

## BUFFALO WATER BOARD MEMBERS

Victoria J. Saxon	Chairman
Warren Galloway	Vice Chairman
John R. Sole	Board Member
Ronald A. Carnevale	Board Member
James B. Milroy	Board Member
Patrick W. H. Wesp	Board Member
Charles E. McGriff	Board Member

Water Treatment Plant  
American Water Services, Inc.™  
2 Porter Avenue  
Buffalo, NY 14201

Billing Office  
American Water Services, Inc.™  
281 Exchange Street  
Buffalo, NY 14204

### Important Service Numbers

#### To Report Leaks:

Dispatch	851-4747
Dispatch	851-4748
Dispatch	851-4749

Billing and Customer Service Number	847-1065
--	----------

Meter Installations	852-0197
Meter Repair	851-4741

Service Inspections - Final Reads on Meter Inspectors	851-4782
--	----------

Filter Plant Control Room	851-4720
Filter Plant Laboratory	851-4704
Water Treatment Supervisor	851-4726

*City of Buffalo- Division of Water*  
Managed by



**American Water Services, Inc.™**

*An American Water Works Company*

# BUFFALO WATER AUTHORITY 2002 - 2003 WATER QUALITY REPORT



Managed by  
**American Water Services, Inc.™**  
**Anthony M. Masiello**  
Mayor

Joseph N. Giambra  
Commissioner of Public Works  
Victoria J. Saxon  
Chairperson, Buffalo Water Board

James Halliday  
Regional Manager, AWS, Inc.

James Campolong  
Project Manager, AWS, Inc.



Buffalo's Water Front

**Water is Life ... Don't Waste it!**

# Introduction

The following is the 9th annual water quality report prepared by the Buffalo Water Authority managed by American Water Services, Inc.™. The purpose of this report is to raise your understanding about drinking water and awareness of the need to protect our drinking water source. This report provides an overview of last years water quality. Included are details about where your water comes from, what it contains, and how it compares to State standards.

Last year our treatment process temporarily exceeded two drinking water standards. Filter monitoring equipment was not in place as of a January first deadline; this standard was satisfied by March. In July, water exceeding a turbidity standard entered our filters, although this water was fed to waste and not allowed to enter our drinking water, a turbidity standard was temporarily violated

If you have any questions about this report or concerning your drinking water, please contact:

Leonard Milioto

Water Treatment Supervisor

2 Porter Ave, Buffalo, NY 14201

Tel: (716) 851-4726, Fax: (716) 851-4672

We want you to be informed about your drinking water. If you want to learn more, please attend any regularly scheduled Water Board meetings. For times and location, please see the local newspaper.

For Health Issues contact:

Erie County Health Department

95 Franklin Street

Buffalo, NY 14202

(716) 858-7677

# The Future of Buffalo's Water Treatment

On September 1997 the City of Buffalo commissioned AmericanAnglian Environmental Technology (AAET) to manage the Buffalo Water Authority. AAET was a joint venture between American Water (the largest US water utility) and Anglian Water. Together, they operate over 1000 treatment plants, servicing 13 million people in 5 continent. In 1999 American Water took over Anglian Water's interest in AAET and the company was renamed American Water Services, Inc.™.

To insure continuing quality and safety in our communities' water supply, the Buffalo Water Board plans the following improvements to our treatment facility in 2003:

- ➔ Retrofit North Coag. Basin to double detention time and improve water quality.
- ➔ Filter bed rehabilitation: More effective filtration will increase water quality and lower its cost.
- ➔ Optimization of treatment to reduce cost.
- ➔ Metering program. Metering will encourage water conservation and curtail unaccounted water.
- ➔ Leak Detection. To reduce non revenue water usage and the amount of water treatment and pumpage needed to supply the city with water.



In 2003 rehabilitation of our filter beds will optimize water treatment

# Metering Program

This program has been mandated by New York State's Department of Environmental Conservation. In general, the water meter project will either replace existing meters or "convert" all flat rate water service to metered accounts using the most automated water meters available. These meters can be read from outside the home and accurately bill you for the amount of water that has been used, in the same way that you are currently billed by other utilities.

## FLAT RATE TO METERED BILLING CONVERSIONS IMPORTANT INFORMATION ABOUT YOUR NEW METER

**Maintenance** Your new meter should register and run without any problems for fifteen years or more. The City of Buffalo owns and maintains the meter only and will replace any meter that fails due to mechanical problems at no charge to you. There is a charge for repairing meters, cables or remotes that are damaged willfully or through the neglect of the property owner. Meters must be protected from freezing if they are located in an unheated area.

**Meter Reading** The remote reading device placed on the outside of your home allows us to accurately read the meter without entering your home. Please do not disturb the remote device or the wire between it and the meter, or place any objects directly in front of the remote device that would make access to this device difficult for the meter reader.

**Meter Billing** The City of Buffalo currently reads and bills metered accounts quarterly. Metered customers are billed for the actual amount of water used during the quarterly period; bills are processed and mailed within approximately 30 days following the previous quarter. Plans are currently being reviewed to change to monthly billing for metered customers; you will receive information about this change in the future.

