERIDIAN
(Population, 41,893)

Ownership: Municipal; population supplied outside of the city limits, about 10,000. Total population supplied, about 51,900.

Source: 3 lakes, fed by springs. Equal distribution of water from each lake to city. Emergency supply: one lake.

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

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

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

Finished-water storage: 6,500,000 gal.

ANALYSES

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

	Lake 3 (raw water)	Finished water		Lake 3 (raw water)	Finished water
Silica (SiO ₂)	5.2	4.5	Hardness as CaCO₃:		
Iron (Fe)06	.06		Total	8	18
Manganese (Mn) .....	.0	.07	Noncarbonate.....	1	8
Calcium (Ca)	1.6	5.4	Color.....	25	10
Magnesium (Mg).....	1.1	1.2	pH.....	6.2	6.8
Sodium (Na)	1.6	1.6	Specific conductance		
Potassium (K) .....	.6	.5	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	25.8	49.5
Bicarbonate (HCO ₃)	9	13	Turbidity.....	3	2
Sulfate (SO ₄)	1.9	8.4	Temperature (F.)...	--	--
Chloride (Cl)	2.8	3.2	Date of collection...	6/12/51	6/12/51
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃) .....	.8	.4			
Dissolved solids.....	27	38			

NATCHEZ
(Population, 22, 740)

Ownership: Municipal; population supplied outside of the city limits, 100. Total population supplied, 22, 840.

Source: 6 wells (1 to 6) 457, 612, 449, 612, 425, and 660 ft deep. The yield from each well is reported to be 500 gpm.

Treatment: Split treatment: Aeration, softening with lime, recarbonation, rapid (anthrafil) filtration, and chlorination.

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

Raw-water storage: None.

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

The entire supply is not softened; only a part. Then the softened water and the raw water are mixed in such proportions as to give a water of the desired hardness prior to filtration.

ANALYSES

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

	<u>1</u> /Four Wells	<u>2</u> /Wells		<u>1</u> /Four Wells	<u>2</u> /Wells
Silica (SiO ₂)	45	38	Hardness as CaCO₃:		
Iron (Fe) .....	.74	.08	Total	226	59
Manganese (Mn) .....	.02	.0	Noncarbonate.....	0	0
Calcium (Ca)	56	7.4	Color.....	4	4
Magnesium (Mg).....	21	9.9	pH.....	7.0	9,1
Sodium (Na)	35	34	Specific conductance		
Potassium (K)	4.8	4.1	(micromhos at		
Carbonate (CO ₃)	0	19	25 C.).....	531	270
Bicarbonate (HCO ₃)	338	88	Turbidity.....	1	0
Sulfate (SO ₄)	14	23	Temperature (F.)...	71	78
Chloride (Cl)	5.2	6.5	Date of collection...	6/15/51	6/14/51
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃)	1.8	1.1			
Dissolved solids.....	350	187			

1/Raw water (composite).

2/Finished water (composite).

PASCAGOULA
(Population, 10,805)

Ownership: Municipal; population supplied outside of city limits, about 200. Total population supplied, about 11,000.

Source: 5 wells (1 and 2, Common St.; 1, 2, and 3, Beach St.), each 800 ft deep. The yield of each well is reported to be 2,300 gpm.

Treatment: Chlorination.

Raw-water storage: None.

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

ANALYSIS

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

	Finished water (composite)		Finished water (composite)
Silica (SiO ₂)	34	Hardness as CaCO ₃ :	
Iron (Fe) .....	.05	Total	10
Manganese (Mn) .....	.0	Noncarbonate	0
Calcium (Ca)	2.7	Color	32
Magnesium (Mg) .....	.7	pH	8.0
Sodium (Na)	244	Specific conductance	
Potassium (K)	11	(micromhos at	
Carbonate (CO ₃)	0	25 C.).....	1,120
Bicarbonate (HCO ₃)	330	Turbidity	0
Sulfate (SO ₄) .....	.6	Temperature (F.).....	87
Chloride (Cl)	196	Date of collection	6/14/51
Fluoride (F) .....	.3		
Nitrate (NO ₃)	1.2		
Dissolved solids	654		
Depth (feet)			800
Diameter (inches)			12
Date drilled			--
Percent of supply			--

TUPELO
(Population, 11,527)

Ownership: Municipal; population supplied outside of the city limits, 50. Total population supplied, 11,577.
 Source: 7 wells (1 to 6, and East Tupelo) 460, 460, 460, 468, 470, 501, and 380 ft deep. The yield of the wells is reported to be 300, 310, 310, 450, 300, 780, and 80 gpm. Emergency supply: a surface reservoir of 262,000 gal supplied by these 7 wells.
 Treatment: Chlorination. A chlorine residual of 0.2 to 0.3 ppm is maintained in the reservoir.
 Storage: For emergency, 262,000 gal.
 Finished-water storage: 332,000 gal.

