Water Quality Quarterly Report

October - December 2000

TORONTO

Works & Emergency Services
Water & Wastewater Services

Our second quarterly report

The province's new Drinking Water Protection Regulation requires waterworks owners to publish reports to consumers on water quality. The City of Toronto's Water and Wastewater Division is pleased to present to the citizens of Toronto its second quarterly report. Our first quarterly report was published on October 25, 2000.

This report replicates the following text as presented in the previous report:

- a description of the water supply system;
- the water treatment process;
- quality assurance methods; and
- measures taken to comply with the regulation.

In addition, the report outlines:

- a summary of water quality analyses for the period October through December 2000.

If you have any questions or comments about Toronto's system or this report, call the Water and Waste Information Line at 392-4546.

What is the new Drinking Water Protection Regulation?

On August 26, 2000, Ontario's new Drinking Water Protection Regulation 459/00 came into effect in order to improve the quality of drinking water throughout the province. Through the regulations, a legally enforceable standard – Ontario Drinking Water Standards (ODWS) was made effective. The regulation focuses on the treatment and testing of drinking water and includes specific provisions for public access to information and notification of adverse results.

Who is responsible for supplying Toronto's water?

The City of Toronto's Water and Wastewater Services Division was created by the amalgamation of the water and sewer functions from seven former municipalities and one public utility commission into the City of Toronto on January 1, 1998. The division is part of Toronto's Works and Emergency Services Department and supplies potable (drinkable) water to the city and treats the city's wastewater.

The Water and Wastewater Services Division headed by General Manager Michael Price, supplies water to 2.4 million Toronto residents and 400,000 residents in York Region through the operation of four water treatment plants, 18 pumping stations, 10 storage reservoirs, 487 kilometres (km) of trunk water mains and 5,347 km of local distribution water mains.

Where does the water come from?

Lake Ontario, eighth largest fresh-water lake in the world (part of the Great Lakes system containing 25 percent of the world's surface freshwater) is the only source of Toronto's drinking water.

The raw water (lake water) is pumped into four water treatment plants from intakes approximately 1 to 3 kilometres offshore and up to 17 metres below the surface.

Because of the location and depth of the intakes, the source water is of very good quality and is not prone to sudden changes.

What is in the source water?

Raw water directly from the lake is not suitable for drinking. There are many impurities in the water that can harm human health if the water is ingested with no treatment. These impurities can be grouped into three categories:

(a) Microbiological: bacteria, algae, viruses, protozoa and other living organisms;

(b) Chemical: substances dissolved in the water from both natural and manufactured sources, which can be further grouped as inorganics, organics and pesticides; and

(c) Physical: materials that primarily make the water appear "cloudy" or "turbid" or unpalatable.

How is the water treated?

The City treats raw water at four filtration plants and produces potable water that meets or exceeds all standards set for drinking water quality by the provincial and federal regulators, and is, therefore, safe to drink.

Three of the four filtration plants are strategically located on the mainland; F.J. Horgan Filtration Plant in the eastend, R.L. Clark Filtration Plant in the westend, and R.C. Harris Filtration Plant located centrally in the beaches area. The fourth plant, Island Filtration Plant, is located on the Toronto Islands and is operated as a summer plant to meet peak demands during warm weather. The Island plant is also operated during spring and fall to supplement production when one of the mainland plants is out of service for maintenance purposes. All of our plant operators are licensed under provincial regulation. The combined rated water production capacity at all plants is 2,300 million litres per day. During the fourth quarter of 2000, a total quantity of 126 billion litres was produced to meet consumer demands.

There are seven different processes that water goes through from the time it enters the plant to the time it is transported through the extensive system of water supply pipes, reservoirs and elevated storage tanks to the consumer's tap:

1. Raw Water Screening

Large particles and debris are removed from the raw water by travelling screens just as the water enters the treatment plants.

2. Coagulation, Flocculation, and Sedimentation

These processes refer to rapid mixing of chemicals known as coagulants or coagulant aids to make the small physical particles in the water clump together (coagulation), and then the gentle mixing to form larger groups of particles known as floc (flocculation). Alum (aluminum sulphate), polyaluminum chloride and a group of chemicals known as polyelectrolytes are the chemicals currently used by the City for this purpose. The thicker, denser floc settles and deposits at the bottom of large sedimentation tanks and the rest is removed during the filtration stage.

3. Taste and Odour Control

Although tap water remains safe to drink during a taste and odour event caused by trace amounts of naturally occurring compounds typically during the late summer, processes to reduce unpleasant taste and odour in the drinking water were put into place at each plant during 1999 and 2000.

Granular activated carbon filters have been installed at two plants. Powdered activated carbon feed systems at the other two plants are placed into service to reduce the intensity of taste and odour in drinking water during an event.

4. Filtration

In this stage, the remaining floc, some chemical and physical impurities, and most of the biological impurities (bacteria, etc.) are removed. The water flows downward by gravity through dual media filters. Dual media filters are made up of layers of granular activated carbon or anthracite, a coal-like mineral, and sand supported on layers of graded gravel. The filtered water is collected via an underdrain system into large tanks for further treatment.