**Billing Cycle** Depending upon the timing of your new meter installation, you may receive a flat rate bill for your property before the new-metered account is set up. If you have already received a flat rate bill, or receive one before the metered account is established, please disregard this bill. You will receive a notice from the billing department with information regarding any credits or monies owed on your flat rate account. Because of the time required to set up a new-metered account, it could take anywhere from 30 to 60 days to process this new account. Even though your first metered bill may be delayed, you will still only pay for the amount of water you actually used.

**Water Conservation** Conservation is one of the primary goals of the metering program. In order to conserve water, people must know how much water they actually use. To conserve water, and to keep your bills low, fix any leaky fixtures in your house or building. Additional conservation tips have been made available to you to help you better understand this important measure.

If you have any questions regarding your bill, please contact our customer service department at 847-1065.

# Abbreviations & Definitions

## Abbreviations & definitions of terms used in this report:

**MCLG (*Maximum contaminant level goal*):** The level of contaminant in drinking water below which there is no known or expected risk to health, MGLGs allow for a margin of safety.

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

**TT (*Treatment Technique*):** A required process intended to reduce the level of contamination in drinking water.

**AL (*Action Level*):** The concentration of a contaminant which, if exceeded, triggers a treatment or other requirement which a water system must follow.

**NTU (*Nephelometric Turbidity Units*):** A measure of clarity (turbidity) of water; turbidity in excess of 5NTU is just noticeable to the average person.

**Turbidity** is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system. State regulations require that turbidity must always be below 5 NTU. The regulations require that 95% of the turbidity samples collected have measurements below 0.5 NTU.

**ortho-phosphate:** A chemical blend used as a TT used to reduce the level of lead and copper contamination in drinking water.

**ppm:** Parts per million, or milligrams per liter (mg/L).

**n/a (NA):** Not any. **NLS:** No limit set. **ND:** Not Detected.

**ppb:** Parts per billion, or micrograms per liter (µg/L).

**TTHM (*Total Trihalomethane*):** Organic compounds, which are disinfection by-products of the chlorination of drinking water. Some people who drink water containing TTHMs in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

**90<sup>th</sup> % Value:** The value reported for lead & copper represents the 90<sup>th</sup> %. A % is a value on a scale of 100 that indicates the % of a distribution that is equal to or below it. The 90<sup>th</sup> % is equal to or greater than 90% of the lead & copper values detected at your water system.

# The History of Water Treatment

The need for a clean, reliable source of water has been a driving force of human civilization. Population centers would accumulate and grow around areas of clean water. Ancient humans recognized that a source of nearby water was a necessity. Its presence was essential to all life, not just for their own uses, but critical for the animals they hunted, and plants they harvested.

Only after the Dark Ages, due to advances in science and technology, was there a general realization that clean looking water was not necessarily safe water. Before the invention of the microscope, the idea of microscopic life was unimagined. Even with that tool it still took over 200 years before a connection between microbes and disease was made. In the mid 19th Century it was proven that cholera was spread by contaminated waters. By the late 19th Century, Louis Pasteur developed the particulate germ theory of disease, which finally established a cause and effect relationship between microbes and disease.

Filtration of water was established as a method of clarifying water in the 18th Century. In 1832 the first municipal water treatment plant was built in Scotland. Unfortunately the aesthetic properties of the water were the major concerns of the time, while effective water quality standards remained absent until the late 19th Century.

In the US, municipal water systems originated as early as 1799, by 1860 over 400 were in service providing water to major cities and towns. Because water quality standard were lacking, these systems contributed to major outbreaks of disease by spreading pathogenic organisms.

In the 1890's effective water treatment techniques began to develop. Coagulation and rapid sand filtration were instituted, which significantly reduced both turbidity and bacteria in water supplies. Chlorination of water was eventually introduced in 1908. Finally a community's water supply could, in fact, be considered safe.

Buffalo's water system history began in 1827, when the Buffalo & Black Rock Jubilee Water Works was formed. It supplied well and spring water through an assemblage of wooden pipes. In 1852 the Buffalo Water Works Co. formed, and pumped its water from the Niagara River. The City of Buffalo purchased both companies in 1868 and began construction of an Intake and tunnel system in the Niagara River. This location proved unfortunate. River turbulence and shoreline pollution caused a public outcry for a new intake. In 1913 this new intake was completed. It was located upstream from the original one, in Lake Erie's Emerald Channel. In 1914 Buffalo began chlorinating its delivered water, and in 1926 the Water Treatment Plant was built utilizing coagulation and filtration along with disinfection of its delivered water.

# More Water Saving Tips

## Leak Detection

☞ Check the small red (leak detection) dial, found between the 7 & 8 on the face of the new water meter. If this dial is turning when you think the water is not being used, this indicates a leak somewhere inside the house.

☞ Check for leaks from faucet. A slow drip can waste 15 to 20 gallons a day, fix it and save 6,000 gallons per year. Most leaks are caused by worn out washers, which often can be repaired by the home owner.

☞ Check for leaks from toilet tanks by putting a few drops of food coloring in the tank. Without flushing; wait 10 to 15 minutes; if the color shows up in the bowl, you have a leak. It's possible to lose up to 100 gallons a day from an "invisible leak", that's more than 30,000 gallons per year. Nearly 90% of all residential leaks are caused by leaks from toilet tanks.

