2004 – 2005 ANNUAL
WATER QUALITY REPORT
BUFFALO WATER AUTHORITY
PWS ID # NY0000422

City of Buffalo-Division of Water
Managed by
American Water

Anthony M. Masiello
Mayor

Joseph N. Giambra
Commissioner of Public Works

Victoria J. Saxon
Chairperson, Buffalo Water Board

Stephen Siegfried
Regional Manager, American Water

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Project Manager, American Water

Buffalo's Water Front
Water is Life … Don't Waste It!

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BUFFALO WATER AUTHORITY INFORMATION

Buffalo Water Board

Victoria J Saxon
Chairman

Warren Galloway
Vice Chairman

David Comerford
Ronald F Mandell
Charles E McGriff
James B Milroy
John R. Sole

Board Members

Important Service Numbers

Billing Office:	**716 – 847 - 1065**	**For billing questions & service problems**
Customer Service		
To Report Leaks:	**716 – 851 - 4747**	**Dispatch**
	716 – 851 - 4748	
	716 – 851 - 4749	
Meter Installations	**716 – 852 - 0197**	
Meter Repair	**716 – 851 - 4741**	
Service Inspections	**716 – 851 – 4782**	**Final reads on meter**
Water Treatment Plant	**716 – 851 – 4720**	
Water Treatment Plant Laboratory	**716 – 851 - 4704**	**Water quality complaints & questions**
Water Treatment Supervisor	**716 – 851 - 4726**	
Erie County Dept. of Health	**716 - 858 - 7677**	**For health issues**
City of Buffalo Web site: http://www.ci.buffalo.ny.us/		

Billing & Customer Service
American Water
281 Exchange Street
Buffalo, NY 14204

Water Treatment Plant
American Water
2 Porter Avenue
Buffalo, NY 14201
PWS ID # NY0000422

Introduction

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien

The following is the 11th annual water quality report prepared by the Buffalo Water Authority managed by American Water. 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 year's water quality. Included are details about where your water comes from, what it contains, and how it compares to State standards. We are pleased to provide you with this information because informed customers are our best customers.

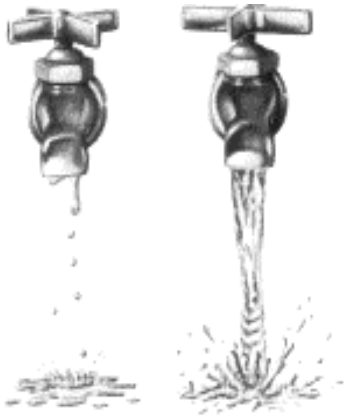
Last year, your tap water met all state and federal drinking water health standards. We are proud to report that our system did not violate a maximum containment level or any other water quality standard. During 2004, our system was in compliance with all applicable state drinking water operating, monitoring and reporting requirements.

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

Abbreviations & Definitions

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

Backwash, Backwash Water: A backward flow of water through a filter bed, allowing trapped debris and floc to be cleared from the filter media.

Backwash Station: An area, just downstream from the equalization station, where backwash water, from the filter cleaning process, is pumped to the Thickener Tanks.

Chlorine: A highly reactive gas, used as a disinfectant in water treatment.

Clearwell: A finished water storage area. Filtered water enters the Clearwell from the filter beds. Clearwell water is pumped to the distribution system, once it is treated with orthophosphate.

Coagulant: A material, such as PACl (polyaluminum chloride), which will form a precipitate in water, and cause the agglomeration of finely divided particles into larger particles, which can then be removed by settling and/or filtration.

Coliform, Coliform bacteria: A group of bacteria that are normally abundant in the intestinal tracts of human and other warm-blooded animals and are used as indicators (being measured as the number of individuals found per 100 milliliter of water) when testing the sanitary quality of water.

Contaminant: Any physical, chemical, biological, or radiological substance or matter in water that may be harmful to human health or which degrades the palatability of water.

Decant: The draw off from the upper layer of liquid after the heaviest material has settled

Disinfection, Disinfectant: is a treatment, which destroys or renders inactive, harmful microorganisms (bacteria, viruses and cysts) to levels deemed to be safe by public health standards; viable microorganisms may still be present.

Disinfection By-Products (DBP): Byproducts of the disinfection of water by chlorine and chlorine compounds. DBP are regulated by the EPA because they are considered harmful in concentrated amounts. Trihalomethanes (THM's) and Halogenated Acetic Acids (HAA's) are among the most regulated DBP's.

Back to:

Distribution System: The system of pipes and valves supplying water to communities and industries.

Abbreviations & Definitions continued

Equalization Basin: An area upstream from the filter beds that collects backwash water from the filter cleaning process. The backwash contents from the equalization basin are directed into the backwash station. .

Filter Beds: 40 rapid, anthracite sand, filters designed to remove undissolved or suspended particles from water by recirculating the water through anthracite media. Filtered water is directed into the Clearwell to await distribution demand.

