# Water Quality Data for Philadelphia 1996

Philadelphia Water Department

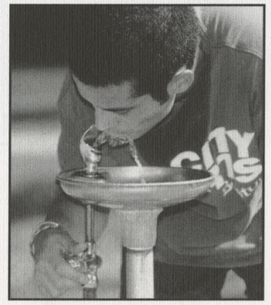
# Water

Water is an essential component of life on this planet. From plants to puppies to people, living things need water.

You are mostly water—72 percent of your body weight is water. Water keeps you healthy. You use water to digest food, keep your skin moist, and to regulate body temperature.

Daily, you lose water from your body through exercise and normal bodily functions, and you must replace it to stay healthy.

Without enough water in your daily diet, you might get dehydrated. By drinking eight to10 glasses of water (not tea, coffee, or soda, but real water!), you help keep your body functioning properly.



Philadelphia's drinking water is drawn from its two rivers, the Schuylkill and the Delaware. Both rivers have played a large part in Philadelphia's growth and development, and have provided Philadelphia's citizens with drinking water for more than 300 years. Industry, farming, and other uses have negatively impacted the quality of the drinking water.

The City of Philadelphia recognizes the importance of clean drinking water, and preserving the water quality in the Schuylkill and Delaware rivers. Philadelphia began treating its water in 1902, when the rivers were so contaminated that many Philadelphians died of typhoid fever and cholera.

These two rivers are a critical part of daily life in the region. The Delaware River alone supports the industrial and consumption requirements of more than 10% of the U.S. population. The Philadelphia Water Department's water treatment plants test the water before it reaches the consumer. While the quality and vitality of both the Schuylkill and Delaware rivers have improved tremendously, our water still requires a good deal of treatment before it is safe to drink.

From bathing to cooking to watering lawns, each customer uses between 80 - 100 gallons of drinking water a day. Approximately 360 million gallons a day (mgd) are distributed from the Water Department's three water treatment plants. The Belmont and the Queen Lane plants distribute treated water from the Schuylkill River, while the Baxter Plant supplies treated water from the Delaware River. Each river serves about half of the city's population.



While there are some differences, the water treatment process at each plant is similar. Water is pumped from the rivers to the plants. It passes through screens to remove debris, such as tree branches and leaves, and then through settling basins to allow silt, sand and other particles to naturally settle to the bottom by gravity.

Even as the Water Department is treating the water to purify it, the water must be monitored to make sure no new contamination occurs. If the weather is warm, sodium hypochlorite may be added to prevent algae from growing.

The water then goes through a process called "flocculation," which can remove more than 90% of the suspended solids. Chemicals, usually ferric chloride or alum sulphate, are added to the water, where they combine with suspended particles already present. This forms "floc," which drops to the bottom of the sedimentation basin or is caught in filters. Other chemicals, such as lime or sulfuric acid, may be added to adjust the acidity of the water and to help the formation of floc.

**Philadelphia's drinking water currently meets or is better than all physical, chemical, radiological and bacterial water quality standards established by the EPA.**


The water passes into the filter building, which contains filters made of carbon and sand. The water flows through the filter gallery, where it flows by gravity through the filters to remove suspended particles. Ammonia is added to reduce chlorinous tastes and odors, and to hold the chlorine in the water. Zinc orthophosphate is added to minimize lead leaching from residential plumbing. Fluoride is added near the end of the treatment process.