ANALYSES

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

	Well 2	1/Wells		Well 2	1/Wells
Silica (SiO ₂)	17	16	Hardness as CaCO₃:		
Iron (Fe) .....	.03	.66	Total	95	104
Manganese (Mn) .....	.01	.01	Noncarbonate.....	0	19
Calcium (Ca)	29	33	Color.....	5	5
Magnesium (Mg).....	5.6	5.2	pH.....	7.6	7.7
Sodium (Na)	46	45	Specific conductance		
Potassium (K)	4.6	7.0	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	405	429
Bicarbonate (HCO ₃)	122	104	Turbidity.....	1	1
Sulfate (SO ₄)	8.1	16	Temperature (F.)...	66	--
Chloride (Cl)	65	71	Date of collection...	5/21/51	5/21/51
Fluoride (F) .....	.0	.0			
Nitrate (NO ₃)	1.2	.5			
Dissolved solids.....	238	246			
Depth (feet)				460	
Diameter (inches)				12	
Date drilled				1931	
Percent of supply				--	

1/Finished water (composite).

VICKSBURG
(Population, 27, 948)

Ownership: Municipal; population supplied outside of the city limits, about 10,000.

Total population supplied, about 37,900.

Source: Mississippi River.

Treatment: Copper sulfate, coagulation with lime and ferric sulfate, sedimentation, rapid sand filtration, and chlorination.

Rated capacity of treatment plant: 5,500,000 gal.

Raw-water storage: None.

Finished-water storage: 630,000 gal.

There is some variation in the chemical character of the water throughout the year.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	8.3	7.2	Hardness as CaCO₃:		
Iron (Fe)03	.04		Total	172	202
Manganese (Mn) .....	.0	.0	Noncarbonate.....	46	80
Calcium (Ca)	46	58	Color	15	6
Magnesium (Mg).....	14	14		pH	7.5	7.8
Sodium (Na)	32	31	Specific conductance		
Potassium (K)	2.7	4.6		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	483	524
Bicarbonate (HCO ₃)	154	149	Turbidity	2	1
Sulfate (SO ₄)	67	93	Temperature (F.)...	76	77
Chloride (Cl)	34	35	Date of collection...	6/16/51	6/16/51
Fluoride (F) .....	.3	.1			
Nitrate (NO ₃)	3.6	2.5			
Dissolved solids.....	304	356			

Regular determinations at treatment plant, 1951 ¹/

	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	120	85	7.8	8.0	7.7	100	120	80	1000	1500	800
Finished water...	90	120	90	8.4	8.4	8.4	110	120	100	0	0	0

¹/Fiscal year.

YAZOO CITY
(Population, 9,746)

Ownership: Municipal; population supplied outside of the city limits, 100. Total population supplied, 9,846.

Source: 3 wells (1 to 3), each 900 ft deep. The yield of the wells is reported to be 1, 100, 1, 000, and 2, 000 gpm.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 300,000 gal.

ANALYSIS

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

	Wells (com- posite) Fin- ished water		Wells (com- posite) Fin- ished water
Silica (SiO ₂)	22	Hardness as CaCO₃:	
Iron (Fe) .....	.09	Total	5
Manganese (Mn) .....	.0	Noncarbonate	0
Calcium (Ca)	1.3	Color	7
Magnesium (Mg) .....	.5	pH	8.2
Sodium (Na)	77	Specific conductance	
Potassium (K) .....	.9	(bicromhos at	
Carbonate (CO ₃)	0	25 C.).....	317
Bicarbonate (HCO ₃)	194	Turbidity	2
Sulfate (SO ₄)	8.2	Temperature (F.)	82
Chloride (Cl)	3.5	Date of collection	5/22/51
Fluoride (F) .....	.2		
Nitrate (NO ₃) .....	.9		
Dissolved solids	212		

TENNESSEE

BRISTOL

(Population, 16, 771)

Ownership: Municipal; population supplied outside the city limits, about 3, 300.
Total population supplied, about 20, 100.

