2021 Drinking Water Quality Report

WHOLESALE CUSTOMER EXCERPT

Published in 2022

This report is produced for you as a requirement of the Federal Safe Drinking Water Act.

NOTE: Industrial and commercial customers, including hospitals, medical centers and health clinics, please forward this report to your Environmental Compliance Manager.

PWD's Public Water System Identification #PA1510001

PHILADELPHIA WATER DEPARTMENT

Water treatment facility in Philadelphia.

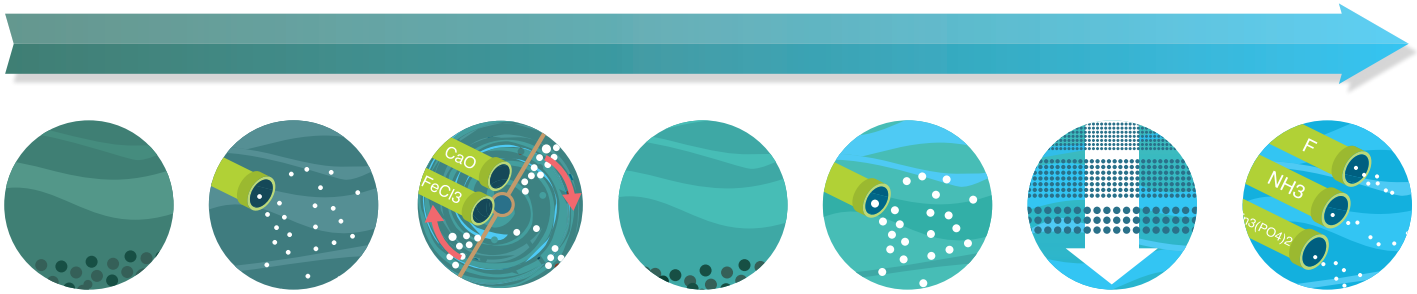
About the Wholesale Customer Excerpt

We share our data tables in this format for industrial/commercial customers and consecutive water systems.

Consecutive water systems are public water systems which obtain their water from another public water system and resell the water, provide treatment, or provide drinking water to an interstate carrier. The term does not include bottled water and bulk water systems.

Our Drinking Water Treatment Process

Once collected, water from Philadelphia's rivers goes through multiple processes to ensure it's crystal clear and safe.



Gravity settling

River water is pumped to reservoirs. Sediment settles.

Disinfection

We add Sodium Hypochlorite to kill harmful organisms.

Coagulant, flocculation, and pH

Gentle mixing helps particles clump together. We also adjust the acidity.

Additional settling

Clumps of particles settle and are removed.

Additional disinfection

We add Sodium Hypochlorite a second time to kill any remaining harmful organisms.

Filtration

Filters remove more microscopic particles.

Additional treatment

Ingredients like Fluoride, Zinc Phosphate and Ammonia help keep water healthy and safe.

Glossary

Here are definitions for some of the words and phrases we use in the report and in our data tables.

Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow. The action level is not based on one sample; instead, it is based on many samples.

Alkalinity: A measure of the water's ability to resist changes in the pH level and a good indicator of overall water quality. Although there is no health risk from alkalinity, we monitor it to check our treatment processes.

E. coli (Escherichia coli): A type of coliform bacteria that is associated with human and animal fecal waste.

gpg (grains per gallon): A unit of water hardness. One grain per gallon is equal to 17.1 parts per million.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL (Maximum Residual Disinfection Level): The highest level of disinfectant that is allowed in drinking water. The addition of a disinfectant is necessary for the control of microbial contaminants.

MRDLG (Maximum Residual Disinfection Level Goal): The level of a disinfectant in drinking water below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Minimum Residual Disinfectant Level: The minimum level of residual disinfectant required at the entry point to the distribution system.

NTU (nephelometric turbidity units): Turbidity is measured with an instrument called a nephelometer. Measurements are given in nephelometric turbidity units.