☞ Check for leaks from tub faucets and showers. Replacing old shower heads with low flow models can save 5 to 10 gallons per minute.

☞ Detect for leaks on service lines by listening for a "hissing" noise at your water meter when no water is being used inside the house. You could have a water line that goes to another building, such as: (1) front house to rear building; (2) house to garage. If you suspect a problem, you should contact your plumber to check this out.

\* Note that water loss due to leaks in a multi-family building are multiplied by the number of units in the complex.

Water Loss In Gallons					
Leak this Size	Loss Per Day	Loss Per Month	Leak this Size	Loss Per Day	Loss Per Month
•	120	3,600	●	6,640	199,520
•	300	10,800	●	6,964	209,520
•	693	20,790	●	8,424	252,720
•	1,200	36,000	●	9,585	296,640
•	1,920	57,600	●	11,324	339,720
•	3,095	92,880	●	12,750	361,600
•	4,295	128,880	●	14,952	448,560

# Water Conservation

Water is a vital and limited resource. It is crucial to conserve water. Between the years 1980 and 2000 Americans have more than doubled their water usage. In many areas severe shortages already exist. We must learn to conserve water now, to avoid severe shortages in the future.

By saving water you can also reduce your water, sewer, and utility bills while easing the burden on water storage, purification, distribution, and treatment.

There are four basic ways to save water: economize, repair leaks, install water-saving devices, reuse water.

## Water Saving Tips

The following are some water saving suggestions that you may find useful:

➤ **Dishwashing:** Wash dishes in standing water after you wipe grease off dishes with a paper towel or cloth. Turn off faucet frequently, and you will save over 20 gallons of water a day. Soak pots and pans before washing.

➤ **Tooth-brushing:** Don't let water run while you brush your teeth. Rinse your mouth with water in a glass and you will save over a gallon of water each time you brush.

➤ **Shower & Bath:** Plug the drain before you run water. Take shallow baths. Keep showers short with pressure at low force. Bathe small children together. Reuse bath water to water lawns and shrubs, and for heavy cleaning jobs (e.g. floors, cars, etc.).

➤ **Sink:** Fill bowl with water instead of letting water run when you wash or shave. Try a faucet aerator to reduce the amount of water used.

➤ **Toilet:** Flush only when necessary. Don't use as a wastebasket for cigarette butts or disposable diapers. Install water saving displacement devices.

➤ **Laundry:** More than 10% of all water used in the home is used in the washing machine. Use the load selector to match water level to size of load. Try to wash full loads whenever possible. Presoak heavily soiled items. If buying a new washing machine, choose one with conservation features.

➤ **Cleaning:** Use a pail or basin instead of running water. Use sponge mops instead of string mops (uses less water for mopping and takes less water to keep clean).

➤ **Lawn & Garden:** Water slowly and thoroughly during cool, shady, and windless times of the day. Let grass grow taller in hot weather. Use judicious amounts of mulch in the garden and around shrubs to conserve moisture. Plant shrubs that don't need a lot of watering.

➤ **Car Washing:** Wet car quickly, turn hose off, wash car from a bucket of soapy water, and rinse quickly with hose. Used water is fine for cleaning chrome, hubcaps, and wheels.

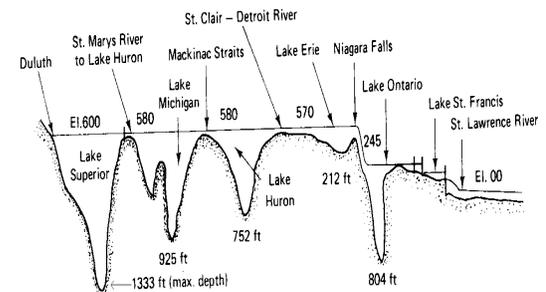
# Raw Water Source

The source of all Buffalo's water is Lake Erie. Lake Erie is the shallowest of the Great Lakes, with an average depth of only 85-ft. It also has the shortest detention time of the Great Lakes. Water remains in the lake for only 2.6 years before it is replaced by fresh water (as compared with 191 years in Lake Superior or 22.6 years in Lake Huron). It is also the siltiest of the Great Lakes. Its bottom consists of finely graded sand, easily upset during turbulent storms.

The combination of its shallowness, short detention time and sandy unstable bottom bestows a great asset upon this body of water. The lake is able to quickly flush itself of harmful contaminants such as pesticides and other organic wastes. When Lake Erie becomes turbulent, fine particles of sand and silt become agitated and suspended throughout the lake. Organic contaminants will tightly cling to these particles and will be quickly flushed from the lake. Therefore water treatment begins as a natural process due to the structure and makeup of Lake Erie.

### Lake Erie Facts and Figure

Length: 241 miles, Width: 57 miles, Avg. Depth: 62', Max Depth: 210', Vol.: 116 miles<sup>3</sup> Surface area: 9,910 miles<sup>2</sup>, Drainage Basin Area: 30,140 miles<sup>2</sup>, Shoreline: 871 miles, Elevation: 569', Outlet: Niagara River & Welland Canal.