Source: South Fork Holston River. The intake is about three-quarters of a mile east of the treatment plant.

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

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

Raw-water storage: None.

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

The treatment plant is located on Rural Route 421, 6.5 miles northeast of Bristol.

There is some variation in the chemical character of the water throughout the year.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water	
Silica (SiO ₂)	4.4	4.5	Hardness as CaCO₃:			
Iron (Fe) .....	.02	.07		Total	64	67
Manganese (Mn) .....	.0	.0		Noncarbonate.....	4	14
Calcium (Ca)	17	18	Color.....	8	5	
Magnesium (Mg).....	5.3	5.3		pH.....	7.3	7.2
Sodium (Na)	2.2	2.5		Specific conductance		
Potassium (K) .....	.6	1.1		(micromhos at		
Carbonate (CO ₃)	0	0		25 C.).....	137	143
Bicarbonate (HCO ₃)	74	64		Turbidity.....	3	1
Sulfate (SO ₄)	6.4	13		Temperature (F.)...	48	48
Chloride (Cl)	2.2	5.0		Date of collection...	3/28/51	3/28/51
Fluoride (F) .....	.0	.0				
Nitrate (NO ₃)	1.6	1.6				
Dissolved solids.....	82	83				

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.....	79	128	40	7.9	8.9	7.2	74	160	24	30	500	2
Finished water...	70	117	16	6.9	7.6	5.9	80	166	34	0	0	0

CHATTANOOGA
(Population, 131,041)

Ownership: City Water Co. Supplies also, outside of city limits, a population of about 61,000, and the communities of East Brainer, East Ridge, Lookout Mountain, Lookout Valley, and Red Bank. Total population supplied, about 230,700.

Source: Tennessee River. The intake is about half a mile east of the treatment plant.

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

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

Raw-water storage: None.

Finished-water storage: 6,500,000 gal.

The treatment plant is located in the eastern part of the city. There is some variation in the chemical character of the raw water throughout the year, but the amount of dissolved solids is usually low. The analysis given represents water from the river at flood stage.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.5	3.8	Hardness as CaCO₃:		
Iron (Fe)09	.09		Total	34	59
Manganese (Mn) .....	.0	.0	Noncarbonate.....	5	29
Calcium (Ca)	10	19	Color.....	20	5
Magnesium (Mg).....	2.1	2.8		pH.....	6.9	7.6
Sodium (Na)	3.3	2.1	Specific conductance		
Potassium (K)7	1.1		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	85.8	138
Bicarbonate (HCO ₃)	35	36	Turbidity.....	1	3
Sulfate (SO ₄)	5.8	28	Temperature (F.)...	--	56
Chloride (Cl)	2.0	4.0	Date of collection...	3/30/51	3/30/51
Fluoride (F) .....	.2	.0			
Nitrate (NO ₃)	2.7	1.1			
Dissolved solids.....	72	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.....	57	74	36	7.5	7.5	7.1	--	66	42	38	433	14
Finished water...	58	73	35	7.6	8.1	7.4	62	75	45	0	0	0

CLARKSVILLE
(Population, 16,246)

Ownership: Municipal. Population supplied outside the city limits, about 800.
Total population supplied, about 17,000.

Source: Cumberland River. The intake is located near the treatment plant, which is on the bank of the river in the southwestern part of the city.

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

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

Raw-water storage: None.

Finished-water storage: 650,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.4	4.0	Hardness as CaCO₃:		
Iron (Fe)09	.08		Total	76	99
Manganese (Mn) .....	.0	.0	Noncarbonate.....	11	25
Calcium (Ca)	24	33	Color.....	10	6
Magnesium (Mg).....	4.0	4.1	pH.....	7.3	7.5
Sodium (Na)	2.7	3.2	Specific conductance		
Potassium (K)	1.4	1.4	(micromhos at		
Carbonate (CO ₃)	0	0	25 C.).....	161	218
Bicarbonate (HCO ₃)	80	90	Turbidity.....	3	3
Sulfate (SO ₄)	13	26	Temperature (F.)...	48	50
Chloride (Cl)	1.2	4.0	Date of collection...	3/26/51	3/26/51
Fluoride (F) .....	.2	.0			
Nitrate (NO ₃)	1.9	1.4			
Dissolved solids.....	103	141			

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	84	130	41	7.5	8.4	7.0	94	130	64	70	900	4
Finished water...	74	117	20	7.3	8.4	6.0	101	144	64	.8	1.0	.3

CLEVELAND
(Population, 12,605)

Ownership: Municipal. Population supplied outside of the city limits, about 6,600. Total population supplied, about 19,200.