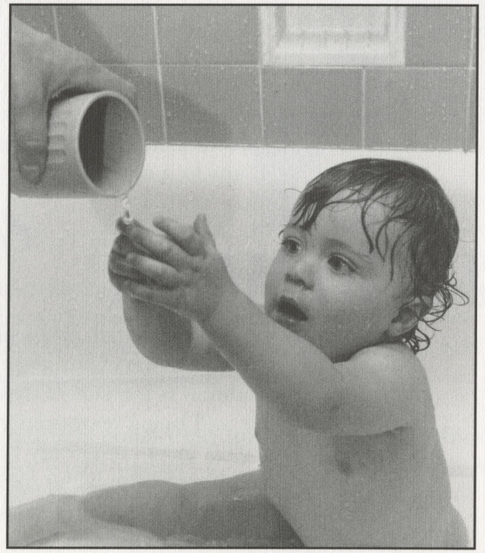
Our water quality is regulated nationally by the Safe Drinking Water Act (SDWA). The passage of this act in 1974, and recently amended in 1996, directed the United States Environmental Protection Agency (EPA) to issue national Primary Drinking Water Regulations for all public water systems having at least 15 service connections or regularly serving at least 25 people. The Act sets standards aimed to control substances that can pose a threat to health when present in certain quantities in water. Primary standards are enforceable through Maximum Contaminant Levels (MCLs). The EPA currently has developed National Primary Drinking Water Standards for eight volatile organic chemicals (VOCs), fluoride, coliform and other microbiological contaminants, synthetic organic chemicals (SOCs) and inorganic chemicals (IOCs), and lead and copper.



The EPA requires water departments to notify their customers that they are monitoring unregulated contaminants which may be in drinking water. The Philadelphia Water Department has prepared this publication, which is available to the public upon request by calling the Department's Customer Information Hotline, (215) 685-6300. This booklet includes chemical analyses of regulated and unregulated compounds under the Safe Drinking Water Act.

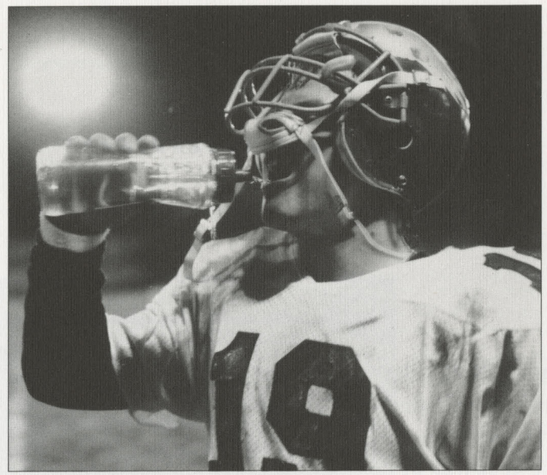
The tables on pages nine through twelve present Philadelphia's water quality data for 1996. The Department's Bureau of Laboratory Services, one of the most highly regarded labs in the country, is comprised of labs which specialize in analyzing organic and inorganic substances, aquatic biology, and materials engineering and testing.

As shown on these tables, the regulated elements are present in concentrations considerably lower than the maximum contaminant levels allowed by the SDWA. The Philadelphia Water Department strives to continue to meet or exceed all EPA standards for water quality.



**In the nineteenth century, scientists discovered that we could clean our drinking water, and stop the ravages of such diseases as cholera, typhoid, and dysentery. Philadelphia began building its first water treatment plant in 1902.**

water about your



The Philadelphia Water Department tests and monitors a number of water quality parameters. Some of these include:

# CHLORINE

Philadelphia began putting chlorine into the water supply in 1913, to help control the cholera and typhoid epidemics which had killed hundreds of citizens. Chlorine is used in the water treatment process as a disinfectant.

When "free" or pure chlorine is present in water for a period of time, it chemically reacts with natural organic compounds in water to produce trihalomethanes (THMs). Philadelphia has adjusted its treatment process by allowing free chlorine to mix with water for only the minimum amount of time needed to ensure disinfection. Chlorine is then mixed with ammonia, resulting in a disinfecting product which does not produce THMs. This keeps to a minimum the THM concentration in drinking water.

# CLOUDY WATER

Aeration is the process which takes place when the water flowing from your tap into your glass appears cloudy. This temporary condition is a result of dissolved air being released from the water and being temporarily suspended in the water in your glass. This most commonly happens in the winter time when the cold water in the water mains is warmed up quickly in household plumbing, thereby encouraging the dissolved air to come out of the water.