# Water Treatment



Emerald Channel Intake

Buffalo's water intake is located in Lake Erie at the mouth of the Niagara River. This region is known as the Emerald Channel, due to the sparkling clarity of the water. The water is gravity fed through a 12 x 12-foot conduit to an onshore screen house. There traveling screens remove large objects such as sticks and other debris that can damage pumps.

Gravity delivers the water through a conduit where chlorine, fluoride, and polyaluminum chloride (PACl) are added. Chlorine is used to disinfect the water, control zebra mussels and other organisms. Fluoride is added to guard against tooth decay. PACl is a chemical coagulant designed to cause fine particles in the water to bind together forming floc.

Pumps direct the rushing water to an underground basin for flocculation and sedimentation. Here the water is mixed by mechanical flocculators (large paddles) and travels to the settling basins where debris in the water is allowed to settle out by gravity.

The water, still containing light floc, is directed over rapid sand filter beds where filtration occurs, removing fine floc. A filter aid (a non-ionic polymer) is added, when necessary, to enhance filtration.

As the water leaves the plant, a corrosion control additive (a sodium orthophosphate blend) is used. This serves as a shield against lead leaching into the water from aged residential water pipes and service lines.

The quality and safety of the water is tested by an in house laboratory at every stage of the treatment process. The final product is pumped through the water mains to the community, where further tests are conducted from samples taken throughout the city, including private homes, businesses and public facilities ensuring that water continues to remain high in quality and safety, at your tap.

# Consumer Tips

## → Appearance

■ If your cold tap water appears brown or red it is probably mineral deposits (tuberculation) in your water caused by:

- ◆ a water main break
- ◆ water or sewer workers flushing fire hydrants
- ◆ vibrations caused by construction
- ◆ children playing with fire hydrants

To report these problems, call the water dept. at 851-4704 or 851-4749. Once the reason has been identified and the disruption of the water main has ceased, run your cold water tap until it clears.

■ If your water appears cloudy in winter or early spring it is most likely trapped air. Cold water has a much greater capacity to hold gas than warm water, and if this tendency is combined with a faucet aerator, your water may appear cloudy due to air bubbles. If the water is allowed to sit for a short while, the bubbles will eventually rise to the surface and dissipate.

## → Taste & Odor

■ After chlorination there remains minute amounts of chlorine in tap water known as residual chlorine. This residual is necessary to kill pathogenic organisms in the water. Many consumers dislike the inherent taste. The following are some ways to eliminate or improve this taste:

▲ Expose water, in a clear uncapped bottle, to sunlight for one hour, and the smell of chlorine will be removed.

▲ Cool water to less than 60°F in the summer. Cool water definitely tastes better. If the smell of chlorine is removed before cooling, the taste will be much better.

▲ Leave water in a kettle overnight. The smell of chlorine will be removed.

▲ Boil water for 5 minutes in a kettle with the lid off, cool to room temperature, then place in a refrigerator with the lid on, but not air tight, until cool.

▲ A well-maintained point-of-use charcoal filter will eliminate the smell of chlorine.

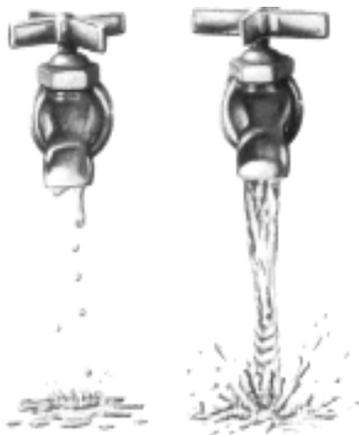
---

# Drinking Water Standards

The Synthetic Organic Compounds listed below were tested for in our 2002 finished water, but were not detected. No MCL has been assigned to these SOC's

2,4,5-T	ACENAPHTHENE	2,3-DICHLOROBIPHENYL
2,4-DB	ACENAPHTHYLENE	2-4-DINITROTOLUENE
4,4'-DDE	ACETOCHLOR	2-6-DINITROTOLUENE
4,4'-DDT	ACIFLUORFEN	2-CHLOROBIPHENYL
BENTAZON	ANTHRACENE	alpha-CHLORDANE
BROMACIL	CYANAZINE	BENZO(A)ANTHRACENE
CHRYSENE	DICHLORPROP	BENZO(B)FLUORANTHENE
DACTHAL	FLUORANTHENE	BENZO(g,h,i)PERYLENE
EPTC	METHIOCARB	BENZO(K)FLUORANTHENE
FLUORENE	NAPHTHALENE	BUTYLBENZYLPHTHALATE
MOLINATE	PHENANTHRENE	DIETHYLPHTHALATE
PROMETON	PROPAZINE	DIMETHYLPHTHALATE
PYRENE	THIOBENCARB	DI-N-BUTYLPHTHALATE
TERBACIL	TRIFLURALIN	trans-NONACHLOR
2,2',3,3',4,4',6-HEPTACHLOROBIPHENYL		
2,2',3,3',4,5',6,6'-OCTACHLOROBIPHENYL		
2,2',3,4',6-PENTACHLOROBIPHENYL		
2,2',4,4',5,6'-HEXACHLOROBIPHENYL		
2,2',4,4'-TETRACHLOROBIPHENYL		
2,4,5-TRICHLOROBIPHENYL		
3,5-DICHLOROBENZOIC ACID		
DIBENZO(a,h)ANTHRACENE		
INDENO(1,2,3-cd)PYRENE		