Pathogens: Bacteria, virus, or other microorganisms that can cause disease.

pCi/L (Picocuries per liter): A measure of radioactivity.

ppm (parts per million): Denotes 1 part per 1,000,000 parts, which is equivalent to two thirds of a gallon in an Olympic-sized swimming pool.

ppb (parts per billion): Denotes 1 part per 1,000,000,000 parts, which is equivalent to half a teaspoon in an Olympic-sized swimming pool.

µg/L (Microgram per liter): One microgram per liter is equal to one part per billion.

ppt (parts per trillion): Denotes 1 part per 1,000,000,000,000 parts, which is equivalent to one drop in 20 Olympic-sized swimming pools.

SMCL (Secondary Maximum Contaminant Level): Non-enforceable Federal water quality guidelines that are established for managing aesthetic and cosmetic conditions of water (e.g. taste, odor, color).

SOC (Synthetic Organic Chemical): Commercially made organic compounds, such as pesticides and herbicides.

Total Coliform: Coliforms are bacteria that are naturally present in the environment. Their presence in drinking water may indicate that other potentially harmful bacteria are also present.

THAAs (Total Haloacetic Acids): A group of chemicals known as disinfection byproducts. These form when a disinfectant reacts with naturally occurring organic and inorganic matter in the water.

TOC (Total Organic Carbon): A measure of the carbon content of organic matter. This measure is used to indicate the amount of organic material in the water that could potentially react with a disinfectant to form disinfection byproducts.

TTHMs (Total Trihalomethanes): A group of chemicals known as disinfection byproducts. These form when a disinfectant reacts with naturally occurring organic and inorganic matter in the water.

Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

Turbidity: A measure of the clarity of water related to its particle content. Turbidity serves as an indicator for the effectiveness of the water treatment process. Low turbidity measurements, such as ours, show the significant removal of particles that are much smaller than can be seen by the naked eye.

VOC (Volatile Organic Chemicals): Organic chemicals that can be either man-made or naturally occurring. These include gases and volatile liquids.

WTP: Water Treatment Plant.

What we test for and how

Public drinking water systems monitor their treated drinking water for approximately 100 regulated contaminants. These regulatory parameters are defined within federal rules such as the Revised Total Coliform Rule, Surface Water Treatment Rule, Disinfectants and Disinfection Byproducts Rules, Lead and Copper Rule and the Radionuclides Rule.

We monitor for the regulated parameters listed below.

Any contaminants found are noted in the tables on the following pages:

Inorganic Chemicals

Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Copper
Cyanide
Fluoride
Lead
Mercury
Nickel
Nitrate
Nitrite
Selenium
Thallium

Synthetic Organic Chemicals

2,3,7,8 - TCDD (Dioxin)
2,4 – D, 2,4,5 - TP (Silvex)
Alachlor
Atrazine
Benzopyrene
Carbofuran
Chlordane
Dalapon
Di(ethylhexyl)adipate
Di(ethylhexyl)phthalate
Dibromochloropropane
Dinoseb
Diquat
Endothall
Endrin
Ethylene Dibromide
Glyphosate
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorocyclopentadiene
Lindane
Methoxychlor
Oxamyl
PCBs Total
Pentachlorophenol
Picloram
Simazine
Toxaphene

Volatile Organic Chemicals

Benzene
Carbon Tetrachloride
1,2-Dichloroethane
o-Dichlorobenzene
p-Dichlorobenzene
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
Dichloromethane
1,2-Dichloropropane
Ethylbenzene
Monochlorobenzene
Styrene
Tetrachloroethylene
Toluene
1,2,4-Trichlorobenzene
1,11-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene
o-Xylene
m,p-Xylenes
Vinyl Chloride

Other factors that can impact drinking water

Appealing to Your Senses

We work to ensure your water looks, tastes and smells the way it should.

To meet all water quality taste and odor guidelines, we test for the following: alkalinity, aluminum, chloride, color, hardness, iron, manganese, odor, pH, silver, sodium, sulfate, surfactants, total dissolved solids, turbidity and zinc.