During filtration process, filters must be cleaned (backwashed) on a regular basis as the filters become clogged due to accumulated solids. The backwash procedure involves pumping treated water through the filter in the reverse direction, dislodging and removing accumulated materials, which results in the generation of backwash wastewater.

5. Disinfection

Disinfection, which is the destruction of disease-causing organisms in the raw and treated water through the addition of chlorine, is a vital step in the water treatment process. Chlorine is added to the water at two different points in the treatment process: to the raw water as it enters the plant, through a process known as pre-chlorination, and to the water after the filtration stage, through post-chlorination.

The primary purpose of pre-chlorination is to decrease microbiological activity within the process which could impair treatment performance and impact undesirably on aesthetic quality of the water. During warm water episodes from late spring to autumn, pre-chlorine is applied at the inlet of the offshore intakes to mitigate growth and attachment of zebra mussels inside the intakes and on internal surfaces of plant structures.

Post-chlorine is applied following filtration in sufficient quantities as required to achieve thorough disinfection.

When the levels of bacteria in raw water are high, additional chlorine is added after the filtration stage through a process known as superchlorination. Following a prescribed contact time for effective disinfection, sulphur dioxide is added to the water to remove excess chlorine to an acceptable level of remaining chlorine (called chlorine residual). The concentration of chlorine residual in the treated water leaving filtration plants is approximately 1.0 milligrams per litre (mg/L) or 1 part per million (ppm) to protect quality as the water travels through the extensive watermain distribution network.

6. Fluoridation

Fluoride is added to the water in a carefully controlled manner during the treatment process for control of dental caries. The

new Ontario Drinking Water Standards (ODWS) recommends that the concentration of fluoride be adjusted to 1.0 (plus or minus 0.2) mg/L.

Based on advice from Toronto's Medical Officer of Health, we have maintained the level of fluoride at 0.8 mg/L during 2000, which is consistent with the Health Canada guidelines.

7. Ammoniation

Ammoniation is the final conditioning process in the treatment of drinking water. During ammoniation, ammonia is added to water which reacts with chlorine residual to form combined chlorine residual. This type of chlorine residual lasts longer providing ongoing protection against any potential contamination of water during its travel through the distribution system. Ammoniation also helps to reduce the intensity of chlorinous odours in the drinking water.

When the water has passed through all these processes, it is available for pumping into the distribution system through "high-lift" pumps. Water is then transported through an extensive system of trunk transmission pipes, underground reservoirs, storage tanks, additional pumping stations and a distribution grid of smaller water mains to serve the consumers in the City of Toronto and a major part of the Region of York.

Terms you need to know

Here are some terms you should know about before reading the information below.

MAC
Maximum Acceptable Concentration. This is a health-related Ontario drinking water standard established for contaminants that have known or suspected adverse health effects when above a certain concentration. The length of time the MAC can be exceeded without injury to health will depend on the nature and concentration of the parameter.

IMAC
Interim Maximum Acceptable Concentration. This is a health-related Ontario drinking water standard established for contaminants when there are insufficient toxicological data to establish a MAC with reasonable certainty, or when it is not practical to establish a MAC at the desired level

AO
Aesthetic Objectives. These are for those parameters that are not health-related, but may impair the taste, smell or colour of water.

OG
Operational Guidelines. These are established for parameters which need to be controlled to ensure efficient treatment and distribution of water.

Parameter
This is a substance that we sample and analyze for in the water.

mg/L
Milligram per litre. This is a measure of the concentration of a parameter in water, sometimes called parts per million (ppm).

How is the safety of drinking water assured?

Residents of the City of Toronto and York Region can have complete assurance in the safety of the drinking water. The City of Toronto's four water treatment plants have

highly effective water treatment and quality assurance processes in place to ensure the absence of harmful substances and disease-causing bacteria such as E.Coli in tap water. These processes are based on a multiple barriers concept whereby coagulation, filtration and chlorine disinfection perform complimentary roles in physically removing and inactivating disease causing organisms which might be present. These processes are monitored by continuous analyzers which provide an immediate confirmation of process effectiveness. Back-up systems are in place to ensure that equipment malfunctions are immediately remedied in order to provide seamless treatment.

Water quality guidelines are established by the federal government through the Guidelines for Canadian Drinking Water Quality (GCDWQ) and the provincial government through the Ontario Drinking Water Standards (ODWS) primarily for protection of public health. Drinking water should not contain disease-causing organisms or hazardous concentrations of toxic chemicals or radioactive parameters. It should be noted that Toronto Water Supply has established water quality objectives for specific parameters such as turbidity, which are more stringent than ODWS.

ODWS also specifies guidelines on the number of samples to be taken, the frequency of sampling and the actions to be taken if any sample results indicate adverse water quality. Given the 2.8 million population served by Toronto Water Supply, the water quality sampling and monitoring program far exceeds that specified by the ODWS.

