2003 WATER QUALITY REPORT

We invite you to review the City of Wilmington's fifth annual Water Quality Report. Water Quality Assurance Results and background about how the City's water-quality monitoring system works are included in this issue of Water Works on pages 5-9.

In This Issue...

City of Wilmington

Water Works

A Newsletter Published by The City of Wilmington, Department of Public Works - Water Division

Volume 2 • Number 1

Summer 2004

Cool Spring Reservoir

Rich in history and still playing a significant role in Wilmington's water system

Early residents showed unusual foresight

In 1872, the City paid $56,875 for 6.5-acres, currently bounded by Ursuline Academy and Park Place to the north, Jackson Street to the east, 10th Street to the south and Franklin Street to the west, and plans were conceived for a 40-million-gallon reservoir to be known as Cool Spring. The Cool Spring name was taken from Caesar A. Rodney's "Cool Spring" home, located near the reservoir. (Rodney was the nephew of statesman Caesar Rodney, who rode to Philadelphia on December 7, 1787 with Delaware's vote ratifying the Constitution, establishing Delaware's identity as the "First State.")

Historic photo of workers in the reservoir.

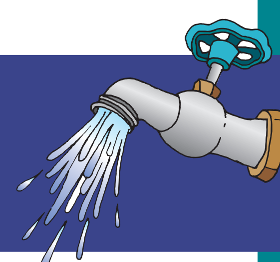
Building a supply that would meet not only current but future water needs was a radical idea at the time, but a wise one, considering the City doubled its demand for water between 1860 and 1870 and was growing rapidly. By 1870, total storage capacity of all Wilmington reservoirs was approximately 3.5 million gallons, only slightly greater than one day's supply. Since its opening in 1878, Cool Spring Reservoir has provided water storage to service low-lying areas of Wilmington.

Historic postcard shows Cool Spring Reservoir and surrounding park.

Park adjoins the reservoir and becomes gathering spot

In the 1880s, at the suggestion of water department employee Thomas C. Hattor, a park was added to the site. It contained hundreds of trees, three small stocked fishponds, fountains and many benches. Soon, iron fences were placed around

Teachers & Kids... Check out the websites listed on page 10 for learning and fun!



(continued from page 1)


Historic photo of reservoir area

the open water areas to protect small children, incandescent lamps were installed and the walks were tarred. In 1900, arc lamps replaced incandescent lights, and eight years later the tar walks were replaced with concrete, and the small lake in the middle of the park was lined with brick. From the early 1920s until 1949, the park hosted the annual Wilmington Flower Market. However, when the crowds reached 25,000, the Flower Market was moved to Brandywine Park and later Rockford Park.

Even though fishing was never allowed at the 20-foot-deep reservoir, and taller and taller chain-link fences and guards were added to keep people away from danger, *Wilmington Morning News* and *Evening Journal* newspaper accounts from as early as the 1930s tell of a number of tragedies. Young children would slip into the fenced reservoir area with fishing poles in hand and unfortunately some drowned. That was a concern when the Ursuline Academy was proposed in the late 1950s, but additional safeguards were put in place and the school that faces on Pennsylvania Avenue and backs to the Cool Spring Reservoir was constructed in the early 1960s.


Historic photo of reservoir area

Cool Spring Reservoir Today

Today, the reservoir serves major downtown businesses, the Riverfront area, and 15,000 city residents. A different kind of danger is prompting the City to explore the replacement of this open water reservoir with an in-ground enclosed tank. Because the reservoir is an open body of finished drinking water, there is concern that it is subject to contamination and algae growth. Recognizing these problems and preparing for upcoming changes in federal water-quality regulations, the City of Wilmington Public Works Department is taking action to develop long-term solutions.

Several options have been considered, including a basin liner and cover for the water, adding a downstream treatment plant, and replacing the open storage tank with a below ground enclosed concrete tank. After extensive analysis of costs, operational issues and neighborhood concerns, the City decided to replace one half of the existing open tank with a sealed tank. The proposed 9.3 million gallon replacement tank will be located in the South Basin of the existing 40 million-gallon reservoir. A new Gate House will be constructed on Van Buren Street adjacent to the reservoir embankment and south of the current location. A design competition is underway for surface improvements that may include a water feature.