Source: Payne Spring and Waterville Spring.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 3,100,000 gal.

ANALYSIS

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

	Springs (finished water)		Springs (finished water)
Silica (SiO ₂)	6.8	Hardness as CaCO₃:	
Iron (Fe) .....	.07	Total	109
Manganese (Mn) .....	.0	Noncarbonate	2
Calcium (Ca)	24		
Magnesium (Mg)	12	Color	2
Sodium (Na)	} 2.9	pH	7.6
Potassium (K)		Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	131	25 C.).....	203
Sulfate (SO ₄)	2.0	Turbidity	2
Chloride (Cl)	3.0	Temperature (F.).....	58
Fluoride (F) .....	.0	Date of collection	3/30/51
Nitrate (NO ₃)	2.4		
Dissolved solids	117		

COLUMBIA
(Population, 10, 911)

Ownership: Municipal. Population supplied outside of the city limits, about 5,100. Total population supplied, about 16,000.

Source: Duck River. The intake is located at the treatment plant which is on the bank of the river in the eastern part of the city.

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

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

Raw-water storage: None.

Finished-water storage: 940,000 gal.

The river was at high stage at the time of the collection of the samples.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.5	1.1	Hardness as CaCO₃:		
Iron (Fe)06	.02		Total	86	110
Manganese (Mn) .....	.0	.0	Noncarbonate.....	10	51
Calcium (Ca)	30	40	Color.....	40	4
Magnesium (Mg).....	2.6	2.5		pH.....	7.4	6.9
Sodium (Na)	1.2	2.0	Specific conductance		
Potassium (K)	1.4	.9		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	166	227
Bicarbonate (HCO ₃)	92	72	Turbidity.....	9	2
Sulfate (SO ₄)	7.6	43	Temperature (F.)...	55	56
Chloride (Cl)	2.0	5.0	Date of collection...	3/31/51	3/31/51
Fluoride (F) .....	.3	.0			
Nitrate (NO ₃)	2.0	2.1			
Dissolved solids.....	134	150			

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	119	126	116	8.0	8.4	7.4	111	120	100	121	1200	45
Finished water...	134	148	130	7.6	7.8	6.8	137	144	128	--	--	--

DYERSBURG
(Population, 10, 885)

Ownership: Municipal; supplies also about 3, 100 people outside of the city limits.

Total population supplied, about 14, 000.

Source: 5 wells (1, 3, and 4 to 6), only 2 of which (5 and 6) are in operation, The depth of the wells is reported to be as follows: 600-700, 600-700, 610, 690, and 635 ft. Well 5, with a reported yield of 2, 000 gpm, furnishes 90 percent of the supply.

Treatment: Aeration (limestone trays), sedimentation, rapid sand filtration, and chlorination.

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

Raw-water storage: None.

Finished-water storage: 834, 000 gal.

The treatment plant is near the Municipal Building.

ANALYSES

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

	Well 5 (raw water)	Well 6 (raw water)	Well 5 (finished water)
Silica (SiO ₂)	8.3	9.4	9.0
Iron (Fe)	4.0	3.4	.08
Manganese (Mn) .....	.0	--	.0
Calcium (Ca)	12	11	11
Magnesium (Mg).....	6.0	6.5	6.7
Sodium (Na).....	5.4	4.9	5.0
Potassium (K)	1.2	.7	.6
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	74	74	73
Sulfate (SO ₄).....	4.1	4.6	4.0
Chloride (Cl)	2.5	2.8	3.5
Fluoride (F) .....	.0	.2	.0
Nitrate (NO ₃) .....	.4	.3	.5
Dissolved solids	76	74	77
Hardness as CaCO ₃ :			
Total	55	54	55
Noncarbonate	0	0	0
Color	2	7	4
pH.....	6.3	6.2	6.8
Specific conductance (micromhos at 25 C.).....	127	134	128
Turbidity	3	--	2
Temperature (F.)	65	65	68
Date of collection	3/25/51	7/5/51	3/25/51
Depth (feet)	690	635	
Diameter (inches)	24	18	
Date drilled	1945	1951	
Percent of supply	90	10	

ELIZABETHTON
(Population, 10, 754)

Ownership: Municipal. Population supplied outside of the city limits, about 1,300. Total population supplied, 12,100.

