This Water Quality Report has been prepared
by Sam Campagna, Water Treatment Supervisor
with the assistance of Leonard Milioto, Chemist

BUFFALO WATER AUTHORITY 1997 - 1998 WATER QUALITY REPORT

Managed by AmericanAnglian

Anthony M. Masiello
Mayor

Joseph N. Giambra
Commissioner of Public Works

John Sole
Chairperson, Buffalo Water Board

Andrew Clarkson
Regional Manager, AAET

Charles Wilson
Director of Northern Operations, AAET

Buffalo's Waterfront

Water is Life ... Don't waste it !

INTRODUCTION

The following is the fifth annual water quality report prepared by the Buffalo Water Authority (BWA). The purpose of this report is to answer consumer questions about the quality and safety of Buffalo's water, and to inform our customers about recent and future developments in Buffalo's water treatment process.

Included in this report is information about the raw water supply, water treatment and distribution, aesthetic qualities concerning finished water, parasites, consumer tips and economy, and water quality parameters. Buffalo is fortunate to have such an exquisite source of raw water to draw from. Lake Erie's self-cleaning properties provide a distinct advantage in water treatment. As you will see the quality of Buffalo's water easily meets and exceeds the most stringent standards outlined by state and federal regulations.

The BWA is committed to serving the community by revamping and modernizing the water treatment process to take advantage of the most effective and economical technology available. Many changes have recently taken place, and more will be undertaken in the near future in response to the changing environment and stricter government regulations.

New York State requires water suppliers to notify their customers about the risks of cryptosporidiosis and giardiasis. Cryptosporidiosis and giardiasis are intestinal illnesses caused by microscopic parasites. Cryptosporidiosis can be very serious for those with weakened immune systems, such as chemotherapy, dialysis or transplant patients, and people with Crohn's disease or HIV infection. People with weakened immune systems should discuss with their health care providers the need to take extra precautions such as boiling water, using certified bottled water or a specially approved home filter. Individuals who think they may have cryptosporidiosis or giardiasis should contact their health provider immediately. For further information about cryptosporidiosis please see "Facts About *Cryptosporidium*" discussed in detail in this report.

For additional information on cryptosporidiosis and giardiasis, please contact...

Erie County Health Department
95 Franklin Street
Buffalo, NY 14202
(716) 858-7677

We are eager to respond to any question or comments you may have. Please forward your remarks to:

Samuel Campagna
Water Treatment Supervisor
Buffalo Water Authority, Filter Plant
Foot of Porter Ave.
Buffalo, New York 14201
Tel: (716) 851-4726
Fax: (716) 851-4672

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 alleviate this problem, call the water dept. if the cause of the disruption is not obvious. 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 organism in the water. Many consumers dislike the inherent taste. The following are some ways to eliminate or improve this taste:

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

b) Cool water to less than 60^{o}F in the summer, cool water definitely tastes better. If the smell of chlorine is removed before cooling, the taste will be much better.

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

d) 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.

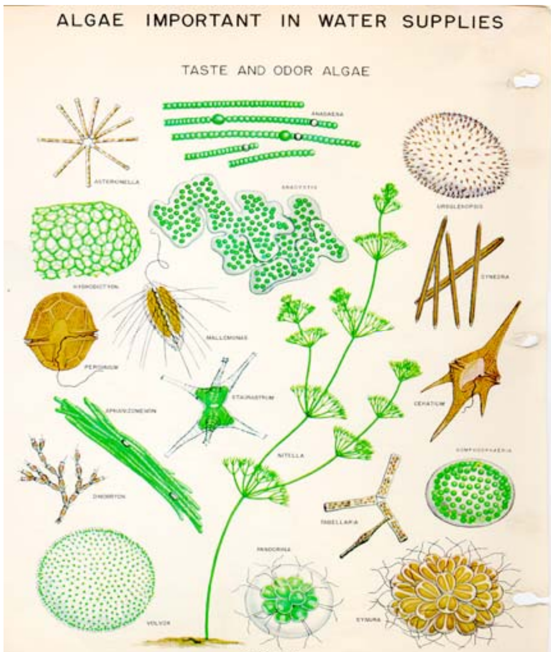
e) A well-maintained point-of-use charcoal filter will eliminate the smell of chlorine.

Aesthetic Quality

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 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.



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.

Generally our prehistoric ancestors assumed clean looking water was safe water. The earliest indications of an actual water treatment process appeared in Asia about 4000 years ago. Here water was not presumed palatable until it was boiled, exposed to sunlight, treated with hot copper, filtered of obvious debris, and cooled before it was consumed.