Temperature and Cloudiness

The temperature of the Schuylkill and Delaware Rivers varied seasonally in 2021 from approximately 34 degrees to 82 degrees fahrenheit. PWD does not treat the water for temperature.

Cloudiness in tap water most commonly happens in the winter, when the cold water from the water main is warmed up quickly in household plumbing. Cold water and water under pressure can hold more air than warmer water and water open to the atmosphere.

When really cold winter water comes out of your tap, it's simultaneously warming up and being relieved of the pressure it was under inside the water main and your plumbing. The milky white color is actually just tiny air bubbles. If you allow the glass to sit undisturbed for a few minutes, you will see it clear up gradually.

2021 Data tables

Sodium, Hardness, and Alkalinity in tap water

The parameters listed on this page are not part of EPA's requirements and are provided for information purposes.

WATER TIP:

Parameters like these matter if you use your water for activities like brewing beer or keeping a home aquarium.

SODIUM IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
Average (ppm)	24 ppm	43 ppm	44 ppm
Average (mg in 8 oz. glass of water)	6 mg	10 mg	10 mg
Range (ppm)	16–64 ppm	30–84 ppm	29–121 ppm
Range (mg in 8 oz. glass of water)	4–15 mg	7–20 mg	7–29 mg

HARDNESS IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
Average	92 ppm or 5 gpg	139 ppm or 8 gpg	169 ppm or 10 gpg
Minimum	75 ppm or 4 gpg	110 ppm or 6 gpg	123 ppm or 7 gpg
Maximum	114 ppm or 7 gpg	170 ppm or 10 gpg	209 ppm or 12 gpg

Hardness defines the quantity of minerals, such as calcium and magnesium, in water. These minerals react with soap to form insoluble precipitates and can affect common household chores such as cooking and washing. Philadelphia's water is considered "medium" hard.

ALKALINITY IN TAP WATER

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average
Average	35 ppm	68 ppm	77 ppm
Minimum	25 ppm	41 ppm	53 ppm
Maximum	45 ppm	92 ppm	98 ppm

Secondary Chemicals

EPA has established National Secondary Drinking Water Regulations (NSDWRs) that set non-mandatory water quality standards. EPA does not enforce these "secondary maximum contaminant levels" (SMCLs). They are established as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.

SECONDARY MCLs: AESTHETIC IMPACTS IN TAP WATER

	EPA's SMCL	Baxter WTP One Year Range*	Belmont WTP One Year Range*	Queen Lane WTP One Year Range*	Violation**
Chloride	250 ppm	50–143 ppm	64–171 ppm	75–261 ppm	No
Copper	1.0 ppm	<0.001–0.002 ppm	0.006–0.019 ppm	0.020–0.046 ppm	No
Fluoride	2 ppm***	0.62 ppm	0.71 ppm	0.71 ppm	No
Iron	0.3 ppm	<0.010–0.016 ppm	<0.010 ppm	<0.010–0.020 ppm	No
pH	6.5–8.5	7.10–7.25	7.10–7.30	6.97–7.34	No
Sulfate	250 ppm	7.35–34.20 ppm	12.30–49.50 ppm	17.40–47.90 ppm	No
Total Dissolved Solids	500 ppm	136–346 ppm	200–468 ppm	230–576 ppm	No

PWD also monitored for Aluminum, Color, Manganese, and Silver in 2021; all results were below respective parameter detection limits.

*Ranges with a less than symbol "<" indicate some results were below the method detection limit for 2021.

**Individual results are averaged monthly and compliance is based on locational running annual average.

***EPA's MCL and MCLG is 4 ppm, but PADEP has set this lower MCL and MCLG which takes precedence.

Sources of Secondary Chemicals

Chloride: Main component of many salts, may increase in winter months; Erosion of natural minerals; Used in the water treatment process in the form of ferric chloride.

Copper: Corrosion of copper pipes in premise plumbing; Erosion of natural deposits.

Fluoride: Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories.

Iron: Corrosion of iron water mains and premise plumbing; Erosion of natural minerals; Used in the water treatment process in the form of ferric chloride.

pH: Adjusted during the water treatment process.