TRihalOMETHANES for 2002	MCL ppb	# of samples	Avg ppb	Min ppb	Max ppb
BROMOFORM	50	20	ND	ND	ND
BROMODICHLOROMETHANE	50	20	9.2	4.3	13.8
CHLORODIBROMOMETHANE	50	20	3.9	2.4	6.0
CHLOROFORM	50	20	16.3	5.9	28.6
TOTAL TRIHALOMETHANES	80	20	29.4	12.7	48.1



# Water Distribution

Water is essential for all life. Besides drinking, bathing and recreation, water is used to fight fire, and has countless industrial applications. The City of Buffalo treated 36 billion gallons last year with an average of 99 million gallons each day to a population of approximately 310 thousand people, covering 46 square miles of piping network. This water must be transported, after treatment, throughout the city. Pumps transport the treated water from a 28 million-gallon clear well, located below the filter beds, through two large conduits. The water travels through 800 miles of pipes and 25,000 valves to 90,000 service connections and 7,800 fire hydrants.

This enormous network of pipes, valves, service connections and hydrants is maintained, day and night, throughout all seasons. In the past year the Buffalo Water Authority has replaced or renovated approximately 1.3 miles of water mains.



# Customer Costs

Historically our customer's billing rates have been among the lowest in the region. The average water bill is only \$230 per year. Buffalo charges \$1.51/1000 gal for up to 74,793 gal purchased; \$1.34/1000 gal for purchases between 74,805 and 269,300 gal; and \$1.02/1000 gal for purchases over 279,300 gal. Seniors receive reduced rates of 91¢, 80¢ & 30¢ respectively. The total quarterly bill includes the cost of water used and the service charge. Quarterly service charges are as follows:

Meter	Regular Rate	Senior Rate	Meter	Regular Rate*
5/8"	\$ 4.07	\$ 8.46	3"	\$ 211.41
3/4"	\$ 21.15	\$ 12.72	4"	\$ 352.35
1"	\$ 35.25	\$ 21.15	6"	\$ 704.70
1-1/2"	\$ 70.47	\$ 42.30	8"	\$ 1,127.52
2"	\$ 112.74	\$ 67.65	10"	\$ 1,620.81

\* Senior Rate not applicable for meters over 2"

# Source Contamination

There are many ways contaminants can be introduced into a drinking water source. Potential sources of drinking water contamination may be divided into four main groups: (1) Commercial/Industrial, (2) Residential/Municipal, (3) Agricultural/Rural, (4) Miscellaneous (Underground Injection Control/Naturally Occurring). For a complete list of potential source and corresponding contaminants, please contact the Buffalo Water Authority at: Tel: (716) 851-4726, Fax:(716) 851-4672 or go to internet website: <http://www.epa.gov/ogwdw/swp/sources1.html>

◆ **Commercial/Industrial:** May include storage tanks, discharges due to industrial activity, construction/demolition activities, waste dumps/landfills/junk yards, mines/gravel pits and research labs.

◆ **Residential/Municipal:** Discharges due to industrial/municipal activity (e.g. airports), apartments, campgrounds, cesspools, septic systems, sewer lines, landfills/dumps, storm-water infiltration basins, Water & Wastewater Treatment Facilities.

◆ **Agricultural/Rural:** Discharges due to boarding stables, wildlife feeding, fertilized crops, dairy operations, rural homesteads, wastewater lagoons, grazing lands, pesticides/fertilizer storage and drainage wells.

**Miscellaneous Sources of contamination:** Naturally occurring contaminants (e.g. lead copper fluoride, etc.), abandoned drinking wells, deep ground water wells, deep ground oil/gas wells and injection of water/steam into mineral formations for extraction.



Agrochemical have increased farm production while saving time and labor to control pests. But their downside is chemical contamination of source waters from run off.

# Drinking Water Standards

The SOC's listed below were tested for in our Finished Water in 2002, but were not detected. All MCL are in ppb

SOC	MCL	SOC	MCL	SOC	MCL
2,4-D	70	2,4,5-TP	10	ALACHLOR	2
ALDRIN	5	PCB 1016	0.5	ALDICARB	3
DCPA	200	PCB 1221	0.5	ATRAZINE	3
DICAMBA	50	PCB 1232	0.5	BUTACHLOR	50
DINOSEB	7	PCB 1242	0.5	CARBARYL	50
DIQUAT	20	PCB 1248	0.5	CHLORDANE	2
ENDRIN	2	PCB 1254	0.5	DALAPON	200
LINDANE	0.2	PCB 1260	0.5	DIELDRIN	5
OXAMYL	200	PCB 1262	0.5	ENDOTHALL	100
HEXACHLOROBENZENE		1	GLYPHOSATE		700
PENTACHLOROPHENOL		1	METHOMYL		50
ETHYLENE DIBROMIDE		0.02	METRIBUZIN		50
HEPTACHLOR EPOXIDE		0.2	PICLORAM		500
ALDICARB SULFOXIDE		4	SIMAZINE		4
HEPTACHLOR		0.4	TOXAPHENE		3
3-HYDROXYCARBOFURAN					50
ALDICARB SULFONE					2
BENZO(A)PYRENE					0.2
CARBOFURAN					40
DI(2-ETHYLHEXYL)ADIPATE					400
DI(2-ETHYLHEXYL)PHTHALATE					6
DIBROMOCHLOROPROPANE					0.2
HEXACHLOROCYCLOPENTADIENE					50
METHOXYCHLOR					40
METOLACHLOR					50
PROPACHLOR					50

## Drinking Water Standards

Other Volatile Organic Compounds listed below were tested for in 2002 in our Finished Water, but were not detected.