The Cool Spring Reservoir is listed as a contributing resource to the amended National Register nomination for the Cool Spring Historic District and the reservoir is also within the City of Wilmington's overlay zoning district known as the Cool Spring/Tilton Park Historic District.

Cool Spring Reservoir in 2004

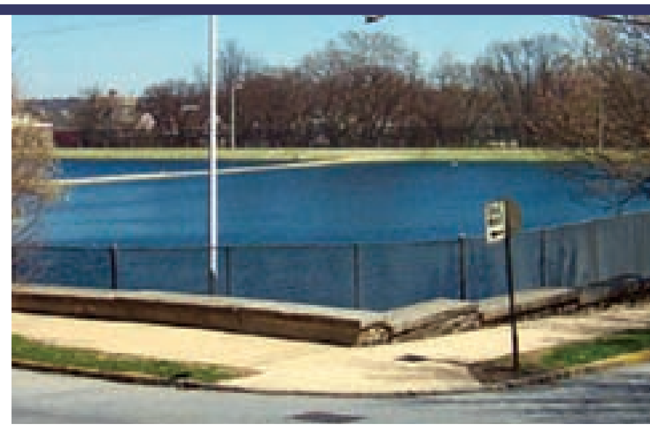
Cool Spring Design Competition

Once the open reservoir has been replaced with a buried tank, what should be on the surface? If features such as a pond, fountains, trees, walking trails, garden areas, or benches are added, where should they be placed?

The City has invited seven architectural landscaping firms to take part in a Cool Spring Design Competition to envision a design that will fit in with - and complement - the surrounding historic neighborhood, schools and park.

Extensive discussions have already taken place with area neighbors, schools, businesses, the Department of Public Works and the State's Department of Health and Social Service. In addition to maintaining water quality standards and protecting the security of the water supply, participants set additional goals, including:

- Maintain the security of both the neighborhood and the park.
- Maximize the possibility for good maintenance of park and reservoir, including cleanliness and litter control, landscape maintenance, and minimizing long-term costs.
- Include a water feature in the design to cool the air and enhance the aesthetic appeal.
- Include historic elements of the City's water supply, including interpretive signage.
- Ensure aesthetic appeal and the reservoir's continued role as a focal point of the neighborhood through designs that reflect the character of the neighborhood.
- Maintain access to safe recreation space for students.
- Ensure that changes will not result in neighborhood flooding or erosion.
- Maintain and improve school parking.
- Maintain and improve safe access in and out of schools, including car and bus pick-up and drop-off.
- Maintain neighborhood access to street parking.

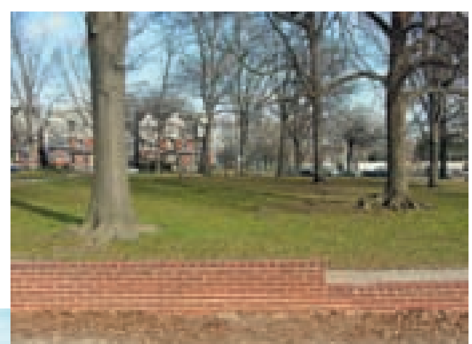


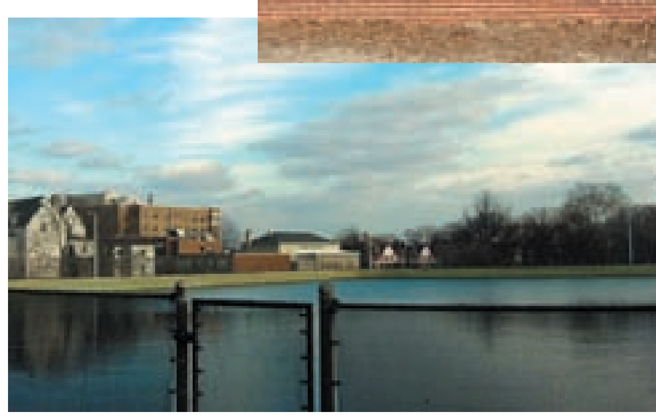
Current View of Cool Spring Reservoir which will be redesigned using an underground holding tank.