Filter Aid: A nonionic polymer used to "tighten" filters, and improve filtration. A filter aid is only used, when necessary.

Floc: The clumps or tufts formed when suspended particles combine with chemical substance or compound that promotes the combination, agglomeration, aggregation or coagulation of suspended particles in the water.

Flocculation Chambers: Chambers with large, slow moving paddles. The slow mixing action promotes floc formation.

Fluoride: Sodium silicofluoride, a fluoride compound added to drinking water, to promote dental health.

Back to: Treatment;

HAA (Halogenated Acetic Acids): Organic compounds, which are disinfection by-products of the chlorination of drinking water, currently the EPA lists HAA's as a health advisory

Intake: A structure located in the Emerald Channel at the Northeastern portion of Lake Erie, just downstream from the Niagara River, which provides source water for Buffalo Water Authority's water treatment process.

Low Lift Pumps: Centrifugal pumps that direct water from the raw water conduit to the underground flocculation and settling basins.

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

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

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant (chlorine) allowed in drinking water (4.0 ppm). There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Abbreviations & Definitions continued …

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

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

Ortho- phosphate: A chemical blend used as a TT (Treatment Technique) used to reduce the level of lead and copper contamination in drinking water.

Nonionic polymer: A long-chained, non-charged compound used to concentrate floc into sludge, and also used as a filter-aid, in the water treatment process

Pathogenic: Disease causing

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

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

Polyaluminum Chloride: A coagulant used in water treatment, used to form floc.

Potable water: water of a quality suitable for drinking, that meets drinking water standards.

Rapid Mix (Chemical Induction Unit): A structure designed to mix chemicals in the treated water conduit.

Raw Water: Lake Erie water, used by the Buffalo Water Authority as its source water.

Raw Water Conduit: Large metal pipe bringing untreated lake water from the intake to the onshore screen house, them up to the chemical treatment points at the water treatment plant.

Screen House: An onshore treatment building containing a series of large, traveling screens. These screens are designed to remove large objects and debris from lake water prior to chemical water treatment.

Sedimentation, Settling: The process of suspended solid particles settling out (going to the bottom of the vessel) in water.

Settling Basins: Large, underground basins allowing heavy floc to settle out of treated water, prior to filtration. The Buffalo Water Authority has 2 settling basins, north & south.

Sludge: Concentrated backwash floc. Sludge is directed to an onsite lagoon.

Source Water: See Raw Water.

Abbreviations & Definitions continued….

Thickening Tanks: An onsite backwash treatment facility designed to concentrate and separate filter backwash into its' sludge and decant components. The Thickening Tanks use a nonionic polymer and settling tubes to treat filter backwash.

TOC (Total Organic Carbon); SUVA (Specific Ultraviolet Absorption); DOC (Dissolved Organic Carbon); UV_{254}: A measure of the organic content of the water. This is a precursor to disinfection by-product when combined with the chlorination of drinking water

Treated Water Conduit: Large metal pipe directing chemically treated water to various stages of the water treatment process.

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

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.

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.

Washwater Tanks: Tanks, holding potable water, used to backwash filter beds.

Weir: is a structure that extends across the width of a channel and is used to impound, measure, or in some way alter the flow of water through the channel.

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

History of Water Treatment

The need for a clean, safe and 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 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

Source Water Assessment Program

A source water assessment was completed under the NYS DOH's Source Water Assessment Program (SWAP). The following is the Executive Summary of this report.

"The New York State Department of Health recently completed a draft Source Water Assessment of the raw water supply's source under the state's Source Water Assessment Program (SWAP). The purpose of this program is to compile, organize, and evaluate information regarding possible and actual threats to the quality of public water supply (PWS) sources. It is important to note that source water assessment reports estimate the potential for untreated drinking water sources to be impacted by contamination. These reports do not address the safety or quality of treated finished potable tap water.

The Great Lakes' watershed is exceptionally large and too big for a detailed evaluation in the SWAP. General drinking water concerns for public water supplies which use these sources include: storm generated turbidity, wastewater, toxic sediments, shipping related spills, and problems associate with exotic species (e.g. zebra mussels – intake clogging and taste and odor problems). The SWAP is based on the analysis of the contaminant inventory compiled for the drainage area deemed most likely to impact drinking water quality at this public water supply raw water intake. This assessment found a moderate susceptibility to contamination for this source of drinking water. The amount of agricultural lands in the assessment area results in elevated potential for protozoa and disinfection byproduct precursor contamination. There is also a high density of sanitary wastewater discharges which results in elevated susceptibility for nearly all contaminant categories.

There is also noteworthy contamination susceptibility associated with other discrete contaminant sources, and these facility types include: Toxics Release Inventory facilities, Chemical Bulk Storage facilities, inactive hazardous waste sites, landfills and Resource Conservation and Recovery Act facilities.

If you have any questions about the state's Source Water Assessment Program, please contact

Ms. Dolores Funke, P.E.,

Senior Public Health Engineer

Erie County Health Department at 858-6966.."