During the treatment process, samples are taken and analyzed to ensure the effectiveness of the treatment process. In addition, a number of key parameters (such as turbidity, chlorine residual, fluoride, etc.) are continuously monitored through on-line instrumentation to ensure that the desired water quality is obtained. The treated water produced at each filtration plant is sampled every four hours to confirm that water is safe for consumption.

The drinking water quality is further monitored throughout the distribution system by a comprehensive sampling and analysis program involving weekly samples at over 100 sampling sites.

Drinking water analysis for hundreds of trace chemical compounds shows that most are not detectable and those that are detected are well below federal and provincial drinking water guidelines.

Independent confirmation of water quality is provided through the Ministry of Environment's (MOE's) Drinking Water Surveillance Program (DWSP). Currently, this program entails regular sampling from each water treatment plant and distribution system locations. Microbiological analyses and analyses for approximately 150 inorganic and organic chemicals, disinfection by-products and pesticides are conducted. MOE's DWSP has served to validate the results of our ongoing comprehensive water quality assurance program.

What do the results indicate?

The results of our extensive water quality assurance program confirm the excellent quality of water produced at Toronto's water treatment plants and supplied to our consumers during the past quarter.

The results of the water quality assurance tests during October to December have been consolidated into Table A for this quarterly report. The results of tests are discussed in the following section. The results have been grouped as microbiological, operational parameters, inorganic and organic chemicals and pesticides.

Microbiological Parameters

Microbiological quality of drinking water is the most important aspect of drinking water quality because of its association with waterborne diseases. The ODWS recommends sampling for raw and treated water several times a week for bacteriological purposes. Our frequency for sampling the raw water is two samples per day at each plant and the treated water at the point of entry to the distribution system is sampled six times per day. During the fourth quarter, the City conducted over 11,500 bacteriological tests on samples from the four filtration plants and the distribution system.

The new ODWS identifies conditions indicating adverse water quality which require initiation of special sampling or corrective action. During the quarter, 99.9 percent of the treated water samples fully met the objectives for acceptable microbiological quality as defined in ODWS. None of the samples indicated unsafe water quality.

Operational Parameters

One of the major objectives of the water treatment process is to remove turbidity. Turbidity is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. Outbreaks of disease traced to water supplies in other parts of the world (such as the 1993 incidence of Cryptosporidiosis in Milwaukee, Wisconsin) have been associated with high turbidity. While the Provincial standard for drinking water still remains at 1.0 Nephelometric Turbidity Unit (NTU), our operating goal for turbidity of the filtered water is currently 0.1 NTU, ten times lower than the Provincial standard. Table A indicates that the average treated water turbidity achieved at our plants during the past quarter was below 0.1 NTU.

Aluminum salts (such as alum or polyaluminum chloride) are used as coagulants during the water treatment process. Coagulation is a critical step in water treatment in order to ensure that the water clarity is as high as possible. While most of the aluminum is removed during the subsequent treatment process, a small amount remains in the water.

In past studies, elevated levels of aluminum had been tentatively linked to the onset of Alzheimer's Disease. Recent evidence, including a study published in the Canadian Medical Association Journal, has indicated that this is likely not the case. Currently, there is no health-related MAC for aluminum. The ODWS states an operational guideline of 0.1 mg/L for residual aluminum. The aluminum levels in drinking water from Toronto plants are closely monitored. The City has maintained a proactive approach to reduce residual aluminum levels in drinking water as much as possible without compromising water quality. The average residual aluminum level in the City's tap water was below 0.04 mg/L during the past quarter.

Inorganic Chemical Parameters

Inorganic parameters such as metals and minerals may be present in the water naturally or as a result of industrial, urban, agricultural activities or other discharges. The ODWS requires analyses of 14 inorganic parameters annually. Toronto Water Supply tested for 34 inorganic parameters during the quarter. As indicated in Table A, the number of inorganics detected was 19, which is typical of the annual results for these parameters. The inorganic parameters which were detected are at extremely low levels, well below the MAC limits.

Organic Chemical Parameters

Organic parameters are present to some degree in all municipal water supplies. Industrial and municipal waste, urban and rural run off and the natural decomposition of biological matter all contribute to the organic content. The ODWS specifies 14 volatile organic compounds, including the trihalomethane group, to be analyzed on a quarterly basis. Toronto Water Supply has been monitoring a significantly larger number of organics on at least a quarterly basis for over two decades. During the fourth quarter, 55 volatile organics, 95 additional organic parameters and 16 additional disinfection by-products (DBPs) were analyzed.

A review of the organic chemical analytical results for the past quarter reveals that only one organic was detected, excluding DBPs, as indicated in Table A. DBPs which include trihalomethanes have received a lot of media attention in the recent past and are described below.