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, in the 17th Century, the idea of microscopic life was unimagined. Even with that tool it still took over 200 years before a connection between microorganisms and disease was made. In the mid 19th Century it was proved 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 standards were lacking, these systems contributed to major outbreaks of disease by spreading pathogenic organisms.

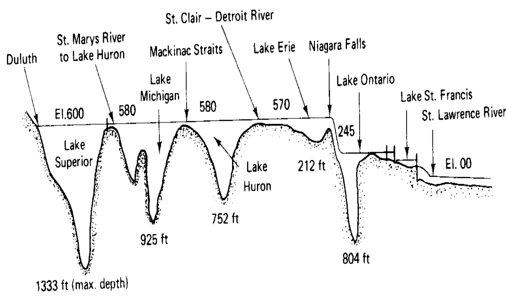
In the 1890's effective water treatment techniques began to develop. Coagulation and rapid sand filtration were instituted, which significantly reduced both turbidity and bacteria in water supplies. Chlorination of water was eventually introduced in 1908. Finally a community's water supply could, in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

WATER TREATMENT AS A NATURAL PROCESS

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 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.



WATER CONSERVATION

Water is a vital and limited resource. It is crucial to conserve water. Between the years 1980 and 2000 Americans will more than double 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 save money. You can reduce you water, sewer, and utility bills, as well as state and local taxes. You can save energy by saving electricity used to pump water. You can help the environment by 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

The following are some water saving suggestion 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 your brushing 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.).

Toilet: Flush only when necessary. Don't use as a wastebasket for cigarette butts or disposable diapers. Install a water saving displacement device that won't harm your plumbing, such as a weighted plastic jug (do not use bricks).

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.

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, then turn hose off, then wash car from a bucket of soapy water, and rinse quickly with hose. Used water is fine for cleaning chrome, hubcaps, and wheels.

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 100.4 million gallons of raw water each day. Our treatment plant pumped 99.03 million gallons of treated water every day to a population of over 340 thousand people. 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. After receiving a pressure boost from auxiliary pumps, 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 diligently maintained, day and night, throughout all seasons. A crew of 57 service workers is called upon to respond to any number of circumstances that can interrupt the distribution of treated water. In the past year the BWA has replaced or renovated approximately 12 miles of water mains.

The billing rate for our customers is among the lowest in the region. The BWA charges $1.27/1000 gal. for up to 67,325 gal. purchased; $1.15/1000 gal. for purchases between 74,805 and 269,300 gallons; and 89 ¢/1000 gal for purchases over 279,300 gallons. Seniors receive reduced rates of 77¢, 69¢ & 26¢ respectively

REPAIR CREW AT WORK

Buffalo Water Dept. workers repair a broken water main at the Fulton Street Pool.

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).

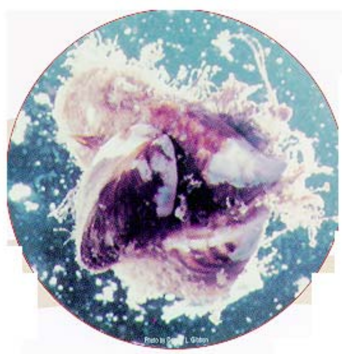
THE ZEBRA MUSSEL

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.



Zebra Mussels

Water Treatment Process

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 in this area. When the water temperature exceeds 50^{o}F, chlorine or potassium permanganate is added to the water at the intake. This is to control zebra mussels, and to help combat taste and odor problems created by their presence. The water is gravity fed to an onshore screen house located at the Colonel Ward Pumping Station Complex, by a 12 X 12-foot conduit. At this screen house, water is filtered through traveling screens, capturing large objects such as sticks and fish.

Gravity delivers the water through a conduit where chlorine, fluoride, and polyaluminum chloride (PAC) are added. Chlorine is used to disinfect the water, and control zebra mussels and other organisms. Fluoride is added to guard against tooth decay. PAC 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. Here the water is precisely mixed by mechanical flocculators (large paddles) and a baffle system. Most of the debris in the water is allowed to deposit into the settling basin as sludge. The sludge is pumped to the Buffalo Sewer Authority for further treatment.

The water, still containing some floc, is directed over rapid sand filter beds. The filter media contained in these beds have all been replaced in the past year to improve particle removal. It is here, by gravity and water pressure, final filtration takes place. During periods when the lake is exceptionally dirty, especially during high wind episodes, a filter aid (a cationic polymer) is added to promote proper filtration.