For a complete copy of this report, contact the Erie County Health Department at 716-858-7677.

Formation of the Great Lakes

One billion years ago

About a billion years ago, a fracture in the earth running from what is now Oklahoma to Lake Superior generated volcanic activity that almost split North America. Over a period of 20 million years, lava intermittently flowed from the fracture creating mountains covering the regions now known as northern Wisconsin and Minnesota, and eastern Canada. Over time these mountains eroded, while occasional volcanic activity continued. Molten magma below the highlands of what is now Lake Superior spewed out to its sides, causing the highlands to sink and form a mammoth rock basin that would one day hold Lake Superior. Eventually the fracture stabilized and, over time, the rock tilted down from north to south.

5 Million Years Ago

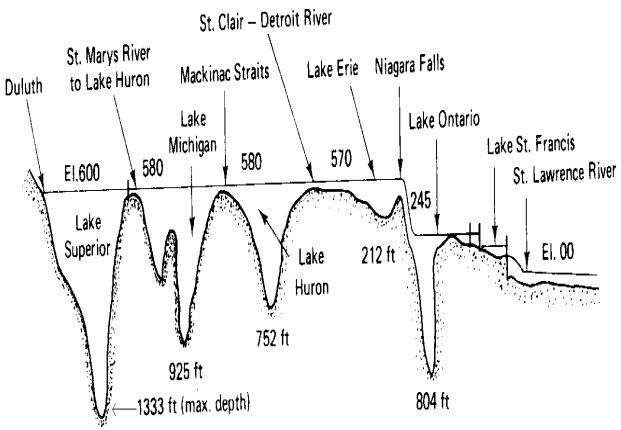
The region went from fire to ice with the arrival of the glaciers, which advanced and retreated many times over the last 5 million years. During the periods of glaciation, giant sheets of ice flowed across the land, leveling mountains and carving out massive valleys. Where the glaciers encountered more resistant bedrock in the north, only the overlying layers were removed. To the south, the softer sandstones and shales were more affected. As the glaciers melted and began receding, their leading edges left behind high ridges, some of which can be seen today in the cliffs of Door County, Wisconsin, and the Bruce Peninsula in Ontario.

Huge lakes formed between these ridges from the retreating ice fronts, and continually changed over time as the ice sheet moved northward. Early drainage from these lakes flowed southward through the present Illinois River Valley toward the Mississippi River, through the Trent River Valley between present lakes Huron and Erie and through the Lake Nippissing-Ottawa River Valley from Georgian Bay on Lake Huron downstream to Montreal, Quebec.

As the ice retreated about 7,000 years ago, the Saint Lawrence Seaway established itself as the outlet to the Atlantic Ocean

About 4000 years ago lake levels dropped to current levels and present day river and stream inlets and outlets developed.

Formation of the Great Lakes
One Continuous Channel Way



Four of the five Great Lakes are at different elevations, leading like a series of steps toward the Atlantic Ocean. The five individual lakes are connected to each other through channel ways, forming one system. Water continually flows from the headwaters of the Lake Superior basin through the remainder of the system.

The International Joint Commission, a binational agency established under the Boundary Waters Treaty of 1909 between Canada and the U.S., has the responsibility for regulation of flows on the St. Mary's and the St. Lawrence Rivers. These channels have been altered by enlargement and placement of control works associated with deep-draft shipping. Agreements between the U.S. and Canada govern the flow through the control works on these connecting channels.

Raw Water Source

IN GENERAL

The sources of drinking water (both tap and bottled) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive materials, and can pick up substances resulting from the presence of animal or human activities. Contaminants that may be present in source water include: microbial contaminants; inorganic contaminants; pesticides and herbicides; organic chemical contaminants; and radioactive contaminants. In order to ensure that tap water is safe to drink, the State and EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems.

The State Health Department and FDA's regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

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 62-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 grated 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 Figures

Lake Erie is the 11th largest world lake - (4th largest Great Lake by surface area)
Length: 241 miles; Width: 57miles; Avg. Depth: 62'; Max Depth: 210'
Vol.: 116 miles^3; Elevation: 569';Shoreline: 871miles; Surface area: 9,910 miles^2
Drainage Basin Area: 30,140 miles^2; Outlet: Niagara River & Welland Canal

Water Treatment

Buffalo's water intake is located in the northeastern region of Lake Erie, just before water enters the Niagara River. This region is known as the Emerald Channel, due to the sparkling clarity of its water. Water rushes into the intake through grates and collects in a circular pool where it drops 60 feet to a 12-foot diameter, mile-long tunnel burrowed under the lakebed. The water is gravity fed to an onshore screen house where 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 mix and direct the water to a rapid mix where additional PACl is added at a Rapid Mix to enhance coagulation. The flow is directed to underground basins for flocculation and sedimentation.

At the flocculation area, the water is slowly mixed by mechanical paddles to enhance floc formation. This treated water then travels to the settling basins where the heavy floc 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. This filtered water enters our Clearwell, where it is stored until needed in the distribution system.