Source: Hampton Spring.

Treatment: Chlorination.

Raw-water storage: None.

Finished-water storage: 900,000 gal.

ANALYSIS

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

	Finished water		Finished water
Silica (SiO ₂)	11	Hardness as CaCO₃:	
Iron (Fe) .....	.07	Total	63
Manganese (Mn) .....	.0	Noncarbonate	4
Calcium (Ca)	13		
Magnesium (Mg)	7.4	Color	3
Sodium (Na)	1.4	pH	7.9
Potassium (K) .....	.6	Specific conductance	
Carbonate (CO ₃)	0	(micromhos at	
Bicarbonate (HCO ₃)	72	25 C.)	128
Sulfate (SO ₄)	6.0	Turbidity	2
Chloride (Cl)	1.8	Temperature (F.)	53
Fluoride (F) .....	.2	Date of collection	3/29/51
Nitrate (NO ₃)	1.4		
Dissolved solids	73		

JACKSON
(Population, 30, 207)

Ownership: Municipal. Population supplied outside the city limits, about 4, 900.

Total population supplied, about 35, 100.

Source: 6 wells located on South Royal Street, 140 to 165 ft deep. The average yield is reported to be 782 gpm.

Treatment: Aeration (coke trays) and sedimentation.

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

Raw-water storage: None.

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

ANALYSES

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

	Well 10	Well 14	Wells (composite) Raw water	Wells (com- posite) Fin- ished water
Silica (SiO ₂)	13	16	16	16
Iron (Fe).....	.05	.02	.42	.10
Manganese (Mn) .....	.0	.0	.04	.0
Calcium (Ca)	9.6	18	12	12
Magnesium (Mg)	3.3	7.2	4.5	4.7
Sodium (Na).....	7.3	14	9.9	11
Potassium (K)	1.1	3.0	1.0	1.2
Carbonate (CO ₃)	0	0	0	0
Bicarbonate (HCO ₃).....	23	22	18	20
Sulfate (SO ₄)	16	52	29	29
Chloride (Cl).....	8.5	16	11	13
Fluoride (F) .....	.0	.1	.0	.1
Nitrate (NO ₃)	8.6	12	12	8.8
Dissolved solids	86	166	104	109
Hardness as CaCO ₃ :				
Total	38	74	48	49
Noncarbonate	19	56	34	33
Color.....	5	10	4	5
pH	6.0	6.0	6.5	6.3
Specific conductance (micromhos at 25 C.)	124	245	158	169
Turbidity	1	2	0	2
Temperature (F.)	63	62	62	61
Date of collection	6/28/51	6/28/51	6/28/51	6/28/51
Depth (feet)	144	148		
Diameter (inches)	12	10		
Date drilled	1940	1947		
Percent of supply	--	--		

JOHNSON CITY
(Population, 27,864)

Ownership: Municipal. Population supplied outside the city limits, about 7,200.

Total population supplied, about 35,100.

Source: 3 springs and Indian Creek. The springs furnish about 90 percent of the supply.

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

Rated capacity of treatment plant: 5,200,000 gpd.

Raw-water storage: None.

Finished-water storage: 4,925,000 gal.

The treatment plant is about 5 miles southeast of Johnson City near Unicoi, Tenn.

ANALYSES

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

	Indian Creek (raw water)	Springs (composite) Raw water	Springs (composite) Finished water
Silica (SiO ₂)	4.5	8.8	7.2
Iron (Fe) .....	.02	.04	.07
Manganese (Mn) .....	.0	.0	.0
Calcium (Ca)	4.2	12	13
Magnesium (Mg).....	2.0	7.6	6.9
Sodium (Na).....	1.6	.9	1.2
Potassium (K) .....	.6	.5	.9
Carbonate (CO ₃)	0	0	0
Bicarbonate (HCO ₃).....	19	70	70
Sulfate (SO ₄).....	3.2	3.3	3.3
Chloride (Cl)	1.0	1.2	1.8
Fluoride (F) .....	.2	.1	.0
Nitrate (NO ₃)	1.4	1.5	1.4
Dissolved solids	38	71	70
Hardness as CaCO ₃ :			
Total	19	61	61
Noncarbonate	3	4	3
Color	22	4	3
pH.....	7.0	7.8	7.8
Specific conductance (micromhos at 25 C.).....	42.9	117	122
Turbidity	7	2	1
Temperature (F.).....	51	54	60
Date of collection	3/29/51	3/29/51	3/29/51