Sulfate: Erosion of natural minerals; Runoff from mining operations.

Total Dissolved Solids: Erosion of natural minerals; May increase during winter months due to road salt runoff or during drought conditions.

LEAD & COPPER – Tested at customers' taps: *Testing is done every 3 years. Most recent tests were done in 2019.*

	EPA's Action Level - for a representative sampling of customer homes	Ideal Goal (EPA's MCLG)	90% of PWD customers' homes were less than	Number of homes considered to have elevated levels	Violation	Source
Lead	90% of homes must test less than 15 ppb	0 ppb	3.0 ppb	2 out of 99	No	Corrosion of household plumbing; Erosion of natural deposits
Copper	90% of homes must test less than 1.3 ppm	1.3 ppm	0.28 ppm	0 out of 99	No	Corrosion of household plumbing; Erosion of natural deposits; Leaching from wood preservatives

INORGANIC CHEMICALS (IOC) – PWD monitors for IOC more often than required by EPA.

Chemical	Highest Level Allowed (EPA's MCL)	Ideal Goal (EPA's MCLG)	Highest result	Range of Test Results for the Year	Violation	Source
Antimony	6 ppb	6 ppb	0.3 ppb	0–0.3 ppb	No	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Barium	2 ppm	2 ppm	0.051 ppm	0.028–0.051 ppm	No	Discharges of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chromium	100 ppb	100 ppb	3 ppb	0–3 ppb	No	Discharge from steel and pulp mills; Erosion of natural deposits
Fluoride	2 ppm*	2 ppm*	0.71 ppm	0.62–0.71 ppm	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate	10 ppm	10 ppm	3.84 ppm	0.64–3.84 ppm	No	Runoff from fertilizer use; Leaching from septic tanks; Erosion of natural deposits

*EPA's MCL and MCLG is 4 ppm, but PADEP has set this lower MCL and MCLG which takes precedence.

TOTAL CHLORINE RESIDUAL – Continuously monitored at Water Treatment Plants

Sample Location	Minimum Disinfectant Residual Level Allowed	Lowest Level Detected	Yearly Range	Violation	Source
Baxter WTP	0.2 ppm	2.39 ppm	2.39–3.88 ppm	No	Water additive used to control microbes
Belmont WTP		1.63 ppm	1.63–2.87 ppm		
Queen Lane WTP		2.02 ppm	2.02–3.99 ppm		

TOTAL CHLORINE RESIDUAL – Tested throughout the Distribution System. Over 360 samples collected throughout the City every month.

Sample Location	Maximum Disinfectant Residual Allowed	Highest Monthly Average	Monthly Average Range	Violation	Source
Distribution System	4.0 ppm	2.46 ppm	1.86–2.46 ppm	No	Water additive used to control microbes

TOTAL ORGANIC CARBON – Tested at Water Treatment Plants

Treatment Technique Requirement	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average	Violation	Source
Percent of Removal Required	35–45%	25–35%	25–35%	n/a	Naturally present in the environment.
Percent of Removal Achieved*	0–72%	7–67%	19–72%	No	
Number of Quarters out of Compliance*	0	0	0		

*PWD achieved TOC removal requirements in all quarters of 2021 at all WTPs. Compliance is based on a running annual average computed quarterly. The numbers shown represent a range of TOC results in weekly samples.

TURBIDITY, A MEASURE OF CLARITY – Tested at Water Treatment Plants

	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average	Violation	Source
Treatment Technique Requirement: *95% of samples must be at or below 0.300 NTU*	100% below 0.300 NTU	100% below 0.300 NTU	100% below 0.300 NTU	n/a	Soil runoff, river sediment
Highest single value for the year	0.096 NTU	0.080 NTU	0.196 NTU	No	

The turbidity of Philadelphia's water in 2021 was 86 percent below the maximum level of 0.3 NTU allowed by the State and Federal Regulations and was 57 percent below the Partnership for Safe Water turbidity goal of 0.1 NTU.

We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. PWD continuously operates and monitors water quality from a total of 160 filters at three drinking water treatment plants.

