WATER QUALITY DATA for PHILADELPHIA

1994

Water is essential for life ❦ It nourishes the world around us and keeps our bodies functioning properly ❦ Our bodies are 72% water, and therefore, it is not surprising to learn that water facilitates our digestive processes, keeps our skin from drying out, and naturally regulates our body temperature ❦ Because our bodies cannot store water, it is important that the water we lose through exercise and normal bodily functions is replaced on a daily basis ❦ Since water loss can cause dehydration, cramping and heat stroke, drinking plenty of water, approximately eight to 10 glasses a day, is a good way to ensure proper water intake ❦

Philadelphia's drinking water is drawn from its two rivers, the Schuylkill and the Delaware. Both of these rivers have played a large part in Philadelphia's growth and development, and have provided Philadelphia's citizens with drinking water for over 300 years. Today, although the water quality of the Schuylkill and Delaware rivers is the best it has been in decades, the water drawn for drinking still requires considerable treatment. The Delaware River alone supports the industrial and consumption requirements of over 10% of the U.S. population. This poses quite a challenge for the Philadelphia Water Department's water treatment plants. 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.

Although there is some variation, the water treatment process at each plant is similar. Water, pumped from the rivers to the plants, is initially screened to remove debris, such as tree branches and leaves, and then held in settling

basins to allow silt, sand and other particles to naturally settle to the bottom by gravity. The water then flows to another tank where other chemicals are introduced, such as lime and ferric chloride, to control the pH of the water and to spur the coagulation process, in which the suspended particles in water combine physically to form larger collections of solids called "floc." Zinc orthophosphate is also added to minimize lead leaching from residential plumbing. The water is rapidly and slowly mixed and then allowed to settle again, this time the "floc" drops to the bottom of the tanks. Later, the water, free of "floc," flows through filtration beds to remove the smaller suspended particles. These beds consist of several layers of varying upgrades of sand and gravel. Finally, the water is ammoniated to achieve a chloramine residual (low odor, longer lasting, less corrosive). It is then stored in reservoirs or piped directly to your home.

Water quality in the U.S. is regulated by the Safe Drinking Water Act (SDWA). The passage of this act in 1974 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 drinking water regulations of the Act

are of two types: primary and secondary. Primary standards are 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).

In June of 1986, amendments were passed to the SDWA. These amendments increased the number of regulated drinking water contaminants from 26 to 83. To date, the Agency has promulgated 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.

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

The Philadelphia Water Department is required by the U.S. EPA to notify its customers that it is monitoring unregulated contaminants which may be in Philadelphia's drinking water. The Water Department has prepared this booklet, which is available to the public upon request by calling the Department's Customer Information number, 685-6300. This booklet includes chemical analyses of regulated and unregulated compounds under the Safe Drinking Water Act.

The following tables outline Philadelphia's water quality data for 1994. As shown on these tables, the regulated elements are present in concentrations considerably lower than the maximum contaminant levels allowed by the SDWA. The Water Department also monitors a number of other substances to give us a better picture of the overall water quality. In addition, the Department continues to explore other non-traditional means of analyzing water quality. One of these is the Taste and Odor team, which tastes and smells water samples ranging from raw river samples (which the team only smells) to treated drinking water. The panel works to ensure that the finished product is safe and pleasant tasting.

The Water Department's customers are frequently interested in certain water quality issues. Some of these include:

CHLORINE Chlorine is used in the water treatment process as a disinfectant. Chlorine was introduced into Philadelphia's water treatment process in 1913, and ended periodic epidemics of cholera and typhoid which had plagued Philadelphia for two centuries.

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), which may be carcinogenic to humans. Philadelphia has adjusted its treatment process by allowing free chlorine to mix with water for only the minimum amount of time needed to ensure complete pathogen kill. Chlorine is then ammoniated, resulting in a disinfecting product which does not produce THMs, thereby significantly reducing the THM concentration in drinking water.

CLOUDY WATER Aeration is taking place when 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.

FLUORIDE Philadelphia's 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 precipitate 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.

LEAD Lead concentration in water has become a much talked about concern because of its associated health effects, particularly on young children and the elderly. Lead does not occur naturally in our water supply, nor is it a result of Philadelphia's water treatment process. In Philadelphia, lead concentration in water is primarily a result of the use of lead service connections prior to the 1950s to connect residential services to the City's water mains in the street, or most recently, solders containing lead

used to join copper piping for home plumbing. Water allowed to stand unused in piping containing lead materials for a period of time, e.g., overnight, can cause dissolving or "leaching" of lead into your drinking water.

Philadelphia banned the use of lead service pipes in 1981 and solders containing lead in January of 1986. As a precaution, lead can be eliminated from your drinking water by flushing your tap before using the water for drinking or cooking simply by allowing the water to run for approximately two to three minutes. For copies of the Water Department's lead brochure, call 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 usually of interest to people who must strictly monitor 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.