As the water leaves the plant, a corrosion control additive (a sodium orthopolyphosphate blend) is injected. 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 water is then 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. This is done to make certain the water continues to remain high in quality and safety.

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. The SDWA requires the USEPA to set enforceable standards for health-related drinking water contaminants to apply to all public water systems. In addition to health related enforceable standards, the SDWA required the USEPA to set nonenforceable federal guidelines for contaminants that may adversely affect the aesthetic quality of drinking water. In 1979 and 1980 the focus of the USEPA efforts was on (1) synthetic organic chemicals (SOC) in drinking water resulting from industrial contamination of surface water supplies and on (2) organic contaminants that were produced in the disinfection process, i.e. trihalomethanes (THM). Supplemental lead and copper testing was completed in December 1993. Action levels were set for these contaminants. The results for 1998's required testing are listed in the following table. The allowable concentration is the maximum contaminant level (MCL).

Compounds	Allowed	Entry Point				Distribution				Source (MCL not applicable)			
Primary Inorganic	MCL (mg/L)	# of samples	Freq per/yr	Range	Avg (mg/L)	# of samples	Freq per/yr	Range	Avg (mg/L	# of samples	Freq per/yr	Range	Avg (mg/L)
Arsenic	0.05	1	1	ND	ND								
Barium	2.00	1	1	ND	ND								
Cadmium	0.005	1	1	ND	ND								
Chromium	0.10	1	1	0.065	0.065								
Copper	1.3	3	Varies	ND	ND	217	Varies	ND - 1.1	0.036	2	Varies	ND	ND
Lead	0.015	4	Varies	ND - .008	0.002	217	Varies	ND - .083	0.004	2	Varies	ND	ND
Mercury	0.002	1	1	ND	ND								
Selenium	0.01	1	1	ND	ND								
Silver	0.05	1	1	ND	ND								
Antimony	0.006	1	1	ND	ND								
Beryllium	0.004	1	1	0.0095	0.009								
Nickel	0.10	1	1	0.049	0.049								
Thallium	0.002	1	1	0.002	0.002								
Cyanide	0.20	1	1	ND	ND								
Sulfate	250.0	1	1	30.5	30.5								
Nitrite (as N)	1.0	2	2	ND - .03	0.015								
Nitrate (as N)	10.0	2	2	ND	ND								
Primary Organic													
POC	0.005	1	1	ND	ND								
Tot THM	0.1	6	4	ND - .0467	0.029	17	4	.004 - .049	0.030				
SOC(grp1)	Varies	1	1	ND	ND								
SOC(grp2)	Varies	1	1	ND	ND								
Secondary													
Fluoride	2.2	2080	Varies	0.1 - 1.38	0.87					260	Varies	ND - 0.2	<0.10
Iron	0.3	3	2	ND - 0.081	0.027								
Manganese	0.3	2	2	ND	ND								
Zinc	5.0	2	2	ND - .063	0.032								
Color	15 units	6	Varies	5 - 10	7.25								
Unregulated													
Alkalinity	NLS	27	12	62 - 90.44	84.26	96	Varies	76.6 - 97.5	83.9	22	12	83.4 - 92.3	87.66
Aluminum	NLS	2	Varies	ND - 0.11	0.055	1	Varies	ND	ND				
Calcium	NLS	23	Varies	62 - 90.4	84.26	97	Varies	71.1 - 87.5	84.71	8	Varies	73 - 87	82.6
Hardness	NLS	9	Varies	107 - 117	113.1	12	Varies	110 - 127	115.1	6	Varies	107 - 117	114
Sodium	NLS	2	1	8.63 - 9.27	8.95								
TDS	NLS	13	12	145 - 171	160.8					10	Varies	151.2- 202	165.2
Conductivity(μΩ)	NLS	1	Varies	202	202	60	Varies	200 - 300	255.4				
TS	NLS	14	12	161 - 206	180.2					12	12	153 - 234	189.6
o-PO4	NLS	215	Varies	ND - 0.8	0.22	841	Varies	ND - 0.6	0.21				
TOC	NLS	12	Varies	1.7 - 2.3	2.05					20	12	1.4 - 2.8	1.94
TOX	NLS	9	Varies	ND - .07	0.047	16	Varies	ND - 0.09	0.059	6	Varies	ND - .041	0.027
HAA	NLS	4	Varies	.013 - .019	0.015	8	Varies	.012 - .022	0.010				
HAN (ppb)	NLS	2	Varies	4 – 4.4	4.18	4	Varies	4 - 5	4.58				
Chloral Hydrate(ppb)	NLS	2	Varies	.66 - 1.2	0.093	4	Varies	.78 - 1.4	0.955				
Bromide	NLS									8	Varies	ND - .041	0.026