DISINFECTION BYPRODUCTS

	Highest Level Allowed (EPA's MCL) - One Year Average	Running Annual Average 2021*	System Wide Range of Results	Violation	Source
Total Trihalomethanes (TTHMs)	80 ppb	49 ppb	13–101 ppb	No	Byproduct of drinking water disinfection
Total Haloacetic Acids (THAAs)	60 ppb	46 ppb	10–88 ppb	No	Byproduct of drinking water disinfection

*Monitoring is conducted at 16 locations throughout the City of Philadelphia. This result is the highest locational running annual average in 2021.

UNREGULATED CONTAMINANT MONITORING (UCMR)[1]

Chemical	Testing Period	Average	Range
Anatoxin-a	07/14/2020–10/20/2020	0.00125 ppb	0–0.03 ppb
Bromide[2]	1/14/2020	0.034 ppm	0–0.052 ppm
Total Organic Carbon (TOC)[2]	1/14/2020	2.27 ppm	2.19–2.34 ppm
HAA5 Total[3]	1/14/2020	21.3 ppb	14.8–31.3 ppb
HAA6Br Total[4]	1/14/2020	7.1 ppb	3.8–10.3 ppb
HAA9 Total[5]	1/14/2020	28.2 ppb	23.6–35.5 ppb
Manganese	1/15/2020	0.55 ppb	0–0.95 ppb

[1] Unless otherwise noted, samples were collected from finished water sampling locations.

[2] Bromide and TOC represent source water samples.

[3] HAA5 Total - Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, and Trichloroacetic Acid

[4] HAA6Br Total - Bromochloroacetic Acid, Bromodichloroacetic Acid, Dibromoacetic Acid, Dibromochloroacetic Acid, Monobromoacetic Acid, and Tribromoacetic Acid

[5] HAA9 Total - Bromochloroacetic Acid, Bromodichloroacetic Acid, Chlorodibromoacetic Acid, Dibromoacetic Acid, Dichloroacetic Acid, Monobromoacetic Acid, Monochloroacetic Acid, Tribromoacetic Acid, and Trichloroacetic Acid

In 2021, PWD performed special monitoring as part of the Unregulated Contaminant Monitoring Rule (UCMR), a nationwide monitoring effort conducted by the EPA. Unregulated contaminants are those that do not yet have a drinking water standard set by the EPA. The purpose of monitoring for these contaminants is to help the EPA decide whether the contaminants should have a standard. For more information concerning UCMR, visit these websites: *https://www.epa.gov/dwucmr/fourth-unregulated-contaminant-monitoring-rule* or *https://drinktap.org/Water-Info/Whats-in-My-Water/Unregulated-Contaminant-Monitoring-Rule-UCMR*

UNREGULATED CONTAMINANTS NOT DETECTED AT ANY OF THE SAMPLING LOCATIONS:

1-Butanol, 2-Methoxyethanol, 2-Propen-1-ol, alpha-Hexachlorocyclohexane, anatoxin-a, Butylated Hydroxyanisole , Chlorpyrifos, Cylindrospermopsin, Dimethipin, Ethoprop, Germanium, Microcystin Total, Nodularin, o-Toluidine, Oxyfluorfen, Permethrin Total, Profenofos, Quinoline, Tebuconazole, Tribufos

CRYPTOSPORIDIUM – Tested at Source Water to Water Treatment Plants prior to treatment in 1/1/2017–3/31/2017

Treatment Technique Requirement	Baxter WTP One Year Average	Belmont WTP One Year Average	Queen Lane WTP One Year Average	Source
Total Number of Samples Collected	6	6	6	Naturally present in the environment.
Number of *Cryptosporidium* Detected	15	2	6	
	0.250 count/L	0.033 count/L	0.100 count/L	

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes *Cryptosporidium*, the most commonly-used filtration methods cannot guarantee 100 percent removal. Our monitoring indicates the presence of these organisms in our source water. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease.

Photographs

JPG Photo & Video
Philadelphia Water Department

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