Drinking Water Quality Average Values for 1994

Regulated Parameters
Finished Water Supply

Parameter	*MCL	**SMCL	***MDL	Baxter	Queen Lane	Belmo
INORGANIC						
Chloride	NA	250	0.5	36	63	43
Cyanide	NA	NA	0.005	ND	ND	ND
Fluoride	4.0	2.0	0.01	0.96	0.93	1.01
Nitrate as Nitrogen	10.0	NA	0.10	1.17	3.10	2.87
Nitrite as Nitrogen	1.0	NA	0.02	ND	0.02	ND
pH, units	NA	6.5-8.5	NA	8.0	7.3	7.1
Sulfate	NA	500	1.0	20	51	53
METALS						
Antimony	0.006	NA	0.002	ND	ND	ND
Arsenic	0.05	NA	0.001	ND	ND	ND
Barium	1.0	NA	0.01	0.02	0.03	0.03
Beryllium	0.004	NA	0.00025	ND	ND	ND
Cadmium	0.005	NA	0.001	ND	ND	ND
Chromium	0.05	NA	0.001	0.002	0.002	0.00
Copper	No MCL. Action Level = 1.3 mg/l of copper at consumer's tap	NA	0.02	ND	0.02	0.02
Iron	NA	0.3	0.05	0.06	0.06	0.05
Lead	No MCL. Action Level = 0.015 mg/l of lead at consumer's tap	NA	0.001	ND	ND	ND
Manganese	NA	0.05	0.01	ND	ND	ND
Mercury	0.002	NA	0.0002	ND	ND	ND
Nickel	0.1	NA	0.01	ND	ND	ND
Selenium	NA	0.01	0.001	ND	ND	ND
Silver	NA	0.05	0.001	ND	ND	ND
Sodium	No MCL. Monitoring only	NA	NA	14.2	42.6	22.5
Thallium	0.002	NA	0.001	ND	ND	ND
Zinc	NA	5.0	0.01	0.10	0.11	0.14

Regulated Parameters
Finished Water Supply- Continued

Parameter	*MCL	**SMCL	***MDL	Baxter	Queen Lane	Belmont
ORGANIC						
★Endrin	0.002	NA	0.00005	ND	ND	ND
★Lindane	0.0002	NA	0.00005	ND	ND	ND
Methoxychlor	0.04	NA	0.0001	ND	ND	ND
★2,4-D	0.07	NA	0.005	ND	ND	ND
★2,4,5-TP Silvex	0.05	NA	0.0001	ND	ND	ND
★Toxaphene	0.003	NA	0.0005	ND	ND	ND
Benzene	0.005	NA	0.0005	ND	ND	ND
Carbon Tetrachloride	0.005	NA	0.0005	0.0007	0.0006	0.0006
Chlorobenzene	0.1	NA	0.0005	ND	ND	ND
o-Dichlorobenzene	0.6	NA	0.0005	ND	ND	ND
p Dichlorobenzene	0.075	NA	0.0005	ND	ND	ND
1,2-Dichloroethane	0.005	NA	0.0005	ND	ND	ND
1,1-Dichloroethylene	0.007	NA	0.0005	ND	ND	ND
c-1,2-Dichloroethylene	0.07	NA	0.0005	ND	ND	ND
t-1,2-Dichloroethylene	0.1	NA	0.0005	ND	ND	ND
Dichloromethane	0.005	NA	0.0005	ND	ND	ND
1,2-Dichloropropane	0.005	NA	0.0005	ND	ND	ND
Ethyl Benzene	0.7	NA	0.0005	ND	ND	ND
Styrene	0.1	NA	0.0005	ND	ND	ND
Tetrachloroethylene	0.005	NA	0.0005	ND	ND	ND
Toluene	1.0	NA	0.0005	ND	ND	ND
1,1,1-Trichloroethane	0.2	NA	0.0005	ND	ND	ND
1,1,2-Trichloroethane	0.005	NA	0.0005	ND	ND	ND
Trichloroethylene TCE	0.005	NA	0.0005	ND	ND	ND
Xylenes	10.0	NA	0.0005	ND	ND	ND
PHYSICAL						
Turbidity (NTU)	No MCL. Less than 0.5 NTU, 95% of the time. Less than 2.0 NTU at any time.		0.1	0.19	0.23	0.19
RADIOLOGICAL						
Gross Alpha (pCi/l)	15	NA	NA	<3	<5	<4
Gross Beta (pCi/l)	5	NA	NA	<3	4±2	3±2
Tritium (pCi/l)	20,000	NA	NA	<182	<180	<180

Non-Regulated Parameters
Finished Water Supply

Parameter	***MDL	Baxter	Queen Lane	Belmont
INORGANIC				
Alkalinity as Calcium Carbonate	20	43	67	57
Ammonia as Nitrogen	0.01	0.21	0.28	0.28
Hardness as Calcium Carbonate	NA	91	141	141
ortho-Phosphate as Phosphorus	0.02	0.118	0.108	0.130
METALS				
Aluminum	0.01	0.12	0.09	0.09
Calcium	1	27	34	36
Magnesium	0.4	6	13	13
Potassium	NA	1.7	3.3	3.1
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
Methylene Chloride	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				
Residue, Total	NA	170	278	262
Conductance, Specific (umhos/cm)	15	299	509	459

Regulated Parameters
Distribution Systems

Parameter	*MCL	***MDL	Baxter	Queen Lane	Belmont
BACTERIOLOGICAL					
Coliform, Total (1/100 ml)	Monthly average of less than one (1) colony.	NA	0	0	0
ORGANIC					
Trihalomethanes, Total	0.1	0.0005	0.081	0.056	0.052
INORGANIC					
Chlorine, Free	NA	0.05	<0.05	<0.05	<0.05
Chlorine, Total	NA	0.05	1.61	1.48	1.64

All results are in mg/l, except where indicated.

* MCL	Maximum Contaminant Level under National Primary Drinking Water Regulations
** SMCL	Secondary Maximum Contaminant Level
*** MDL	Method Detection Level
NA	Not Applicable
ND	None Detected
★	1991 Results

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