# CRYPTOSPORIDIUM

Cryptosporidium is a microscopic, disease-causing parasite. It can be transmitted in several ways, including through water. The EPA has not yet determined what level of the parasite is harmful, and there are currently no regulations requiring monitoring or reporting of the parasite in water. Even though low levels of Cryptosporidium in drinking water do not necessarily pose a health threat, the Philadelphia Water Department does research on the Schuylkill and Delaware rivers and treated water. People with impaired immune systems—those receiving chemotherapy or living with HIV/AIDS—are at greater risk. Cryptosporidium can also be present in bottled water which comes from surface waters, such as rivers or lakes and in swimming pools or recreational water.

# FLUORIDE

The Philadelphia City Health Code has required the Water Department to add fluoride to its treated water since 1954. Approximately 1 milligram per liter (mg/l), or 1 part per million (ppm), of fluoride is added, which is the amount recommended by the American Dental Association to provide maximum dental protection.

# HARDNESS

Hardness defines the quantity of minerals such as calcium and magnesium in a gallon of 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. Hardness also affects other water qualities such as its corrosiveness, with soft water being more corrosive.

water

about your

# LEAD

The impact of lead in water is an on-going health issue, especially for young children and the elderly. There is no natural source of lead in our water supply, nor is it a result of Philadelphia's water treatment process. In the 1950s, before the effects of lead were widely known, lead service connections were used to link residential water services to the water main in the streets. Lead solder was also used to join copper piping for home plumbing. When water is allowed to stand unused in any piping which contains lead materials, for 6 hours or more or overnight, lead can dissolve or "leach" into your drinking water.

Philadelphia banned the use of lead service pipes in 1981, and solders containing lead in 1986. If you are concerned that there are lead pipes or solder in your water supply plumbing, before using the water for drinking or cooking, flush your tap by running the water for approximately two to three minutes. This will allow fresh water from the City's water main into your residential water supply. The Philadelphia Water Department has an informative brochure on lead in the home. For copies, call (215) 685-6300.

# SODIUM

Sodium occurs naturally in water and can also be present as a by-product of the water treatment process. Its concentration is primarily of interest to people who must strictly limit their salt intake for health reasons. As shown on the table, sodium levels vary throughout Philadelphia depending upon the water source.

# TEMPERATURE

The temperatures of both the Schuylkill and Delaware rivers vary seasonally from approximately $33^0$ F to $85^0$ F. The Water Department does not treat the water for temperature.