DIOXIN	1-CHLOROBUTANE
ACETONE	2-NITROPROPANE
2-BUTANONE	ALLYL CHLORIDE
2-HEXANONE	METHYLACRYLATE
NITROBENZENE	HEXACHLORETHANE
ACRYLONITRILE	TETRAHYDROFURAN
DIETHYL ETHER	CARBON DISULFIDE
METHYL IODIDE	PENTACHLOROETHANE
PROPIONITRILE	CHLOROACETONITRILE
ETHYL METHACRYLATE	
METHYL METHACRYLATE	
METHYLACRYLONITRILE	
4-METHYL-2-PENTANONE	
1,1-DICHLOROPROPANONE	
1,2,3-TRICHLOROBENZENE	
1,2,3-TRICHLOROPROPANE	
tert-AMYL METHYL ETHER	
tert-BUTYL ETHYL ETHER	
trans-1,3-DICHLOROPROPENE	
trans-1,4-DICHLORO-2-BUTENE	

The Volatile Organic Compounds listed below were tested for in 2002 in our Finished Water, all MCL are 50 PPB

VOC	Range
BROMODICHLOROMETHANE	3.4 - 12.4
CHLOROFORM	3.2 - 19.5
DIBROMOCHLOROMETHANE	1.6 - 4.2

## Facts About Cryptosporidium

*Cryptosporidium* is a parasite that lives and multiplies in the intestines of warm-blooded animals. Its eggs are shed through feces, where they can enter lakes, reservoirs and other sources of drinking water. When exposed to adverse conditions, these eggs can form a spore so rugged that they become impervious to even concentrated bleach.

Once the spore is ingested, an intestinal illness called *Cryptosporidiosis* may result. The incubation period may range from 1 - 12 days. *Cryptosporidium* can be spread by person-to-person, or animal-to-person contact, and by drinking contaminated water.

Human *Cryptosporidiosis* was first reported in 1976. The primary symptom is acute diarrhea. Other symptoms include abdominal pain, vomiting, headache, loss of appetite and a low-grade fever.

Some persons infected with *Cryptosporidium* will not become ill, but others may be especially susceptible to *Cryptosporidiosis*. In most individuals with normal immune systems, symptoms generally persist for two weeks or less. But immunocompromised persons, including individuals receiving chemotherapy and kidney dialysis patients, persons on steroid therapy, and those with Crohn's disease or HIV/AIDS, may have severe and long-lasting illness.

Properly operated water treatment procedures are effective in providing a barrier to *Cryptosporidium* and other pathogenic microorganisms from reaching the distribution system. Due to their high resistivity to chlorine, normal disinfection methods are ineffective against these parasites. Proper filtration of these small tough organisms, including the coagulation and sedimentation processes, is the most important vehicle in their control and elimination.

*Cryptosporidium* is spread through contact with fecal matter. One can minimize the risk of acquiring and spreading this parasite by cleansing hands after fecal contacts such as after toilet use, diaper changing and picking up pet waste. Since cattle are a common source, avoid drinking raw milk, and cleanse hands after contact with any farm animals. Avoid drinking unfiltered water, and comply with any water advisory issued by local and state authorities. If uncertain about the quality of a water supply, exposing water to a rolling boil for at least one minute will kill *Cryptosporidium*.

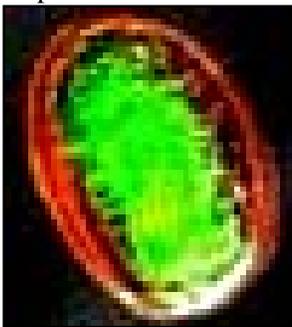
Bottled water, unless distilled or certified for cyst removal may contain *Cryptosporidium*. Current standards for bottled water do not guarantee that it be *Cryptosporidium*-free.

If home water filters are used, filters should have a pore size of less than 2 microns. Home filters should be certified for cyst removal by the National Sanitation Foundation (NSF; Standard #53).

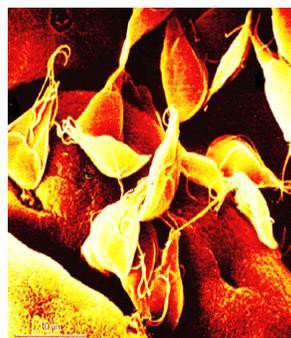
# Facts About Giardia

*Giardia* is a microbial pathogen present in varying concentrations in many surface waters and ground water under the influence of surface water. It is removed/inactivated through a combination of filtration and disinfection or by disinfection. From 7/97 – 12/98, as part of the Information Collection Rule, 18 monthly samples were collected and analyzed for *Giardia* cysts in our source water. 3 samples were presumed positive for *Giardia*, but none were confirmed. Therefore, our monitoring indicated the presence of *Giardia* in our source water. It was tested for on 11/95 in the treated water that goes to your tap and was not found.