Disinfection By-products

Trihalomethanes (THMs) are one group of disinfection by-products resulting from the use of chlorine to disinfect water to eliminate disease-causing microorganisms which may be present in raw water sources. The maximum limit for THMs in water is currently 0.1 milligrams per litre (mg/L) or parts per million (ppm). The United States Environmental Protection Agency (USEPA) lowered the maximum allowable level in US drinking water to 0.08 mg/L in November 1998. In December 1995, Health Canada's Great Lakes Basin Cancer Risk Assessment Study released a report which linked long term use (over 35 years) of water containing elevated THM levels to an increased risk of bladder and colon cancer. THM levels that were below 0.05 mg/L were not a cause for concern. A 1998 California study linked consumption of water containing THM levels higher than 0.075 mg/L to increased risk of miscarriages. The average THM level in water produced at Toronto's water treatment plants during the past decade has been considerably below the levels of concerns. Over the past ten years, THM levels have been consistently less than 0.02 mg/L. The average THM level during the fourth quarter of 2000 was .012 mg/L and the running annual average of system end samples was .015 mg/L.

Since 1995, we began monitoring for other groups of chlorination by-products called haloacetic acids (HAAs) and haloacetonitriles (HANs). Currently, limits for HAAs and HANs are not stipulated by the ODWS. The levels of these compounds in Toronto's drinking water are significantly below maximum acceptable levels proposed by the USEPA. The levels of HAAs

determined in the fourth quarter as indicated in Table A was .009 mg/L which is much lower than USEPA's maximum contaminant level of 0.06 mg/L.

It must be emphasized that the primary and over-riding public health concern is to provide water that is microbiologically safe. It has in fact been stated that the use of chlorine is one of the most significant public health advances in this century. Other disinfectants such as ozone – which are generally considered to be less effective in disinfecting water – are known to produce other disinfection by-products, which may also be of concern.

Pesticides

The ODWS specifies 44 pesticides that should be tested for on a quarterly basis. The City carries out quarterly tests for 112 pesticides to ensure the safety of drinking water. As shown in Table A, which summarizes pesticide analyses during the past quarter, only 1 pesticide (atrazine) was detected. The actual concentration of atrazine detected in water is 50 times lower than the acceptable MAC specified by the ODWS.

Did we exceed the standards?

Of the 11,540 microbiological tests carried out during the quarter, 14 results were in exceedance of the MAC indicating an adverse water quality condition as defined in the new regulation. The MAC exceedances indicated a possible deterioration in water quality, but not an unsafe condition. Results of subsequent samples and vicinity samples were clear with the exception of two locations, which required flushing of local watermains. Table B summarizes the specifics of each exceedance and action taken to remedy.

There were no exceedances of MACs for any of the other parameters tested over the reporting period.

What measures were taken to comply with the regulation?

Because past practices by the City surpassed the requirements of the new Drinking Water Protection Regulation in most areas, the measures required to comply were limited to:

- Obtaining laboratory accreditation for analyses of specific parameters;
- Implementation of modified adverse water quality notification protocol and posting of warning notices;
- Provision of water quality public information package; and
- Implementation of individual filter grab sampling at one water treatment plant pending installation of continuous monitoring system which is currently in progress.

Table C summarizes regulatory issues and requirements together with past practices and additional measures undertaken by the City to comply with the new Drinking Water Protection Regulations.

Summary

As outlined in this quarterly report, Toronto Water and Wastewater Services has taken all necessary measures to comply with the new Drinking Water Protection Regulations and the Ontario Drinking Water Standards.

The contents of this report demonstrate that Toronto's waterworks practices continue to surpass the requirements of the new regulation in many areas.

The information in this report provides consumers in the City of Toronto and the urban areas of York Region with reasons to have a high level of confidence in the safety and security of their drinking water supply.

January 29, 2001

TABLE A
SUMMARY OF ANALYTICAL RESULTS

FOURTH QUARTER - 2000

MICROBIOLOGICAL PARAMETERS

PARAMETER/LOCATION	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS MEAN	COMMENTS
Coliform Bacteria (CFU/100mL)	0*		Oct-Dec		1 CFU/100 mL					Indicates possible contamination by fecal material.
F.J.Horgan Filtration Plant				552		0	0	0	0.0000	
R.C.Harris Filtration Plant				552		0	0	0	0.0000	
Island Filtration Plant				80		0	0	0	0.0000	
R.L.Clark Filtration Plant				486		3	1	0	0.0045	
Distribution				1215		2	1	0	0.0011	
Fecal Coliform Bacteria (CFU/100mL)	0*		Oct-Dec		1 CFU/100 mL					Indicates likely contamination by fecal material.
F.J.Horgan Filtration Plant				552		0	0	0	0.0000	
R.C.Harris Filtration Plant				552		0	0	0	0.0000	
Island Filtration Plant				80		0	0	0	0.0000	
R.L.Clark Filtration Plant				486		0	0	0	0.0000	
Distribution				1215		0	0	0	0.0000	
Background Bacteria (MF-CFU/100mL)	200*		Oct-Dec		1 CFU/100 mL					Indicates general bacterial presence.
F.J.Horgan Filtration Plant				552		1	1	0	0.0012	
R.C.Harris Filtration Plant				552		0	0	0	0.0000	
Island Filtration Plant				80		0	0	0	0.0000	
R.L.Clark Filtration Plant				486		2	1	0	0.0025	
Distribution				1215		38	2000	0	0.0938	
Heterotrophic Plate Count (CFU/mL)	500*		Oct-Dec		1 CFU/mL					Indicates general bacterial presence.
F.J.Horgan Filtration Plant				552		28	130	0	0.0562	
R.C.Harris Filtration Plant				552		11	11	0	0.0360	
Island Filtration Plant				80		3	2	0	0.1193	
R.L.Clark Filtration Plant				486		24	32	0	0.0440	
Distribution				1215		200	420	0	0.2047	