Once plans are received, the Cool Spring Reservoir Working Group will hold a daylong workshop to review all proposed concept designs and will choose up to 3 designs to present to the larger community. The public will be invited to review the designs and comment at a community meeting. The Working Group will use those comments to rank the firms and will submit their recommendation to the City's Architecture & Engineering Review Board. The A&E Review Board will select a firm based on:

- Quality of the proposed design;
- Responsiveness to stated Program;
- Citizen input from the Open House; and
- Qualifications of the firm.

Additional views of Cool Spring Reservoir and surrounding areas.





Covering Open Reservoirs Like Cool Spring Is Another Step in Assuring Safe Drinking Water

In the 18th Century, scientists discovered filtration was an effective means of clarifying water. Even though they had no way of measuring clarity, that was the beginning of the role water quality improvements have played in fighting terrible water-borne diseases like cholera and typhoid fever. In 1993, a *Cryptosporidium* Outbreak in Milwaukee made it clear that vigilance in monitoring water quality must be continuous. More recently, we maintain a sense of awareness that public facilities are vulnerable. We have taken measures to tighten the security of the water supply.

1832	First municipal water filtration plant in Paisley, Scotland
1855	Cholera proven to be a waterborne disease
1860	400 small water systems exist in US
1879	First US Filtration Plant in Poughkeepsie, NY
1900 (in Philadelphia)[3]	600 cases of typhoid fever per 100,000 people
1907	Ability to detect bacteria, along with introduction of chlorine as a disinfectant leads to first quantitative water quality standards
1913	Chlorination started in Philadelphia - [3] 100 cases of typhoid per 100,000 people
1925	Most water systems employ filtration and chlorination
Since 1952	Less than 1 case of typhoid per million people in US
1974	Initiated Safe Drinking Water Act (SDWA); amended 1977, 1979, 1980, 1986
1988	Lead Contamination Control Act
1993	*Cryptosporidium* Outbreak in Milwaukee - largest waterborne disease outbreak in recent US history hospitalizes 4,000 and results in 54-100 deaths
1996	SDWA amended (Proposed Long Term 2 Enhanced Surface Water Treatment Rule) - requires covering uncovered finished water reservoirs like Cool Spring

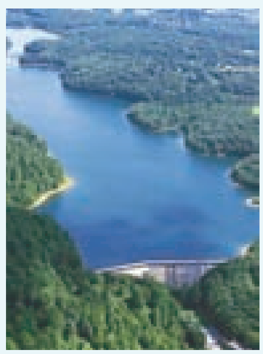
Compiled from *Handbook of Drinking Water Quality* (1997), *Water Quality and Treatment* (1999), and *Introduction to Environmental Engineering* (1985).

Wilmington's Water Sources

Over 38,000 households and businesses depend on Wilmington's Department of Public Works for fresh, pure drinking water. That means approximately 140,000 people in the City and surrounding suburbs use water from Wilmington supply sources each day.

Since 1827, the City has been using the Brandywine Creek as its primary source of water supply. The Brandywine Creek is part of the Brandywine Watershed that originates far to the north in Pennsylvania and passes through towns like Coatesville, Downingtown and West Chester before arriving in Wilmington. Water from the creek is diverted at a dam and flows along a raceway on the south side of the river where it flows to the Brandywine Filtration Plant or is pumped to the Porter Filtration Plant. The City has the capacity to withdraw up to 56 million gallons-per-day from the Brandywine.

The Race at Brandywine Creek



Aerial View of Hoopes Reservoir

During droughts, heavy rain and other emergencies, Hoopes Reservoir, built in 1932, stores 2 billion gallons and serves as the City's secondary water source. It also assures emergency back-up for all of northern Delaware. Other City reservoirs include Cool Spring Reservoir, located just off Pennsylvania Avenue, and the Porter Reservoir at Rock Manor Golf Course.