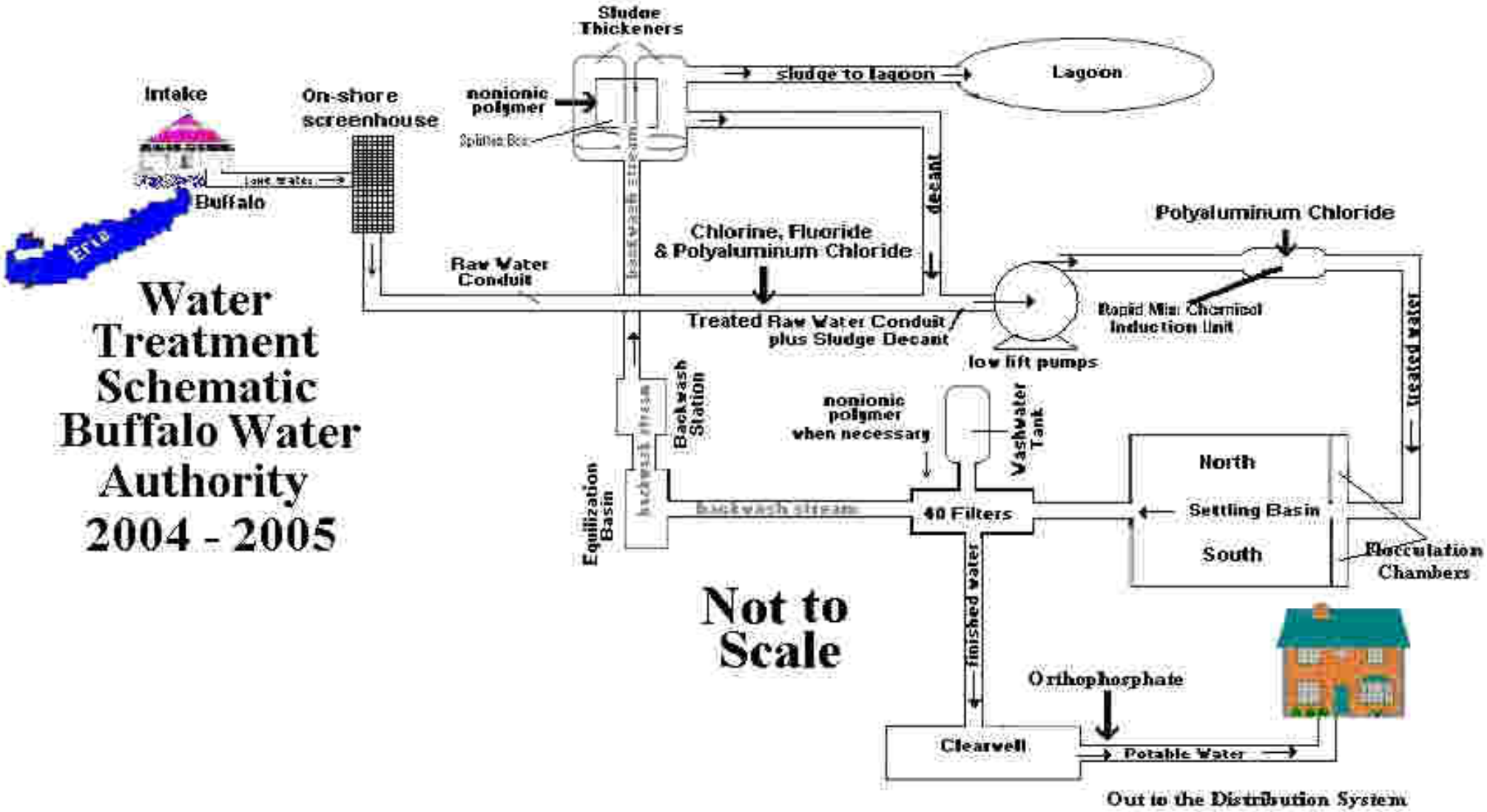
The rapid sand filters occasionally need to be cleaned of trapped debris; this is done by backwashing the filters with potable water stored in our washwater tanks. To comply with EPA's Filter Backwash Recycle Rule the backwash water, containing filter bed debris, is recycled back to the raw water conduit after sludge production in the Thickening Tanks.

The Thickening Tanks concentrate the debris into sludge using a nonionic polymer and settling tubes. The sludge portion is directed by pumps to an onsite lagoon where further processing takes place before removal to a landfill. The decant portion is directed over a weir at the top of the Thickening Tanks to the Raw water conduit, where the water treatment process begins.

As the potable water leaves the plant, a corrosion control additive (a sodium orthopolyphosphate 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.

Water Treatment Schematic



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 29.6 billion gallons last year with an average of 81 million gallons each day to a population of approximately 290 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 80,000 service connections and 7,800 fire hydrants.