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	28	37	10	7.0	7.0	6.9	--	--	--	5.1	48	2.8
Finished water...	46	54	35	8.5	8.1	7.0	--	--	--	0	0	0

KINGSPORT
(Population, 19,571)

Ownership: Municipal. Population supplied outside of city limits, about 2,400.

Total population supplied, about 22,000.

Source: South Fork Holston River, regular supply; a mountain reservoir (an impounded supply), auxiliary or emergency supply.

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

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

Raw-water storage: None.

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

The treatment plant is 1 mile southwest of Kingsport.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.5	4.4	Hardness as CaCO₃:		
Iron (Fe)10	.08		Total	131	109
Manganese (Mn) .....	.0	.0	Noncarbonate.....	29	25
Calcium (Ca)	36	32	Color.....	20	12
Magnesium (Mg).....	10	7.1		pH.....	7.0	7.7
Sodium (Na)	16	14	Specific conductance		
Potassium (K)	4.0	2.3		(micromhos at	
Carbonate (CO ₃)	0	0	25 C.).....	312	292
Bicarbonate (HCO ₃)	124	102	Turbidity	1	1
Sulfate (SO ₄)	41	49	Temperature (F.)...	55	54
Chloride (Cl)	7.5	5.5	Date of collection...	3/28/51	3/28/51
Fluoride (F) .....	.1	.1			
Nitrate (NO ₃)	15	5.6			
Dissolved solids.....	199	171			

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.....	74	115	38	7.5	8.2	6.9	89	128	46	53	650	8
Finished water...	80	121	41	8.1	9.0	6.9	102	144	52	0	0	0

KNOXVILLE
(Population, 124, 769)

Ownership: Municipal. Population supplied outside the city limits, about 40,800. Total population supplied, about 165,600.

Source: Tennessee River.

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

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

Raw-water storage: None.

Finished-water storage: 12,900,000 gal.

ANALYSES

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

	Raw water	Finished water		Raw water	Finished water
Silica (SiO ₂)	4.4	4.2	Hardness as CaCO₃: Total Noncarbonate.....	84 14	116 46
Iron (Fe) .....	.09	.17		
Manganese (Mn) .....	.0	.0		
Calcium (Ca)	26	38	Color..... pH..... Specific conductance (micromhos at 25 C.)..... Turbidity..... Temperature (F.)... Date of collection...	25 7.5 187 19 54 3/29/51	4 7.6 275 2 55 3/29/51
Magnesium (Mg).....	4.6	5.2			
Sodium (Na)	5.6	7.7			
Potassium (K) .....	.8	2.4		
Carbonate (CO ₃)	0	0			
Bicarbonate (HCO ₃)	85	86			
Sulfate (SO ₄)	10	27			
Chloride (Cl)	9.5	24			
Fluoride (F) .....	.1	.0		
Nitrate (NO ₃)	1.0	1.7			
Dissolved solids.....	127	188			

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.....	71	94	51	7.8	8.0	7.6	98	137	56	24	350	7
Finished water...	71	92	53	7.8	8.0	7.4	112	154	71	.59	.89	.16

MEMPHIS
(Population, 396,000)

Ownership: Municipal--Memphis Light, Gas and Water Division.

Source: 86 wells, 51 in Parkway Well Field and 35 in Sheahan Well Field (another well field is being developed). Fifty-four of the eighty-six wells range in depth from 400 to 600 ft and 19 from 1,300 to 1,400 ft. Of the remaining wells 10 are between 300 and 400 ft deep. The yield of most of the wells, all depths, is reported to be from 400 to 500 gpm.

Treatment: Aeration (limestone trays) and rapid sand filtration, for the removal of iron and hydrogen sulfide.

Rated capacity of treatment plant; 55,000,000 gpd.

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

Finished-water storage: 43,000,000 gal.