Notes: * Counts exceeding these limits are indicative of adverse water qualty.
CFU = Colony Forming Units

OPERATIONAL PARAMETERS

PARAMETER/LOCATION	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Chlorine Residual (Total-mg/L)	3		Oct-Dec							Chloramine is the major component of the total chlorine residual.
F.J.Horgan Filtration Plant				Continuous		N/A	1.2	0.77	0.99	The maintenance of an adequate residual during water distribution is
R.C.Harris Filtration Plant				monitoring			1.65	0	0.97	sessential to the protection of public health.
Island Filtration Plant				at plants.			1.12	0.5	0.89	Minimum residual reported at the R.C.Harris plant resulted from over
R.L.Clark Filtration Plant							1.2	0.45	0.92	dechlorination rather than inadequate treatment.
Distribution				1205		1205	1.38	0.08	0.83	
Turbidity (NTU)	1		Oct-Dec							Turbidity (cloudiness) of water is an indication of the presence of
F.J.Horgan Filtration Plant				Continuous		N/A	0.17	0.03	0.05	particles such as bacteria in the water. If excessive, this may interfere
R.C.Harris Filtration Plant				monitoring			0.12	0.03	0.05	with proper disinfection.
Island Filtration Plant				at plants.			0.12	0.05	0.08	
R.L.Clark Filtration Plant							0.16	0.02	0.03	
Fluoride (mg/L)	1.5		Oct-Dec							Naturally occuring fluoride levels are supplemented during treatment to
F.J.Horgan Filtration Plant				644		644	1.1	0.7	0.82	achieve the optimum level of 0.8 mg/L as recommended by the
R.C.Harris Filtration Plant				644		644	0.9	0.5	0.79	Medical Officer of Health.
Island Filtration Plant				94		94	0.82	0.24	0.73	
R.L.Clark Filtration Plant				552		552	0.9	0.17	0.70	
Aluminum (mg/L)		0.1	Oct-Dec		0.005					Aluminum levels are slightly elevated during treatement as a result of
F.J.Horgan Filtration Plant				92		92	0.081	0.017	0.040	the use of alum to help in the removal of bacteria and particulates.
R.C.Harris Filtration Plant				92		92	0.074	0.012	0.030	
Island Filtration Plant				15		15	0.056	0.02	0.033	
R.L.Clark Filtration Plant				92		92	0.079	0.012	0.035	

GENERAL CHEMISTRY AND PHYSICAL PARAMETERS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Alkalinity		30-500	Oct-Dec	11		11	91	77	82	Due to natural mineral content.
Ammonia, Total			Oct-Dec	1696		1696	0.3	0.04	0.189	Result of water chloramination.
Carbon Dioxide, Free			Oct/Nov	3		3	8.2	5.5	7.1	
Colour (True Colour Units)		5	Oct-Dec	182		182	1	1	1	
Conductivity (u mho/cm)			Oct-Dec	11		11	317	294	306	Indicator of dissolved solids.
Hardness		80-100	Oct-Dec	11		11	128	124	126	Moderate hardness due to mineral content.
Nitrilotriacetic Acid (NTA)	0.4		Oct 16,17,19	5	0.05	0	0	0	0	
Organic Nitrogen		0.15	Oct-Dec	10		10	0.311	0.073	0.172	
Oxygen, Dissolved			Oct-Dec	7		7	13	9.9	11.9	
pH (pH Units)		6.5-8.5	Oct-Dec	183		183	7.6	7.2	7.4	
Temperature (deg. C Raw water)		15	Oct-Dec	Continuous			14.5	1.4	7.7	
Total Dissolved Solids		500	Oct/Nov	3		3	195	181	186	Due to natural mineral content.
Total Organic Carbon		5	Oct-Dec	11		11	2.2	1.6	2.0	Dissolved organic carbon is a component of the total as listed.

Notes: All parameters are measured in mg/L unless otherwise noted.
The results listed represent water from all four water treatment plants.