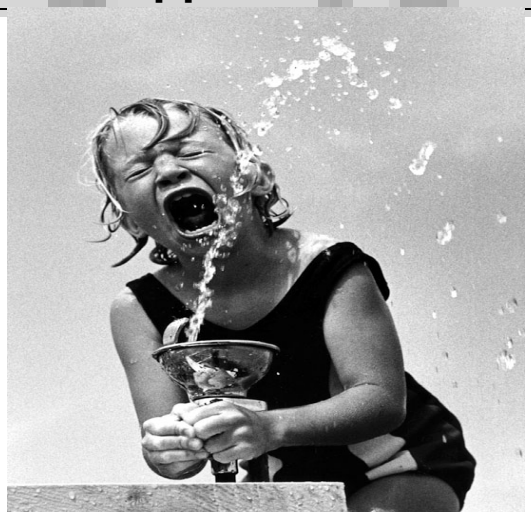
This enormous network of pipes, valves, service connections and hydrants is maintained, day and night, throughout all seasons. In the past year the Buffalo Water Authority has replaced or renovated approximately 1.7 miles of water mains.

Customer Costs

Our customer's billing rates are among the lowest in the state. **The average 2004 annual water bill was only $344 per year.** The total quarterly bill includes the cost of water used and the service charge. Senior Citizens receive a significant discount.

Water Usage (Gallons)	Regular Rate Price per 1000 gallons	Senior Rate Price per 1000 gallons
Up to 74,805	$2.16	$1.30
Over 74,805–269,299	$1.91	$1.14
Over 269,299	$1.46	43¢

Quarterly Service Charge For 2004				
Meter Size	Regular Rate	Senior Rate	Meter Size	Regular Rate
5/8"	$20.13	$12.09	3"	$302.10
¾"	$30.21	$18.18	4"	$503.49
1"	$50.37	$30.21	6"	$1,007.01
1½"	$100.71	$60.48	8"	$1,611.21
2"	$161.13	$96.66	10"	$2,316.12
Senior rates not applicable for meters over 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.

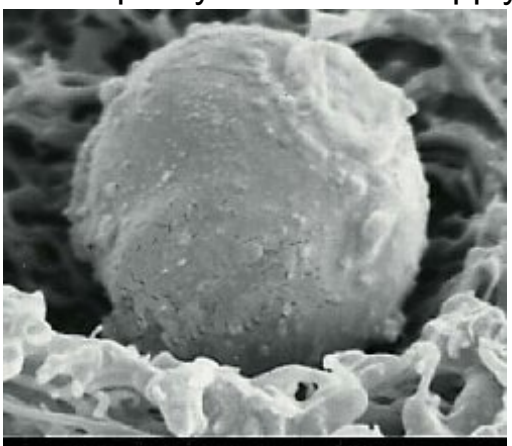
Once the spore is ingested, an intestinal illness called *Cryptosporidiosis* may result. The incubation period may range from 1 - 12 days. *Cryptosporidium* can be spread by person-to-person, or animal-to person contact, and by drinking contaminated water.

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*.



Cryptosporidium Oocyst

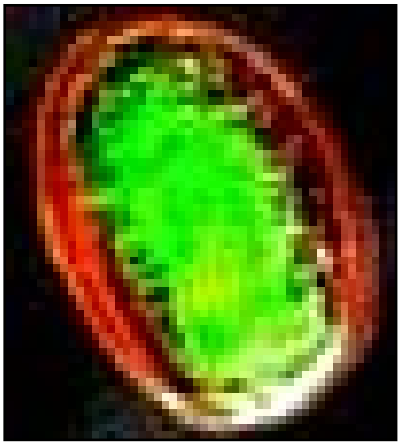
Bottled water, unless distilled or certified for cyst removal may contain *Cryptosporidium*. Current standards for bottled water do not guarantee that it be *Cryptosporidium*-free.

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).

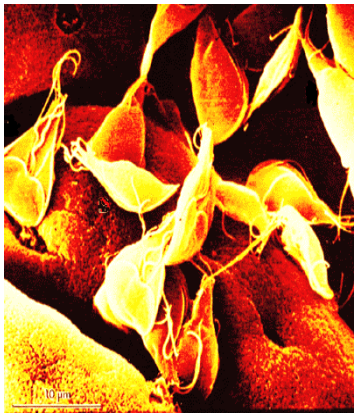
Facts About Giardia

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 (raw) water. 3 samples were presumed positive for Giardia, but none were confirmed. Therefore, our monitoring indicated the presence of Giardia in our source (raw) 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

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 80-year history. Although water sometimes has a taste and odor, it is 100% safe to drink.

Decaying vegetation and byproducts of microbia 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 actinomycetes and the blue-green algae.

Two highly studied by-products of actinomycetes 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 actinomycetes and the blue-green algae. Both geosmin and MIB can have odor threshold concentrations of less than 10 parts per trillion.