Ingestion of *Giardia* may cause giardiasis, an intestinal illness. People exposed to *Giardia* may experience mild or severe diarrhea, or in some instances no symptoms at all. Fever is rarely present. Occasionally, some individuals will have chronic diarrhea over several weeks, with significant weight loss. Giardiasis can be treated with anti-parasitic medication. Individuals with weakened immune systems should consult with their health care provider about what steps would best reduce their risks of becoming infected. Anyone who thinks they may have been exposed to Giardiasis should contact their health care provider immediately. The *Giardia* parasite is passed in the feces of an infected person or animal and may contaminate water or food. Person to person transmission may also occur in day care centers or other settings where hand washing practices are poor.



Microscopic view of giardia



Giardia invading human intestines

# Drinking Water Standards

The EPA Regulated Volatile Organic Compounds listed below were tested for in 2002 in our Finished Water, but were not detected.

BENZENE	VINYL CHLORIDE
ETHYLBENZENE	1,2-DICHLOROETHANE
STYRENE	1,2-DICHLOROPROPANE
TOLUENE	DICHLOROMETHANE
XYLENES	TRICHLOROETHYLENE
1,1,1-TRICHLOROETHANE	
1,1,2-TRICHLOROETHANE	
1,1-DICHLOROETHYLENE	
1,2,4-TRICHLOROBENZENE	
1,2-DIBROMO-3-CHLOROPROPANE	
1,2-DIBROMOMETHANE	
1,2-DICHLOROBENZENE (ORTHO)	
1,4-DICHLOROBENZENE (PARA)	
CARBON TETRACHLORIDE	
CHLOROBENZENE (MONO)	
cis-1,2-DICHLOROETHYLENE	
TETRACHLOROETHYLENE	
trans-1,2-DICHLOROETHYLENE	

The EPA Unregulated & other Volatile Organic Compounds listed below were tested for in 2002 in our Finished Water, but were not detected.

2-CHLOROTOLUENE	1,1-DICHLOROETHANE
4-CHLOROTOLUENE	1,1-DICHLOROPROPYLENE
BROMOBENZENE	1,1-DICHLOROPROPENE
BROMOMETHANE	1,2,4-TRIMETHYLBENZENE
CHLOROETHANE	1,3,5-TRIMETHYLBENZENE
CHLOROMETHANE	1,3-DICHLOROPROPANE
DIBROMOMETHANE	2,2-DICHLOROPROPANE
NAPHTHALENE	4-ISOPROPYLTOLUENE
n-BUTYLBENZENE	BROMOCHLOROMETHANE
n-PROPYLBENZENE	HEXACHLOROBUTADIENE
sec-BUTYLBENZENE	ISOPROPYLBENZENE
tert-BUTYLBENZENE	METHYL tert-BUTYL ETHER
1,1,1,2-TETRACHLOROETHANE	
1,1,1,2,2-TETRACHLOROETHANE	
1,2,3-TETRACHLOROBENZENE	
1,2,3-TETRACHLOROPROPANE	
1,3-DICHLOROBENZENE (META)	
cis-1,3-DICHLOROPROPYLENE	
DICHLOROFLUOROMETHANE	
trans-1,3-DICHLOROPROPYLENE	
TRICHLOROFLUOROMETHANE	

# Drinking Water Standards

ENTRY POINT PARAMETERS	MCL	AVG	UNITS	RANGE	# OF TESTS
pH	n/a	7.6	SU	7.4 - 7.9	1334
ALKALINITY	n/a	88	PPM	74.2 - 94.9	24
CALCIUM HARDNESS	n/a	84.8	PPM	82 - 88	24
FREE CHLORINE	5	1.03	PPM	.68 - 1.29	2432
TOTAL CHLORINE	n/a	1.26	PPM	0.9 - 1.68	1328
FLUORIDE	2.2	0.85	PPM	.06 - 1.3	2245
TOTAL DISSOLVED SOLIDS	n/a	166	PPM	145 - 178	20
TOTAL SOLIDS	n/a	183	PPM	140 - 222	20
TURBIDITY	TT<0.5	0.11	NTU	.03 - .22	2442
COLIFORM	<1	ND	count/ml	n/a	196
HETEROTROPHIC BACTERIA	<500	1	count/100ml	0 - 16	102

2002 ENTRY POINT RESULTS				
INORGANICS	MCL	RESULTS	UNIT	DATE
ALUMINUM	0.2	0.042	ppm	4/8/02
BARIUM	2	0.022	ppm	4/8/02
CALCIUM	n/a	32.0	ppm	4/8/02
FLUORIDE	2	1.0	ppm	4/8/02
MAGNESIUM	n/a	9.0	ppm	4/8/02
MOLYBDENUM	n/a	0.001	ppm	4/8/02
NITRATE-N	10	0.320	ppm	5/13/02
NITRITE-N	1	0.005	ppm	5/13/02
SODIUM	n/a	10.0	ppm	4/8/02
STRONTIUM	n/a	0.157	ppm	4/8/02
SULFATE	250	24.0	ppm	4/8/02