INORGANIC PARAMETERS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Antimony			Oct 16,17,19	5	0.0005	0	0	0	0	
Arsenic	0.025		Oct 16,17,19	5	0.002	0	0	0	0	
Barium	1		Oct 16,17,19	5	0.005	5	0.027	0.02	0.022	Common mineral constituent.
Beryllium			Oct 16,17,19	5	0.001	0	0	0	0	
Boron	5		Oct 16,17,19	5	0.005	5	0.02	0.017	0.018	Common mineral constituent.
Cadmium	0.005		Oct 16,17,19	5	0.0001	0	0	0	0	
Calcium			Oct 16,17,19	5	0.5	5	36.9	35.8	36.6	Mineral largely responsible for water hardness.
Chloride		250	Oct-Dec	11		11	28	23	25	Common mineral constituent.
Chromium	0.05		Oct 16,17,19	5	0.005	0	0	0	0	
Cobalt			Oct 16,17,19	5	0.0001	0	0	0	0	
Copper		1	Oct 16,17,19	5	0.0005	5	0.015	0.0005	0.0042	Common mineral constituent.
Cyanide	0.2		Oct 16,17,19	5	0.001	0	0	0	0	
Iron		0.3	Oct-Dec	11	0.001	11	0.008	0	0.003	Common mineral constituent.
Lead	0.01		Oct 16,17,19	6	0.0005	1	0.003	0	0.0005	
Magnesium			Oct 16,17,19	5	0.05	5	8.4	8.0	8.2	Common mineral constituent.
Manganese		0.05	Oct 16,17,19	5	0.005	0	0	0	0	
Mercury	0.001		Oct 16,17,19	5	0.00005	1	0.00005	0	0.00001	
Molybdenum			Oct 16,17,19	5	0.001	5	0.001	0.001	0.001	
Nickel			Oct 16,17,19	5	0.001	0	0	0	0	
Nitrate	10		Oct-Dec	11		11	0.540	0.300	0.417	Natural constituent but may be elevated in agricultural areas.
Nitrite	1		Oct-Dec	11	0.01	0	0	0	0	
Phosphorous			Oct 16,17,19	5	0.05	0	0	0	0	
Potassium			Oct 16,17,19	5	0.1	5	1.7	1.6	1.7	Common mineral constituent.
Selenium	0.01		Oct 16,17,19	5	0.002	0	0	0	0	
Silica			Oct,Dec	7		7	1.7	1	1.4	Natural constituent increased by fluoridation.
Silver			Oct 16,17,19	5	0.0001	0	0	0	0	
Sodium		200	Oct 16,17,19	5	0.1	5	11.5	10.8	11.2	Natural constituent which may increase during winter snowmelt.
Strontium			Oct 16,17,19	5	0.001	5	0.168	0.163	0.166	Common mineral constituent.
Sulphate		500	Oct-Dec	11		11	35	28	32	Natural constituent increased during water dechlorination.
Thallium			Oct 16,17,19	5	0.00005	0	0	0	0	
Titanium			Oct 16,17,19	5	0.005	0	0	0	0	
Uranium	0.1		Oct 16,17,19	5	0.0001	5	0.0003	0.0002	0.0003	Common mineral constituent.
Vanadium			Oct 16,17,19	5	0.0005	5	0.0011	0.0007	0.0008	Common mineral constituent.
Zinc		5	Oct 16,17,19	5	0.005	1	0.018	0	0.004	

Notes: All parameters are measured in mg/L unless otherwise noted.
The results listed represent water from all four water treatment plants.
Lead Results presented include a value of 0.003 mg/L as obtained from a sample representing maximum residence time in the distribution system.