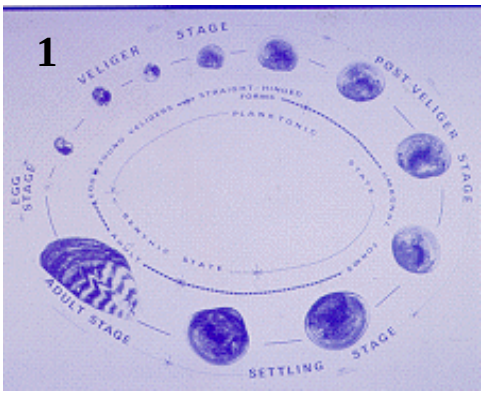
Zebra Mussels

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

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

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, and reuse water.

Water Savings 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 use on 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. " *When it's yellow, let it mellow, when it's brown, flush it down"*

- 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.

More Water Savings 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 homeowner.
- 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 showerheads 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.

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

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

Consumer Tips

➔Appearance

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

- 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 a minute amount 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.

2004 System Improvements

To insure continuing quality and safety in our communities' water supply, the Buffalo Water Authority has made the following improvements to our system in 2004:

- Retrofit North Settling. Basin: To double detention time and improve water quality.
- South Basin Sluice Gates Operators rehabilitated.
- Chemical Induction Unit: More effective chemical feed improving water quality, and reducing treatment cost.
- Optimization of filter-aid polymer: Enhancing filtration and reducing cost.
- Metering program. Metering will encourage water conservation and curtail unaccounted water.
- Leak Detection: To reduce non-revenue water usage and optimize water treatment and pumpage.
- Security cameras at all water tanks and remote pump stations
- SCADA (system monitoring and control) upgrade at the Col. Ward Pump Station which allows for monitoring and remote control of all water tanks and remote pump stations

Future of Buffalo's Water System

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 continents. In 1999 American Water took over Anglian Water's interest in AAET and the company was renamed American Water Services, Inc. ™ and in 2004 became American Water.

To insure continuing quality and safety in our communities' water supply, the Buffalo Water Board plans the following improvements to our treatment & distribution systems in 2005

- Filter bed rehabilitation: More effective filtration will increase water quality and lower its cost.
- Optimization of treatment to reduce cost.
- Continuation of the Metering program. Metering will encourage water conservation and curtail unaccounted water.
- Continuation of Leak Detection. To reduce non-revenue water usage and the amount of water treatment and pumpage needed to supply the city with water.
- Homeland Security: Security upgrades including doors, windows, fencing & surveillance cameras.
- Pump & Motor rehabilitation: Better water pressure control will reduce water main breaks.
- South Basin rehabilitation (Baffle Curtains)
- New inhouse sampling pumps and sampling points.
- Continued upgrade program for all large commercial and industrial water meters

ARE THERE CONTAMINANTS IN OUR DRINKING WATER?

As the State regulations require, we routinely test your drinking water for numerous contaminants. These contaminants include: total coliform, turbidity, inorganic compounds, nitrate, nitrite, lead & copper, volatile organics compounds, total trihalomethanes, and synthetic organic compounds.

The following table depicts which compounds were detected in your drinking water. The State allows us to test for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

It should be noted that drinking water, including bottled water, might 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)

Although our drinking water met or exceeded state and federal regulations, some people may be more vulnerable to disease causing microorganisms or pathogens in drinking water than the general population.

Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections.

These people should seek advice from their health care provider about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium, Giardia and other microbial pathogens are available from the Safe Drinking Water Hotline (800-426-4791).

2004 Table of Detected Contaminates: Inorganics

	Contaminant	Any MCL of TT violation?	Sample Date (or highest detected)	Max Level Detected	Unit	MCLG	MCL	Range	Likely Source of Contamination
Entry Point	BARIUM	No	4/20/04	0.021	ppm	2	2	N/A	Erosion of natural deposit. Discharge from: drilling waste & metal refineries
Entry Point	FLUORIDE	No	8/12/04	0.1	ppm	N/A	2.2	0.0 - 1.1	Erosion of natural deposit; water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Entry Point	NICKEL	No	4/20/04	3.4	ppb	100	100	N/A	Naturally-occuring mineral
Entry Point	NITRATE-N	No	4/20/04	0.34	ppm	10.0	10.0	N/A	Run-off from fertilizers; leaching from septic tanks & sewage; erosion of natural deposits
Entry Point	SODIUM	No	4/20/04	9.9	ppm	N/A	N/A	N/A	Naturally-occuring mineral
Entry Point	SULFATE	No	4/20/04	27	ppm	N/A	250	N/A	Naturally-occuring mineral
Entry Point	ZINC	No	4/20/04	0.032	ppm	N/A	N/A	N/A	Naturally-occuring mineral

	Contaminant	Any MCL of TT violation?	Sample Date (or highest detected)	Max Level Detected	Unit	MCLG	AL	Range	Likely Source of Contamination
distribution	COPPER[1]	No: 90% = .68ppm	7/19/02	0.39	ppm	1.3	1.3	ND - 0.39	Corrosion of household plumbing; erosion of natural deposits; leaching from wood preservatives.
distribution	LEAD[1]	No: 90% = 7ppb	8/8/02	14	ppb	15	15	ND - 14	Corrosion of household plumbing; erosion of natural deposits.