Compounds	Allowed	Entry Point				Distribution				Source (MCL not applicable)			
Other	MCL (mg/L)	# of samples	Freq per/yr	Range	Avg (mg/L)	# of samples	Freq per/yr	Range	Avg (mg/L	# of samples	Freq per/yr	Range	Avg (mg/L)
pH (S.U.)	NLS	458	Varies	7.3 - 7.8	7.5	1066	Varies	7.4 - 7.9	7.6	273	Varies	7.7 - 8.4	8.1
Total Chlorine	NLS	9	Varies	0.8 - 1.6	1.22	12	Varies	0.5 - 1.1	0.77				
Free Chlorine	NLS	2468	2190	0.5 - 1.54	1.02	2407	Varies	0.2 - 1.15	0.42	273	260	0.0 - 0.72	0
Ammonia (as N)	NLS									6	Varies	0.01	0.01
Ammonia (as NH3)	NLS									5	Varies	.04 - .09	0.057
Turbidity (NTU)	0.5 /5.0	2471	2190	.05 - .5	0.14	1073	Varies	.05 - 2.5	0.3	278	Varies	.2 - 135.0	5.37
Coliform #/100 ml	1 / 100 mL	208	208	<1	<1	2347	2160	<1	<1	208	Varies	<1 - 60	<1
SPC (# / 1.0 ml)	NLS	156	156	<1 - 3	<1	2295	780	<1 - 500	<1	156	Varies	<1 - TNTC	1
E.coli (present)	1									13	Varies	ND - 24	2
Giardia (# / 100 L)	NLS									6	Varies	ND	ND
Cryptosporidium # / 100 L	NLS									6	Varies	ND	ND
Gross Alpha (pCi/L)	15 pCi/L	2	1	-0.06 - 1.2	0.37								
Gross Beta (pCi/L)	30 pCi/L	2	1	1.2 -3.8	2.5								
Radium 226 (pCi/L)	5pCi/L	1	1	ND	ND								
Radium 228 (pCi/L)	5pCi/L	1	1	ND	ND								
Cesium-134 (pCi/L)	NLS	1	1	ND	ND								
Cesium-137 (pCi/L)	NLS	1	1	ND	ND								
Cobalt-57 (pCi/L)	NLS	1	1	ND	ND								
Cobalt-60 (pCi/L)	NLS	1	1	ND	ND								
UV254 (1/cm)	NLS	14	Varies	.011 - .022	0.016					14	Varies	.021 - .03	0.025

< = less than NLS = No Set Limit ND = Not Detectable NTU = Nephelometric Turbidity Unit
POC = Primary Organic Cmpds. SOC = Synthetic Organic Cmpds

THM = Trihalomethane **Please note: unless otherwise specified all units are in mg/L**

THE FUTURE OF BUFFALO'S WATER TREATMENT

As of June 1997 the City of Buffalo has commissioned AmericanAnglian Environmental Technology (AAET) to manage the Buffalo Water Authority. AAET is 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.

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

- Increase the capacity of our backwash pump station.

This improvement will allow us to clean more filters at a faster rate, especially necessary during turbulent autumn storms.

- Sludge thickeners

Thickening the sludge allow the BWA to reclaim the north basin which will greatly increase settling capacity and improve water quality.

- Use of particle counters to optimize raw water treatment.

The treatment plant will be able to more precisely determine correct raw water treatment with in-line particle counters on the raw and finished water, and portable particle counters to monitor filter bed output quality. Particle counters count and gage particle sizes as small as 1 micron. Size ranges can be set up based on state and federal regulations, or based on the size ranges corresponding to various pathogenic organisms (e.g. *Cryptosporidium* & *Giardia*)

- Metering program

Over the next 4 years over 75,000 meters are targeted for installation. Metering will encourage water conservation and curtail unaccounted water, which will aid in leak detection. This will ultimately result in a reduction of water usage and decrease the amount of water treatment and pumpage needed to supply the city with water, making water more affordable.

As technology advances, the ability to assess hazardous contamination in public water supplies is heightened. This results in the implementation of additional and more stringent drinking water standards. Demands upon water suppliers for more frequent monitoring and more sophisticated treatment processes to assure higher quality drinking water will increase along with the cost of public drinking water. The responsibility for assuring the safety of drinking water at the tap will be shared by federal, state, and local authorities; the public water suppliers; and consumers.