Wilmington has three ground-level storage tanks with the capacity of holding more than 57 million gallons of water. In addition, elevated tanks, stand-pipe tanks and holding tank reservoirs are located throughout the City.

Wilmington is one of five principle sources providing water to northern New Castle County. Other suppliers include the Artesian Water Company, United Water Delaware, and the cities of Newark and New Castle.

Porter Filtration Plant

THE CITY OF WILMINGTON

2003 WATER QUALITY REPORT

About This Report...

The Environmental Protection Agency (EPA) requires The City of Wilmington, and all other water suppliers in the US, to report yearly on specific details about testing for a number of contaminants in our water. Chemical and biological monitoring provides the data that helps suppliers such as the City of Wilmington make key water quality management decisions to ensure the freshness and purity of our drinking water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) regulates bottled water, which must provide the same protection for public health.

To ensure that tap water is safe to drink, the EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems.

How We Test Our Drinking Water

The Wilmington Water Division monitors for over 100 contaminants, including herbicides, pesticides, *Cryptosporidia*, *Giardia*, and coliform bacteria. We collect samples from the Brandywine Creek, Hoopes Reservoir, Porter Reservoir, Cool Spring Reservoir, the filtration plants, and at customers' taps in the distribution system.

Last year, over 5,000 water samples were drawn from the City's freshwater supply and our laboratory performed over 40,000 water analyses on those samples. This data supports the conclusion that Wilmington's water system complies with all applicable EPA drinking water regulations.

Trained personnel at the City's water quality laboratory closely monitor our water for more than 100 contaminants. Testing is performed at numerous intervals in the treatment process, from untreated water, through the treatment process and then randomly from homes.

During disinfection, certain by-products form as a result of chemical reactions between chlorine and naturally occurring organic matter in water. These are carefully controlled to keep disinfection effective and by-product levels low.

Protecting the Public from Disease

Microbiological testing of water helps protect the public from diseases such as polio, diphtheria, typhoid, and cholera. Although *Cryptosporidium*, a microbial pathogen that can cause abdominal infection, is found in surface water throughout the US, it was not detected in the City of Wilmington water sampled in 2003 and has never been detected in our treated and filtrated supply.

In 2003, the City's Water Division took about 5,000 water samples from the City's freshwater supply and performed over 40,000 water analyses on those samples. The result? Our drinking water meets or exceeds all state and federal water quality standards.

Important Health Note for "At Risk" Populations

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as those with cancer undergoing chemotherapy, organ transplant recipients, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly vulnerable to infections. These people should seek advice from their health care providers. EPA/CDC guidelines on appropriate ways to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Potential Contaminants

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic Contaminants, such as salts and metals, which can occur naturally or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Pesticides and Herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.

Radioactive Contaminants, which can occur naturally or be the result of oil and gas production and mining activities.

Contacts

Your involvement in water service planning at public meetings will help us meet and exceed community expectations as well as government regulations. Be sure to check ww.ci.wilmington.de.us/citydepartments/publicworks for upcoming meetings, locations and times.

In addition, during this time of heightened watchfulness, you can help us ensure the safety of our water supply by reporting any unusual or suspicious activity either on our waterways, near our reservoirs, water filtration plants, water towers or pumping stations.

To report an incident, or if you have questions about this report, call Colleen Arnold, Water Quality Manager at **(302) 573-5522**. Weekends or after 5 pm - **(302) 571-4150**.

Table 1: Water Quality Results - Detected Primary Substances[1]