## *Drinking Water Quality Average Values for 1996*

**Regulated Parameters – Finished Water Supply**
**Primary Standards**

| Parameter | MCL(1) | MDL(2) | Baxter | Queen Lane | Belmont |
|---|---|---|---|---|---|
| **INORGANIC** | | | | | |
| Cyanide | 0.2 | 0.005 | ND | ND | ND |
| Fluoride | 4 | 0.1 | 0.98 | 1.01 | 1.00 |
| Nitrate as Nitrogen | 10.0 | 0.02 | 1.18 | 3.23 | 2.85 |
| Nitrite as Nitrogen | 1 | 0.02 | ND | ND | ND |
| **METALS** | | | | | |
| Antimony | 0.006 | 0.002 | ND | ND | ND |
| Arsenic | 0.05 | 0.001 | ND | 0.001 | ND |
| Barium | 2 | 0.01 | 0.02 | 0.04 | 0.03 |
| Beryllium | 0.004 | 0.00025 | ND | ND | ND |
| Cadmium | 0.005 | 0.001 | ND | ND | ND |
| Chromium | 0.1 | 0.001 | ND | ND | 0.003 |
| Mercury | 0.002 | 0.0002 | ND | ND | ND |
| Nickel | 0.1 | 0.01 | ND | ND | ND |
| Selenium | 0.05 | 0.001 | ND | ND | ND |
| Thallium | 0.002 | 0.001 | ND | ND | ND |
| Copper(3) | NA | 0.02 | ND | ND | ND |
| Lead(4) | NA | 0.001 | ND | ND | ND |
| **ORGANICS** | | | | | |
| Benzene | 0.005 | 0.0005 | ND | ND | ND |
| Carbon Tetrachloride | 0.005 | 0.0005 | ND | ND | ND |
| 1,2-Dichloroethane | 0.005 | 0.0005 | ND | ND | ND |
| o-Dichlorobenzene | 0.6 | 0.0005 | ND | ND | ND |
| p-Dichlorobenzene | 0.075 | 0.0005 | ND | ND | ND |
| 1,1-Dichloroethene | 0.007 | 0.0005 | ND | ND | ND |
| cis-1,2-Dichloroethene | 0.07 | 0.0005 | ND | ND | ND |
| trans-1,2-Dichloroethene | 0.1 | 0.0005 | ND | ND | ND |
| Dichloromethane | 0.005 | 0.0005 | ND | ND | ND |
| 1,2-Dichloropropane | 0.005 | 0.0005 | ND | ND | ND |
| Ethylbenzene | 0.7 | 0.0005 | ND | ND | ND |
| Chlorobenzene | 0.1 | 0.0005 | ND | ND | ND |
| Styrene | 0.1 | 0.0005 | ND | ND | ND |
| Tetrachloroethene | 0.005 | 0.0005 | ND | ND | ND |
| Toluene | 1 | 0.0005 | ND | ND | ND |
| 1,2,4 -Trichlorobenzene | 0.07 | 0.0005 | ND | ND | ND |
| 1,1,1-Trichloroethane | 0.2 | 0.0005 | ND | ND | ND |
| 1,1,2-Trichloroethane | 0.005 | 0.0005 | ND | ND | ND |
| Trichloroethene | 0.005 | 0.0005 | ND | ND | ND |
| Xylenes (Total) | 10 | 0.0005 | ND | ND | ND |

All results are in milligrams per liter (mg/l), except where indicated.

(1) MCL = Maximum Contaminant Level
(2) MDL = Method Detection Limit
(3) No Maximum Contaminant Level (MCL) but an Action Level of 1.3 mg/l
(4) No Maximum Contaminant Level (MCL) but an Action Level of 0.015 mg/l
ND = Not Detected
NA = Not Applicable

## Regulated Parameters - Finished Water Supply
## Primary Standards - Continued

| Parameter | MCL(1) | MDL(2) | Baxter | Queen Lane | Belmont |
|---|---|---|---|---|---|
| **PHYSICAL** | | | | | |
| Turbidity, NTU | No MCL: Less than 0.5 NTU, 95% of the time. Less than 2.00 at any time. | | | | |
| | | NA | 0.1 | 0.08 | 0.08 |
| **RADIOLOGICAL** | | | | | |
| Gross Alpha (pCi/1) | 15 | NA | 1.7±1.5 | <3 | NA |
| Gross Beta (pCi/1) | 4 mRem | NA | 2.6±1.8 | 2.6±1.9 | NA |
| Tritium | 20,000 | NA | <600 | <600 | NA |
| **Non-reportable Primary Standards** | **SMCL (3)** | **MDL** | | | |
| Aluminum | 0.2 | 0.01 | 0.04 | 0.01 | 0.03 |
| Chloride | 250 | 1 | 42 | 68 | 63 |
| Color (Units) | 15 | 2.5 | <2.5 | <2.5 | <2.5 |
| Iron | 0.3 | 0.05 | <0.05 | <0.05 | <0.05 |
| Manganese | 0.05 | 0.01 | <0.01 | <0.01 | <0.01 |
| pH (Units) | 6.5 - 8.5 | | 7.5 | 7.3 | 7.3 |
| Solids, Total Dissolved | 500 | 1 | 196 | 328 | 306 |
| Sulfate | 250 | NA | 18 | 48 | 51 |
| Zinc | 5 | 0.01 | 0.13 | 0.15 | 0.14 |

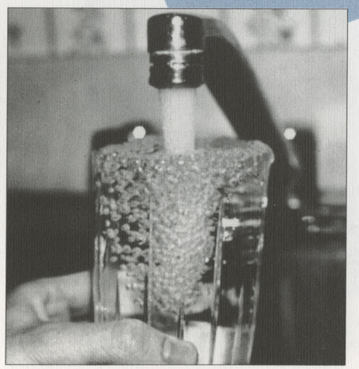
All results are in milligrams per liter (mg/l), except where indicated.