ORGANIC PARAMETERS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Acenaphthene			Oct/Nov	5	0.0003	0				
Acenaphthylene			Oct/Nov	5	0.0004	0				
Acrolein			Oct/Nov	10	0.001	0				
Acrylonitrile			Oct/Nov	10	0.001	0				
Anisole			Oct/Nov	5	0.00001	0				
Anthanthrene			Oct/Nov	5	0.0009	0				
Anthracene			Oct/Nov	5	0.0001	0				
Aroclor1016	0.003		Oct/Nov	5	0.00002	0				
Aroclor1221	0.003		Oct/Nov	5	0.00002	0				
Aroclor1232	0.003		Oct/Nov	5	0.00002	0				
Aroclor1242	0.003		Oct/Nov	5	0.00002	0				
Aroclor1248	0.003		Oct/Nov	5	0.00002	0				
Aroclor1254	0.003		Oct/Nov	5	0.00002	0				
Aroclor1260	0.003		Oct/Nov	5	0.00002	0				
Benzene	0.005		Oct/Nov	10	0.0001	0				
Benzidine			Oct/Nov	5	0.0028	0				
Benzo(a)anthracene			Oct/Nov	5	0.0002	0				
Benzo(a)pyrene	0.00001		Oct/Nov	5	0.00001	0				
Benzo(b)chrysene			Oct/Nov	5	0.0009	0				
Benzo(b/j)fluoranthene			Oct/Nov	5	0.0004	0				
Benzo(e)pyrene			Oct/Nov	5	0.0005	0				
Benzo(g,h,i)perylene			Oct/Nov	5	0.0008	0				
Benzo(k)fluoranthene			Oct/Nov	5	0.0005	0				
Biphenyl			Oct/Nov	5	0.0006	0				
Bromobenzene			Oct/Nov	10	0.0004	0				
Bromochloromethane			Oct/Nov	10	0.0004	0				
4-Bromophenyl-phenylether			Oct/Nov	5	0.0005	0				
n-Butylbenzene			Oct/Nov	10	0.0003	0				
sec-Butylbenzene			Oct/Nov	10	0.0002	0				
tert-Butylbenzene			Oct/Nov	10	0.0002	0				
Butylbenzylphthalate			Oct/Nov	5	0.0002	0				
Camphene			Oct/Nov	5	0.0005	0				
Carbon tetrachloride	0.005		Oct/Nov	10	0.0008	0				
4-Chloro-3-methylphenol			Oct/Nov	5	0.0005	0				
Chlorobenzene	0.08	0.03	Oct/Nov	10	0.0002	0				
Bis(2-Chloroethoxy)methane			Oct/Nov	5	0.0005	0				
Bis(2-Chloroethyl)ether			Oct/Nov	5	0.0004	0				
Bis(2-Chloroisopropyl)ether			Oct/Nov	5	0.0007	0				
1-Chloronaphthalene			Oct/Nov	5	0.0006	0				
2-Chloronaphthalene			Oct/Nov	5	0.0004	0				
2-Chlorophenol			Oct/Nov	5	0.0003	0				
4-Chlorophenyl-phenylether			Oct/Nov	5	0.0005	0				
2-Chlorotoluene			Oct/Nov	10	0.0002	0				
4-Chlorotoluene			Oct/Nov	10	0.0005	0				
Chrysene			Oct/Nov	5	0.0003	0				
Coronene			Oct/Nov	5	0.0009	0				
Di-n-butylphthalate			Oct/Nov	5	0.0005	0				
Di-n-octylphthalate			Oct/Nov	5	0.0006	0				
Dibenz(a,h)anthracene			Oct/Nov	5	0.0008	0				
1,2-Dibromo-3-chloropropane			Oct/Nov	10	0.0006	0				
1,2-Dibromoethane			Oct/Nov	10	0.0004	0				
Dibromomethane			Oct/Nov	10	0.0004	0				
2,4-Dichloroanisole			Oct/Nov	5	0.00001	0				
1,2-Dichlorobenzene	0.2	0.003	Oct/Nov	10	0.0003	0				
1,3-Dichlorobenzene			Oct/Nov	10	0.0002	0				
1,4-Dichlorobenzene	0.005	0.001	Oct/Nov	10	0.0004	0				
3,3-Dichlorobenzidine			Oct/Nov	5	0.0006	0				
1,1-Dichloroethane			Oct/Nov	10	0.0002	0				
1,2-Dichloroethane	0.005		Oct/Nov	10	0.0002	0				
1,1-Dichloroethylene	0.014		Oct/Nov	10	0.0002	0				
cis-1,2-Dichloroethene			Oct/Nov	10	0.0005	0				
trans-1,2-Dichloroethene			Oct/Nov	10	0.0002	0				

ORGANIC PARAMETERS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Dichloromethane	0.05		Oct/Nov	10	0.0003	0				
2,4-Dichlorophenol	0.9	0.0003	Oct/Nov	5	0.0002	0				
2,6-Dichlorophenol			Oct/Nov	5	0.0004	0				
1,2-Dichloropropane			Oct/Nov	10	0.0002	0				
1,3-Dichloropropane			Oct/Nov	10	0.0003	0				
2,2-Dichloropropane			Oct/Nov	10	0.0005	0				
1,1-Dichloropropene			Oct/Nov	10	0.0002	0				
cis-1,3-Dichloropropene			Oct/Nov	10	0.0002	0				
trans-1,3-Dichloropropene			Oct/Nov	10	0.0002	0				
Diethylphthalate			Oct/Nov	5	0.0004	0				
7,12-Dimethylbenz(a)anthracene			Oct/Nov	5	0.0003	0				
2,4-Dimethylphenol			Oct/Nov	5	0.0005	0				
Dimethylphthalate			Oct/Nov	5	0.0006	0				
4,6-Dinitro-2-methylphenol			Oct/Nov	5	0.0004	0				
2,4-Dinitrophenol			Oct/Nov	5	0.001	0				
2,4-Dinitrotoluene			Oct/Nov	5	0.0005	0				
2,6-Dinitrotoluene			Oct/Nov	5	0.0004	0				
Dioxin & Furan	0.000000015			0		0				Not previoulsy found in any samples analyzed to date.
Diphenyl ether			Oct/Nov	5	0.0005	0				
1,2-Diphenylhydrazine(Azobenzene)			Oct/Nov	5	0.0003	0				
Ethylbenzene		0.0024	Oct/Nov	10	0.0001	0				
Bis(2-Ethylhexyl)phthalate			Oct/Nov	1	0.001	0				
Fluoranthene			Oct/Nov	5	0.0002	0				
Fluorene			Oct/Nov	5	0.0004	0				
Geosmin			Oct/Nov	5	0.00001	0				
Hexachlorobenzene			Oct/Nov	5	0.000002	0				
Hexachlorobutadiene			Oct/Nov	5	0.000002	0				
Hexachlorocyclopentadiene			Oct/Nov	5	0.000005	0				
Hexachloroethane			Oct/Nov	5	0.000005	0				
Indeno(1,2,3-cd)pyrene			Oct/Nov	5	0.0008	0				
Indole			Oct/Nov	5	0.0006	0				
2-Isobutyl-3-methoxypyrazine			Oct/Nov	5	0.00001	0				
Isophorone			Oct/Nov	5	0.0003	0				
2-Isopropyl-3-methoxypyrazine			Oct/Nov	5	0.00001	0				
Isopropylbenzene			Oct/Nov	10	0.0002	0				
p-Isopropyltoluene			Oct/Nov	10	0.0004	0				
2-Methylisoborneol (MIB)			Oct/Nov	5	0.00001	0				
1-Methylnaphthalene			Oct/Nov	5	0.0007	0				
2-Methylnaphthalene			Oct/Nov	5	0.0006	0				
2-Methylphenol (o-Cresol)			Oct/Nov	5	0.0004	0				
4 & 3-Methylphenol (p & m-Cresol)			Oct/Nov	5	0.0005	0				
Methyl-tert-butyl ether (MTBE)			Oct/Nov	10	0.0002	0				
Naphthalene			Oct/Nov	10	0.0004	0				
5-Nitroacenaphthene			Oct/Nov	5	0.0006	0				
Nitrobenzene			Oct/Nov	5	0.0005	0				
2-Nitrophenol			Oct/Nov	5	0.0004	0				
4-Nitrophenol			Oct/Nov	5	0.0015	0				
n-Nitroso-di-n-propylamine			Oct/Nov	5	0.0004	0				
n-Nitrosodimethylamine (NDMA)	0.000009		Oct/Nov	5	0.000001	4	0.0000019	0	0.0000010	Possible source under investigation.
n-Nitrosodiphenylamine/Diphenylamine			Oct/Nov	5	0.0005	0				
Nonylphenol			Oct/Nov	5	0.0004	0				
Pentachlorobenzene			Oct/Nov	5	0.000002	0				
Pentachlorophenol	0.06	0.03	Oct/Nov	5	0.0001	0				
Perylene			Oct/Nov	5	0.0005	0				
Phenanthrene			Oct/Nov	5	0.0002	0				
Phenol			Oct/Nov	5	0.0004	0				
n-Propylbenzene			Oct/Nov	10	0.0002	0				
Pyrene			Oct/Nov	5	0.0002	0				