Contaminant	Units	MCLG[2]	MCL[3] or TT[4][5]	Brandywine Filter Plant: # of Samples	Brandywine: Average	Brandywine: Range Lowest	Brandywine: Range Highest	Porter Filter Plant: # of Samples	Porter: Average	Porter: Range Lowest	Porter: Range Highest	Source
Microbiological Indicators												
Total Coliform	% of samples positive/month	0%	TT:No more than 5% of samples may be Total Coliform positive in a month	12 months/ 1473 samples	0%	0%	0%	12 months/ 1473 samples	0%	0%	0%	Bacteria that are naturally present in the environment. Used as an indicator of the presence of other potentially harmful bacteria.
E. coli	% of samples positive/month	0%	No sample must test positive for e-coli	12 months/ 1473 samples	0%	0%	0%	12 months/ 1473 samples	0%	0%	0%	Human and animal fecal waste.
Turbidity - Percentile	% of samples below 0.3 NTU	N/A	TT:95% of monthly samples must be less than 0.3 NTU	12	99.1%	**93%**	100%	12	100%	100%	100%	Soil runoff
Turbidity - Values	NTU		TT: No sample must ever exceed 1.0	2128	0.08	0.03	0.81	2179	0.03	0.02%	0.35	Soil runoff
Inorganic Chemicals												
Antimony	ppb[15]	6	6	2	—	Non-Detect	Non-Detect	2	—	Non-Detect	0.1	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
Arsenic	ppb[15]	none	50	2	—	Non-Detect	0.2	2	—	Non-Detect	0.2	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
Barium	ppm[14]	2	2	2	0.03	0.03	0.03	2	0.03	0.03	0.04	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Chromium	ppb[15]	100	100	2	1.3	0.2	2.3	2	—	Non-Detect	2.8	Discharge from steel and pulp mills; Erosion of natural deposits.
Fluoride	ppm[14]	4	1.8/4 [6]	229	1.2	0.2	2.4	237	1.0	0.5	2.0	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate	ppm[14]	10	10	2	3.4	3.0	3.7	2	3.4	3.2	3.6	Runoff from fertilizer use; Leaching from septic tanks; sewage; Erosion of natural deposits.
Selenium	ppb[15]	50	50	2	—	Non-Detect	0.5	2	—	Non-Detect	0.5	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.
Lead and Copper (based on 2002 sampling)												
Lead	ppb[15]	0	TT: 90% of tap water samples must be less than the Action Level of 15	50	7 [11]	Non-Detect	12	50	7 [11]	Non-Detect	12	Corrosion of household plumbing systems; Erosion of natural deposits.
Copper	ppm[14]	1.3	TT: 90% of tap water samples must be less than the Action Level of 1.3	50	—	0.01	0.42	50	—	0.01	0.35	
Disinfectants												
Chlorine	ppm[14]	MRDLG = 4.0[7]	MRDL =4.0[8] TT: Min. Redisual 0.3	2061	1.7	0.3	3.5	2130	1.6	0.8	3.5	Water additive used to control microbes.
Disinfection Byproduct Precursors												
Total Organic Carbon	ppm[14]			12	1.5	1.0	2.6	12	1.4	<1.0	1.7	Naturally present in the environment. Total organic carbon (TOC) has no health effects. However, TOC provides a medium for the formation of disinfection byproducts.
Total Organic Carbon	% Removal (Raw to Treated)			12	47	29	63	12	52	44	64	
Total Organic Carbon	Compliance Ratio		TT; Ratio of Actual % Removal to Required % Removal must be > or = to 1	12	1.6	1.3	2.6	12	1.5	1.0	2.6	
Disinfection Byproducts												
Total Trihalomethanes (TTHM)	ppb[15]	N/A[9]	80: Based on Running Annual Average of Quarterly Samples	32	39.4[10]	9	99	32	39.4[10]	9	99	Byproduct of drinking water disinfection. Forms due to reaction of chlorine with total organic carbon.
Bromodichloromethane	ppb[15]	0		16	8.3	3.5	18	16	8.6	4.4	14	
Dibromochloromethane	ppb[15]	60		16	2.0	0.7	4.3	16	2.6	0.9	5.2	
Haloacetic Acids (HAA5)	ppb[15]	N/A[9]	60: Based on Running Annual Average of Quarterly Samples	32	32.5[10]	8.6	85	32	32.5[10]	8.6	85	Byproduct of drinking water disinfection. Forms due to reaction of chlorine with total organic carbon.
Dichloroacetic Acid	ppb[15]	0		16	22	3.9	41	16	11	3.2	25	
Trichloroacetic Acid	ppb[15]	300		16	21	4.8	47	16	16	2.1	26	
Organic Chemicals												
Heptachlor	ppt[16]	0	400	4	—	Non-Detect	104	3	—	Non-Detect	—	Residue of banned pesticide.
Dichloromethane	ppb[15]	0	5	4	—	—	Non-Detect	1.7	—	Non-Detect	Non-Detect	
Radionuclides												
Gross Alpha	PCi/L[17]		15	1	—	2.4	2.4	1	—	Non-Detect	Non-Detect	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation.
Gross Beta	PCi/L[17]		50	1	—	2.8	2.8	1	—	3.4	3.4	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation

Table 2: Water Quality Results - Detected Secondary Substances[12]

			Brandywine Filter Plant				Porter Filter Plant				
Contaminant	Units	SMCL	# of Samples	Average	Range		# of Samples	Average	Range		Source
Conventional Physical and Chemical Parameters					Lowest	Highest			Lowest	Highest	
Aluminum	ppb[15]	50-200	1	—	4.1	4.1	1	—	5.7	5.7	A metal - Erosion of natural deposits.
Chloride	ppm[14]	250	238	59	40	96	242	59	40	89	Naturally occurring; road salt; Chemical additive to treat the water.
Color	Color Units	15	1	—	Non-Detect	Non-Detect	1	—	Non-Detect	Non-Detect	Iron and manganese; organic sources, such as algae.
Foaming Agents	ppm[14]	0.5	1	—	Non-Detect	Non-Detect	1	—	Non-Detect	Non-Detect	Industrial discharges of detergents or cleansing substances.
Iron	ppb[15]	300	10	12.7	6	24	10	23	6	46	Naturally occurring; Chemical additive to treat the water.
Manganese	ppb[15]	50	11	12	Non-Detect	17	11	15	Non-Detect	27	Naturally occurring.
Odor	Threshold Odor Number (TON)	3	1	—	Non-Detect	Non-Detect	1	—	Non-Detect	Non-Detect	Organic sources, such as algae.
pH	pH units	6.5-8.5	237	7.2	6.5	8.7	241	7.1	6.5	7.7	
Silver	ppb[15]	100	1	—	Non-Detect	Non-Detect	1	—	Non-Detect	Non-Detect	A metal - Erosion of natural deposits.
Sulfate	ppm[14]	250	1	—	18	18	1	—	20	20	Naturally occurring.
Total Dissolved Solids (TDS)	ppm[14]	500	1	—	250	250	1	—	220	220	Metals and salts naturally occurring in the soil; organic matter.
Zinc	ppb[15]	5000	47	214	7	1720	43	456	290	602	Naturally occurring; Chemical additive to treat the water.

Table 3: Other Primary Contaminants Tested, But Not Detected in 2003

Microbiological Organisms	cis-1,2-Dichloroethylene
Giardia	Dalapon
Cryptosporidium	Di(2-ethylhexyl) adipate
Inorganic Chemicals	Di(2-ethylhexyl) phthalate
Asbestos	Dinoseb
Beryllium	Dioxin
Cadmium	Diquat
Cyanide	Endothall
Mercury	Endrin
Nitrite	Epichlorohydrin
Thallium	Ethylbenzene
Organic Chemicals (including Pesticides and Herbicides)	Ethylene dibromide
1,1,1-Trichloroethylene	Glyphosate
1,1,2-Trichloroethylene	Heptachlor epoxide
1,1-Dichloroethylene	Hexachlorobenzene
1,2,4-Trichlorobenzene	Hexachlorocyclopentadiene
1,2-Dibromo-3-chloropropane (DBCP)	Methly tert Butyl Ether
1,2-Dichloroethane	Methoxychlor
1,2-Dichloropropane	o-Dichlorobenzene
2,4,5-TP (Silvex)	Oxamyl (Vydate)
2,4-D	p-Dichlorobenzene
Acrylamide	Pentachlrophenol
Alachlor	Picloram
Aldicarb	Polychlorinated Biphenyls (PCBs)
Aldicarb sulfone	Simazine
Aldicarb sulfoxide	Styrene
Atrazine	Tetrachloroethylene
Beno(a)pyrene	Toluene
Benzene	Toxaphene
Carbofuran	trans-1,2-Dichloroethylene
Carbon Tetrachloride	Trichloroethylene
Chlordane	Vinyl chloride
Chlorobenzene	Xylenes (total)

Key to Charts

[1] ....Primary parameters are contaminants that are regulated by a maximum contaminant level (MCL), because above this level consumption may adversely affect the health of a consumer.