(1) MCL = Maximum Contaminant Level
(2) MDL = Method Detection Limit
(3) SMCL = Secondary Maximum Contaminant Level
NA = Not Applicable



## Non-Regulated Parameters
## Finished Water Supply

| Parameter | MDL(1) | Baxter | Queen Lane | Belmont |
|---|---|---|---|---|
| **INORGANIC** | | | | |
| Alkalinity as Calcium Carbonate | NA | 41 | 42 | 44 |
| Ammonia as Nitrogen | 0.01 | 0.22 | 0.28 | 0.29 |
| Hardness as Calcium and Magnesium Carbonate | NA | 98 | 157 | 157 |
| ortho-Phosphate as Phosphorus | 0.02 | 0.22 | 0.22 | 0.22 |
| **METALS** | | | | |
| Calcium | NA | 30 | 42 | 44 |
| Magnesium | NA | 5 | 13 | 12 |
| Potassium | NA | 1.8 | 3.3 | 3.0 |
| Sodium | NA | 11.9 | 29.9 | 19.1 |
| **ORGANIC** | | | | |
| Bromobenzene | 0.0005 | ND | ND | ND |
| o-Chlorotoluene | 0.0005 | ND | ND | ND |
| p-Chlorotoluene | 0.0005 | ND | ND | ND |
| Cumene | 0.0005 | ND | ND | ND |
| m-Dichlorobenzene | 0.0005 | ND | ND | ND |
| 1,1-Dichloroethane | 0.0005 | ND | ND | ND |
| 1,3-Dichloropropane | 0.0005 | ND | ND | ND |
| 1,1-Dichloropropene | 0.0005 | ND | ND | ND |
| c-1,3-Dichloropropene | 0.0005 | ND | ND | ND |
| t-1,3-Dichloropropene | 0.0005 | ND | ND | ND |
| 1,1,1,2-Tetrachloroethane | 0.0005 | ND | ND | ND |
| 1,1,2,2-Tetrachloroethane | 0.0005 | ND | ND | ND |
| 1,2,3-Trichloropropane | 0.0005 | ND | ND | ND |
| m,p Xylene | 0.0005 | ND | ND | ND |
| o-Xylene | 0.0005 | ND | ND | ND |
| **PHYSICAL** | | | | |
| Solids, Total | NA | 201 | 337 | 317 |
| Conductivity (µmhos/cm) | 15 | 279 | 479 | 430 |



All results are in milligrams per liter (mg/l), except where indicated.

(1) MDL = Method Detection Limit
ND = Not Detected
NA = Not Applicable

**Regulated Parameters**
**Distribution Systems**

| Parameter | MCL(1) | MDL(2) | Baxter | Queen Lane | Belmont |
|---|---|---|---|---|---|
| **BACTERIOLOGICAL** | | | | | |
| Coliform, Total | No more than 5% of the samples can be positive for Total Coliform in one month | | 0 | 0 | 0 |
| **ORGANIC** | | | | | |
| Trihalomethanes, Total | 0.1 | 0.0005 | 0.0820 | 0.0500 | 0.0710 |
| **INORGANIC** | **MRDL(3)** | | | | |
| Chlorine, Free | 4 | 0.05 | <0.05 | <0.05 | <0.05 |
| Chlorine, Total | 4 | 0.05 | 1.92 | 1.67 | 1.66 |

All results are in milligrams per liter (mg/l), except where indicated.

(1) MCL = Maximum Contaminant Level
(2) MDL = Method Detection Limit
(3) MRDL = Maximum Residual Disinfection Level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