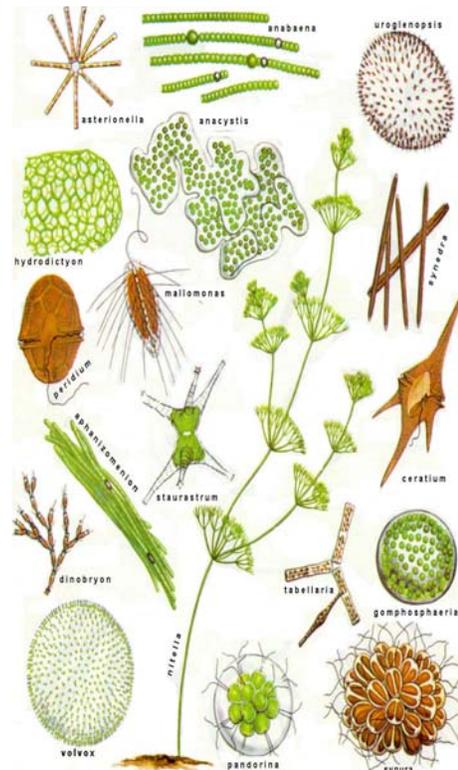
THESE INORGANICS WERE TESTED FOR BUT NOT FOUND IN OUR FINISHED WATER IN 2002		
BORON	ANTIMONY	BERYLLIUM
COBALT	ARSENIC	CHROMIUM
IRON	CADMIUM	MANGANESE
LEAD	COPPER	PERCHLORATE
NICKEL	CYANIDE	POTASSIUM
SILICA	MERCURY	SELENIUM
SILVER	THALLIUM	VANADIUM

# Aesthetic Qualities

Taste and odor is one component of drinking water's aesthetic quality. The Water Authority in recent years has been experiencing some of the worst episodes of summer taste and odor in its 70-year history. Although water sometimes has a taste and odor, it is 100% safe to drink.

Decaying vegetation and byproducts of microbes are probably the most universal sources of taste and odor problems in surface water. The organisms most often linked to taste and odor problems are the filamentous bacteria *actinomyces* and the blue-green algae.

Two highly studied by-products of *actinomyces* and the blue-green algae are geosmin and methylisborneol (MIB). These compounds are responsible for the common earthy-musty odors in water supplies and have been isolated from many genera of *actinomyces* and the blue-green algae. Both geosmin and MIB can have odor threshold concentrations of less than 10 parts per trillion.



Taste & Odor Algae

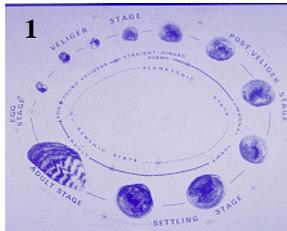
# Zebra Mussels

The zebra mussel is a small freshwater shellfish native to the Black & Caspian seas of western Russia. They were introduced into European waters in the 18th Century. By 1986 the mollusks were transported to North America from freshwater European ports, through the discharge of ballast tanks from international shippers.

They are prolific breeders. Each female can produce up to 40,000 eggs each year. Using elastic-like fibers they can attach to any hard surface and quickly colonize large areas, reaching densities of more than 100,000 per square meter. They feed by filtering water containing microorganisms through their gill system.

Once the zebra mussels invaded Lake Erie they spread like wildfire. Their impact on Lake Erie has been profound. Nearly all particulate matter is strained from the lake's water. Uneaten suspended matter is bound with mucous and amassed among the shells in its immense colonies. Because of this filtering activity, the clarity of Lake Erie has greatly improved, allowing light to penetrate much deeper, and with much greater intensity than ever before.

Unfortunately this phenomenon has serious consequences to the lake's ecosystem and water quality. Besides severely affecting the aquatic food chain, this increase in light intensity causes the foul summertime taste and odor problem. The additional light entering the lake causes a steep acceleration in the blue-green algae growing cycle, the main source of taste and odor problems.



(1) Life cycle of the zebra mussel; (2) Zebra mussel close-up; (3) beach wash-up of zebra mussels

# Drinking Water Standards

The Safe Drinking Water Act (SDWA) was passed in 1974 because of congressional concerns about organic contaminants in drinking water and uneven state supervision of public drinking water supplies. Last year we conducted over 15000 tests for over 80 drinking water contaminants. No contaminants detected were in violation of a Maximum Contaminant Level (MCL), a Treatment Technique (TT), or exceeding an Action Level. (AL).

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. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

SOURCE WATER PARAMETERS FOR 2002				
PARAMETER	UNITS	AVG.	RANGE	# OF TESTS
pH	SU	8.0	7.8 - 8.6	1333
ALKALINITY	PPM	93.4	86 - 103	24
CALCIUM HARDNESS	PPM	90.5	88 - 96	24
FLUORIDE	PPM	0.01	0 - .15	235
TOTAL DISSOLVED SOLIDS	PPM	160	122 - 186	20
TOTAL SOLIDS	PPM	192	135 - 233	20
TURBIDITY	NTU	7.0	.614 - 144	2426
COLIFORM	count/ ml	59	0 - 1000	193
HETEROTROPHIC BACTERIA	count/ 100ml	61	0 - 1300	153