[2] ....MCLG – Maximum Contaminant Level Goal is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow no margin of safety.

[3] ....MCL – Maximum Contaminant Level is 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.

[4] .... TT – Treatment Technique refers to the required process intended to reduce the level of a comtaminant in drinking water. EPA's surface water treatment rules require systems to (1) disinfect their water and (2) filter their water such that the specific contaminant levels cited are met. Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. Total organic carbon is regulated by a Treatment Technique that requires systems operate with enhanced coagulation or enhanced softening to meet specified percent removals.

[5] ....Unless otherwise indicated value given is a MCL.

[6] .... State limit is to not exceed 1.8 mg/L. Federal MCL is 4.0 mg/L.

[7] ....MRDLG – Maximum Residual Disinfectant Level Goal means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety.

[8] ....MRDL – Maximum Residual Disinfectant Level means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of health effects.

[9] ...."Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual comtaminants.

- HAA5 – dichloroacetic acid (zero), trichloroacetic acid (three)
- TTHM – bromodichloromethane (zero), bromoform (zero), dibromochloromethane (0.06 mg/L)"

[10] ....Cited average is **highest** combined (Brandywine & Porter Filter Plants) running annual average calculated from quarterly samples in 2003.

[11] ....Value given is not an average but the 90th Percentile Action Level.

[12] ....Secondary parameters are contaminants that are regulated by non-enforceable guidelines because the contaminants may cause non-health related cosmetic effects, such as taste, odor, or color.

[13] ....SMCL – Secondary Maximum Contaminant Level is the level of a physical, chemical or biological contaminant in drinking water above which the taste, odor, color or appearance (aesthetics) of the water may be adversely affected. This is a non-enforceable guideline which is not directly related to public health.

[14] ....ppm – parts per million

[15] ....ppb – parts per billion

[16] ....ppt – parts per trillion

[17] ....PCi/L – picocuries per liter

Highlighted and Bolded values indicate a violation occurred.

VIOLATIONS

Turbidity: In September of 2003, the Brandywine Filter Plant violated monthly turbidity requirements. We are required to have no more than 5% of monthly turbidity readings exceed 0.3 NTU. In September, 7% of monthly turbidity readings exceeded 0.3 NTU (93% were less than 0.3). Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

FUN & LEARNING ON THE WEB!

Jr. WaterWorks PAGES

Kids...

Want to play fun games and learn more about water? Go online to these really cool, kid-friendly sites!

www.EPA.gov

Click on *For Kids*

Explore the Environmental Kids Club site and be sure to click on Water to learn all about the steps in cleaning water to make it safe to drink.

www.lvwater.org

Click on *Get Dewey to the Delaware Game*

Click to spin the wheel and see how many spaces you can advance Dewey the Water Drop on his trip to the Delaware River. Then see if you get the answer right to a question on water.

Teachers...

Want to bring fun into the classroom as you help your students learn more about water? Try these sites!

www.discoveryschool.com

Grades K-12

Find K-12 lesson plans on water and great teaching tools like a video called "Water: To the Last Drop," plus a puzzle-maker, word lists and lots more.