2004 Table of Detected Contaminates: Microbiological

	Contaminant	Any MCL of TT violation?	Sample Date (or highest detected)	Max Level Detected	Unit	MCLG	MCL	Range	Likely Source of Contamination
distribution	Heterotrophic Bacteria	No	12/20/04	25	count / ml	N/A	N/A	0 - 25	Naturally occurring
distribution	Turbidity[2] Distribution:	No	12/1/04	0.56	NTU	N/A	TT >5.0 NTU	0.1 - 0.56	soil runoff
Entry Point	Turbidity[2] Entry Point:	No	5/31/04	0.24	NTU	N/A	TT: 95% samples not <0.5NTU	0.04 - 0.24	soil runoff

2004 Table of Detected Contaminates: Disinfection By-products formd by chlorination of tap water, and their precursors

	Contaminant	Any MCL of TT violation?	Sample Date (or highest detected)	Max Level Detected	Unit	MCLG	MCL	Range	Likely Source of Contamination
Entry Point	Total Chlorine	No	12/21/04	1.77	ppm	N/A	N/A	0.87 - 1.77	By-product of drinking water chlorination
Entry Point	Free Chlorine Entry Point:	No	10/19/04	1.78	ppm	(MRDLG) 4.0	(MRDL) 4.0	0.64 - 1.78	By-product of drinking water chlorination
distrib	Free Chlorine Distribution:	No	11/16/04	1.4	ppm	(MRDLG) 4.0	(MRDL) 4.0	0.2 - 1.4	By-product of drinking water chlorination
distrib	TTHM[3]	No: RAA= 23.8ppb	8/10/04	41.5	ppb	N/A	TT=80ppb	10.1 - 41.5	By-product of drinking water chlorination
distrib	HAA	No: RAA= 14.3ppb	11/16/04	22.5	ppb	N/A	TT=60ppb	9.1 - 22.5	By-product of drinking water chlorination
Entry Point	TOC	No	1/13/04	2.3	ppm	N/A	TT = TOC & SUVA >2.0	1.8 - 2.3	Precursors to by-products of drinking water chlorination
Entry Point	SUVA	No	3/23/04	1.4	L/mg-m	N/A	TT = TOC & SUVA >2.0	0.5 - 1.4	Precursors to by-products of drinking water chlorination

2004 Table of Detected Contaminates: Other Properties of Tap Water

	Contaminant	Any MCL of TT violation?	Sample Date (or highest detected)	Max Level Detected	Unit	MCLG	MCL	Range	Likely Source of Contamination
Entry Point	Total Solids	No	8/6/04	213	ppm	N/A	N/A	163 - 213	Naturally occurring minerals
Entry Point	Total Dissolved Solids	No	12/13/04	210	ppm	N/A	N/A	145 - 210	Naturally occurring minerals
Entry Point	Alkalinity	No	8/5/04	102	ppm	N/A	N/A	97.4 - 102	Naturally occurring minerals
Entry Point	Calcium Hardness	No	3/31/04	95.5	ppm	N/A	N/A	94.5 - 95.5	Naturally occurring minerals
Entry Point	pH	No	5/15/04	7.9	SU	N/A	N/A	7.3 - 7.9	Naturally occurring

Footnotes for Table of Detected Contaminants:

(1) Out of 53 homes tested, in 2002 none were above the AL of 15 ppb for Lead. The TT employed by the Buffalo Water Authority, intended to reduce lead contamination of drinking water is the addition of ortho-phosphate as a part of water treatment. This chemical serves to coat water lines, to prevent lead from leaching into the drinking water. Infants & children who drink water containing lead in excess of the AL could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning disabilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. Infants & young children are more vulnerable to lead in drinking water then the general population. Lead levels in your home might be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested, and you should flush your tap for 30 seconds – 2 minutes before using your tap water. Additional information is available from the Safe Drinking Water Hotline (1-800-426-4791).

(2) 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. Our highest single measurement for 2004 occurred on 12/1/04 (0.56 NTU). 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. Although December was the month that had the fewest distribution measurements meeting the TT for turbidity, the levels recorded were in the acceptable range allowed and did not constitute a violation.

(3) Representative testing for TTHM included 8 samples collected through 2004 (sites tested quarterly). Our highest detected reading occurred in Aug. It was 41.5 ppb, well below the MCL of 80 ppb. Some people who drink water containing TTHM in excess of the MCL over many years experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

The EPA's Safe Drinking Water Hotline is: (800-426-4791)

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What does this information mean?

As you can see by the table, our system had no violations. We have learned through our testing, that some contaminants have been detected; however, these contaminants were detected below the level allowed by the State.