ANALYSES

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

	Well 2A Parkway Field	Well 23 Parkway Field	Well 38 Parkway Field	Well 47 Parkway Field	Well 59 Sheahan Field
Silica (SiO ₂)	13	13	10	12	13
Iron (Fe) .....	.44	.41	.69	.37	.21
Manganese (Mn) .....	.0	.0	.0	.0	.0
Calcium (Ca)	10	11	3.8	13	6.7
Magnesium (Mg)	5.5	5.6	.7	6.5	3.6
Sodium (Na)	8.2	9.2	40	8.3	12
Potassium (K)	1.3	.9	3.0	.6	.6
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	72	78	112	86	51
Sulfate (SO ₄)	3.2	3.1	5.3	3.8	5.8
Chloride (Cl)	3.0	3.0	1.8	3.2	6.0
Fluoride (F) .....	.0	.1	.1	.1	.1
Nitrate (NO ₃) .....	.4	.3	.9	.3	1.1
Dissolved solids	81	85	122	90	76
Hardness as CaCO ₃ :					
Total	48	50	12	59	32
Noncarbonate	0	0	0	0	0
Color	6	18	9	7	9
pH	7.0	6.9	7.5	6.5	6.9
Specific conductance (micromhos at 25 C.)	123	128	173	144	108
Turbidity	2	2	2	2	2
Temperature (F.)	62	62	71	63	61
Date of collection	4/2/51	4/2/51	4/2/51	4/2/51	4/2/51
Depth (feet)	567	493	1,376	638	366
Diameter (inches)	10	8	8	--	10
Date drilled	1943	1924	1941	1948	1935
Percent of supply	--	--	--	--	--

	Well 65 Sheahan Field	Wells Parkway Field 1/	Wells Sheahan Field 1/	Wells Parkway Field 2/	Wells Sheahan Field 2/
Silica (SiO ₂)	12	13	14	14	14
Iron (Fe) .....	.60	.43	.34	.07	.08
Manganese (Mn) .....	.0	.0	.0	.0	.0
Calcium (Ca)	2.7	8.2	8.2	9.4	7.9
Magnesium (Mg)	1.3	4.6	3.8	4.6	3.1
Sodium (Na)	35	17	13	16	15
Potassium (K)	2.5	1.7	.7	2.4	1.8
Carbonate (CO ₃)	0	0	0	0	0
Bicarbonate (HCO ₃)	101	85	65	84	65
Sulfate (SO ₄)	5.1	3.7	4.6	4.0	4.5
Chloride (Cl)	2.0	2.5	4.2	4.2	4.5
Fluoride (F) .....	.1	.1	.1	.0	.0
Nitrate (NO ₃) .....	.5	.4	.3	.6	.9
Dissolved solids	112	94	81	98	84
Hardness as CaCO ₃ :					
Total	12	39	36	42	32
Noncarbonate	0	0	0	0	0
Color	17	7	4	3	3
pH	7.7	6.9	6.8	7.4	7.4
Specific conductance (micromhos at 25 C.)	160	137	120	145	119
Turbidity	2	2	3	1	1
Temperature (F.)	70	--	63	70	71
Date of collection	4/2/51	4/2/51	4/2/51	4/2/51	4/2/51
Depth (feet)	1,305				
Diameter (inches)	8				
Date drilled	1941				
Percent of supply	--				

1/Raw water (composite).

2/Finished water (composite).

MORRISTOWN
(Population, 13, 019)

Ownership: Municipal.

Source: Havelly Spring furnishes 65 percent of supply; Cherokee Lake 20 percent; and 1 well, 214 ft deep, 15 per cent.

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

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

Raw-water storage: None.

Finished-water storage: 2, 083, 000 gal.

The treatment plant is about 2 miles northwest of Morristown.

ANALYSES

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

	Raw 1/water	Finished 1/water		Raw 1/water	Finished 1/water
Silica (SiO ₂)	7.5	7.2	Hardness as CaCO₃:		
Iron (Fe)01	.07		Total	157	161
Manganese (Mn) .....	.0	.0	Noncarbonate.....	5	13
Calcium (Ca)	35	38	Color.....	6	2
Magnesium (Mg).....	17	16		pH.....	7.6	7.6
Sodium (Na)	1.2	1.1	Specific conductance (micromhos at 25 C.).....	287	291
Potassium (K)	1.0	1.9		Turbidity.....	2	2
Carbonate (CO ₃)	0	0	Temperature (F.)...	58	59
Bicarbonate (HCO ₃)	186	180	Date of collection...	3/29/51	3/29/51
Sulfate (SO ₄)	2.5	4.4			
Chloride (Cl)	2.0	4.0			
Fluoride (F) .....	.1	.0			
Nitrate (NO ₃)	6.6	5.6			
Dissolved solids.....	165	168			

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.....	145	173	106	7.3	7.6	7.1	161	202	84	--	--	--
Finished water...	135	168	98	7.1	7.5	6.9	152	194	82	--	--	--

1/Havelly Spring.