www.USGS.gov/education

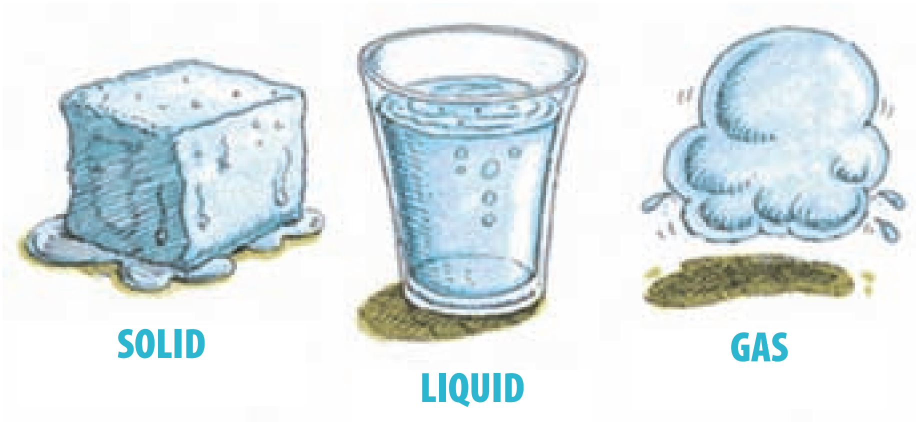
Click on *The Learning Web*

The U.S. Geological Society site is dedicated to K-12 education and lifelong learning on subjects about the Earth, such as land, water, plants, animals and maps.

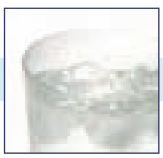
AMAZING WATER

(From the American Water Works Association web site at www.awwa.org)

Did you know that water can take on 3 different forms?

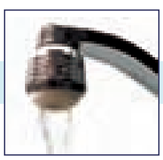


Pure water is tasteless, odorless and colorless.
It can exist in three different states: solid (ice), liquid, or gas (vapor).



SOLID WATER

Ice is frozen water. When water freezes, its molecules move farther apart, making ice less dense than water. This means that ice will be lighter than the same volume of water and so ice will float in water. Water freezes at 0° Celsius, 32° Fahrenheit.



LIQUID WATER

Liquid water is wet and fluid. This is the form of water with which we are most familiar. We use liquid water in many ways, including for washing and drinking.

WATER AS GAS

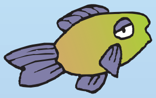
Water as a gas vapor is always present in the air around us. You cannot see it. When you boil water, the water changes from a liquid to a gas or water vapor. As some of the water vapor cools, we see it as a small cloud called steam. This cloud of steam is a mini version of the clouds we see in the sky. At sea level, steam is formed at 100° Celsius, 212° Fahrenheit.

TRIVIA QUESTION:

When water is stored in a cloud, it is in the form of a gas vapor.
How do you think the weather affects the form water will take as it returns to Earth?

ANSWER: When it is warm, water falls as raindrops. When it is cold, it falls as snow, hail or sleet.

Pure Water Begins with You



You can take a greater role in reducing contaminants before they enter our creeks, rivers and underground sources.

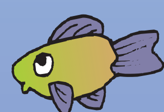
It only requires a few simple changes. Lend a hand by educating yourself, your family and neighbors about proper disposal of dangerous household chemicals, litter and other wastes.

1) **Dispose of dangerous household chemicals at DSWA collection sites.** Never pour dangerous household chemicals such as antifreeze, pesticides, oil and other hazardous materials down sink or storm water drains. These empty directly into our creeks and rivers during wet weather. Bins are provided at DSWA recycling and collection sites for the safe disposal of these materials.

2) **Don't litter.** Styrofoam, plastics and other debris can block storm drains and injure or kill fish and wildlife.

3) **Mulch or compost grass clippings.** Leave clippings on the lawn and sweep them off the street.

4) **Properly dispose of pet waste.** Pet waste should be retrieved and disposed of in the trash or flushed down a toilet.



5) **Watch for polluters.** Report illegal dumping or any unusual activity near water or storm drains to the Department of Public Works.

5 Simple Tips

In accordance with Title VI of the Civil Rights Act of 1964, state and federal law, "no person or group shall be excluded from participation, denied any benefits, or subjected to discrimination on the basis of race, color, national origin, age, sex, religion, handicap, and/or disability." General complaints or inquiries should be directed to: Affirmative Action Officer (302) 576-2460, and persons with disabilities may contact 504 Coordinator (302) 576-2460, City of Wilmington, Personnel Department, 4th Floor, 800 French Street, Wilmington, Delaware 19801. TDD is available at (302) 571-4568.

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