2004 Raw Water Data

Source (RAW) Water Parameters for 2004					
Parameter	units	avg	range	max date	# of tests
Total Solids	PPM	175.40	162.5 - 212.5	8/6/04	5
Total Dissolved Solids	PPM	163.80	144.5 - 209.5	12/13/04	5
Calcium hardness	PPM	95.00	94.5 - 95.5	3/31/04	10
Alkalinity	PPM	99.40	97.4 - 101.4	8/5/04	12
turbidity	NTU	3.42	0.22 - 64.3	11/6/04	2428
pH	SU	8.1	7.5 - 8.3	11/5/04	1331
fluoride	PPM	0.008	0 - 0.1	8/11/04	264
Coliform	count per 100ml	37	0 - 1000	12/22/04	179
Standard PlateCount	count per ml	111	0 - 1000	10/19/04	140

Undetected contaminants

Below is a list of contaminants that were tested for in 2004, but were not detected in our drinking water:

1,1,1,2-TETRACHLOROETHANE; 1,1,1-TRICHLOROETHANE; 1,1,2,2-TETRACHLOROETHANE; 1,1,2-TRICHLOROETHANE; 1,1-DICHLOROETHANE; 1,1-DICHLOROETHYLENE; 1,1-DICHLOROPROPYLENE; 1,2,3-TETRACHLOROBENZENE; 1,2,3-TETRACHLOROPROPANE; 1,2,4-TRICHLOROBENZENE; 1,2,4-TRIMETHYLBENZENE; 1,2-DIBROM0-3-CHLOROPROPANE; 1,2-DIBROMOMETHANE; 1,2-DICHLOROBENZENE (ORTHO); 1,2-DICHLOROETHANE; 1,2-DICHLOROPROPANE; 1,3,5-TRIMETHYLBENZENE; 1,3-DICHLOROBENZENE (META); 1,3-DICHLOROPROPANE; 1,4-DICHLOROBENZENE (PARA); 2,2-DICHLOROPROPANE; 2,3,7,8-TCDD (Dioxin); 2,4,5-TP; SILVEX; 2,4-D; 2-CHLOROTOLUENE; 3-HYDROXYCARBOFURAN; 4-CHLOROTOLUENE; 4-ISOPROPYLTOLUENE; ALACHLOR; ALDICARB ; ALDICARB SULFONE; ALDICARB SULFOXIDE; ALDRIN; alpha-CHLORDANE; ANTIMONY; ARSENIC; ATRAZINE; BENZENE; BENZO(A)PYRENE; BERYLLIUM; BROMOBENZENE; BROMOCHLOROMETHANE; BROMOMETHANE; BUTACHLOR; CADMIUM; CARBARYL; CARBOFURAN; CARBON TETRACHLORIDE; CHLOROBENZENE (MONO); CHLOROETHANE; CHLOROMETHANE; CHROMIUM; cis-1,2-DICHLOROETHYLENE; cis-1,3-DICHLOROPROPYLENE; CYANIDE; DALAPON; DI(2-ETHYLHEXYL)ADIPATE; DI(2-ETHYLHEXYL)PHTHALATE; DIBROMOMETHANE; DICAMBA; DICHLOROFLUOROMETHANE; DIELDRIN; DINOSEB; DIQUAT; ENDOTHALL; ENDRIN; ETHYLBENZENE; gamma-CHLORDANE; GLYPHOSATE; HEPTACHLOR; HEPTACHLOR EPOXIDE; HEXACHLOROBENZENE; HEXACHLOROBUTADIENE; HEXACHLOROCYCLOPENTADIENE; IRON; ISOPROPYLBENZENE; LINDANE; MANGANESE; MERCURY; METHOMYL; METHOXYCHLOR; METHYL tert-BUTYL ETHER (MTBE); Methylene Chloride; METRIBUZIN; n-BUTYLBENZENE; NITRITE-N; n-PROPYLBENZENE; OXAMYL (VYDATE); PCB 1016; PCB 1221; PCB 1232; PCB 1242; PCB 1248; PCB 1254; PCB 1260; PENTACHLOROPHENOL; PICLORAM; PROPACHLOR; sec-BUTYLBENZENE; SELENIUM; SILVER; SIMAZINE; STYRENE; tert-BUTYLBENZENE; TETRACHLOROETHYLENE (PCE); THALLIUM; TOLUENE; TOXAPHENE; trans-1,2-DICHLOROETHYLENE; trans-1,3-DICHLOROPROPYLENE; TRICHLOROETHYLENE (TCE); TRICHLOROFLUOROMETHANE; VINYL CHLORIDE; XYLENES, TOTAL

Is our water system meeting other rules that govern operations?

During 2004, our system was in compliance with all applicable state drinking water operating, monitoring and reporting requirements.

CLOSING

Thank you for allowing us to continue to provide your family with quality drinking water this year. We ask that all our customers help us protect our water sources, which are the heart of our community. The Annual Water Quality Report Supplement will be available at all libraries located in Buffalo. Please call our treatment plant laboratory @ 716-851-4704 if you have questions about water quality.