MURFREESBORO
(Population, 13, 052)

Ownership: Municipal. Population supplied outside of the city limits, about 3, 000. Total population supplied, about 16, 100.

Source: Springs furnish 80 percent of the supply and Stone River 20 percent. One well 346 ft deep and with a reported yield of 1, 120 gpm, auxiliary supply.

The Stone River supply is used only during the dry season.

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

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

Raw-water storage: None.

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

The treatment plant is about 1 mile southwest of Murfreesboro.

ANALYSES

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

	Raw 1/water	Finished 1/water		Raw 1/water	Finished 1/water
Silica (SiO ₂)	6.4	4.6	Hardness as CaCO₃:		
Iron (Fe)03	.05		Total	135	140
Manganese (Mn) .....	.0	.0	Noncarbonate.....	9	14
Calcium (Ca)	48	52	Color.....		
Magnesium (Mg).....	3.7	2.4			13	2
Sodium (Na)	2.0	2.0	pH.....	7.6	7.8
Potassium (K) .....	.9	1.5	Specific conductance (micromhos at 25 C.).....		
Carbonate (CO ₃)	0	0			257	282
Bicarbonate (HCO ₃)	154	153	Turbidity.....	4	1
Sulfate (SO ₄)	6.7	11	Temperature (F.)...	57	56
Chloride (Cl)	3.0	5.2	Date of collection...	3/27/51	3/27/51
Fluoride (F) .....	.1	.0			
Nitrate (NO ₃)	6.0	6.0			
Dissolved solids.....	156	166			

Regular determinations at treatment plant, 1950

	Alkalinity as CaCO ₃ (ppm)			pH			Hardness as CaCO ₃ (ppm)			Turbidity		
	Av	Max	Min	Av	Max	Min	Av	Max	Min	Av	Max	Min
Raw water.....	152	195	82	7.3	7.7	7.0	160	220	92	11	125	2.4
Finished water...	157	205	88	7.6	8.1	6.9	177	244	112	0	0	0

1/Springs only.

NASHVILLE
(Population, 174, 307)

Ownership: Municipal; also supplies a large population in the suburban areas and a number of other places. Total population supplied, about 259, 000.

Source: Cumberland River.

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

Rated capacity of treatment plant: 42, 000, 000 gpd.

Raw-water storage: None.

Finished-water storage: 58, 000, 000 gal.

ANALYSES

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

	Finished water	1/Raw water	Finished 1/water
Silica (SiO ₂)	4.7	10	8.2
Iron (Fe) .....	.15	2/1.8	2/.95
Manganese (Mn) .....	.0	--	--
Calcium (Ca)	29	25	25
Magnesium (Mg).....	4.2	5.0	4.2
Sodium (Na).....	2.6	6.0	5.0
Potassium (K) .....	.7		
Carbonate (CO ₃)	0	--	--
Bicarbonate (HCO ₃).....	80	81	73
Sulfate (SO ₄).....	24	19	28
Chloride (Cl)	3.5	2.0	3.6
Fluoride (F) .....	.1	--	--
Nitrate (NO ₃)	2.1	--	--
Dissolved solids	113	110	130
Hardness as CaCO ₃ :			
Total	90	84	80
Noncarbonate	24	18	21
Color	3	--	--
pH.....	7.5	7.5	7.1
Specific conductance (micromhos at 25 C.).....	184	--	--
Turbidity	2	76	--
Temperature (F.).....	53	--	--
Date of collection	3/27/51	--	--

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.....	72	124	34	7.5	8.3	7.2	76	122	41	77	722	6
Finished water...	64	120	29	7.1	7.3	6.8	80	124	49	0	0	0

1/Average of analyses of monthly composites of daily samples Aug. 1949-July 1950. Analyzed by the Nashville Waterworks Department.

2/Iron and aluminum oxides.