ORGANIC PARAMETERS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Styrene			Oct/Nov	10	0.0002	0				
2,3,4,6-Tetrachloroanisole			Oct/Nov	5	0.00001	0				
1,2,3,4-Tetrachlorobenzene			Oct/Nov	5	0.000002	0				
1,2,3,5-Tetrachlorobenzene			Oct/Nov	5	0.000002	0				
1,2,4,5-Tetrachlorobenzene			Oct/Nov	5	0.000002	0				
1,1,1,2-Tetrachloroethane			Oct/Nov	10	0.0003	0				
1,1,2,2-Tetrachloroethane			Oct/Nov	10	0.0004	0				
Tetrachloroethylene	0.03		Oct/Nov	10	0.0004	0				
2,3,4,5-Tetrachlorophenol			Oct/Nov	5	0.0006	0				
2,3,4,6-Tetrachlorophenol	0.1	0.001	Oct/Nov	5	0.0001	0				
2,3,5,6-Tetrachlorophenol			Oct/Nov	5	0.0005	0				
Toluene		0.024	Oct/Nov	10	0.0001	0				
2,4,6-Trichloroanisole			Oct/Nov	5	0.00001	0				
2,3,6-Trichloroanisole			Oct/Nov	5	0.00001	0				
1,2,3-Trichlorobenzene			Oct/Nov	5	0.000005	0				
1,2,4-Trichlorobenzene			Oct/Nov	5	0.000005	0				
1,3,5-Trichlorobenzene			Oct/Nov	5	0.000003	0				
1,1,1-Trichloroethane			Oct/Nov	10	0.0003	0				
1,1,2-Trichloroethane			Oct/Nov	10	0.0003	0				
Trichloroethylene	0.05		Oct/Nov	10	0.0002	0				
2,4,6-Trichlorophenol	0.005	0.002	Oct/Nov	5	0.0002	0				
2,3,4-Trichlorophenol			Oct/Nov	5	0.0006	0				
2,3,5-Trichlorophenol			Oct/Nov	5	0.0005	0				
2,4,5-Trichlorophenol			Oct/Nov	5	0.0007	0				
1,2,3-Trichloropropane			Oct/Nov	10	0.0004	0				
2,3,6-Trichlorotoluene			Oct/Nov	5	0.000002	0				
2,4,5-Trichlorotoluene			Oct/Nov	5	0.000002	0				
a,2,6-Trichlorotoluene			Oct/Nov	5	0.000002	0				
1,2,4-Trimethylbenzene			Oct/Nov	10	0.0003	0				
1,3,5-Trimethylbenzene			Oct/Nov	10	0.0005	0				
Vinyl Chloride	0.002		Oct/Nov	4	0.001	0				
m- & p-Xylene		0.3	Oct/Nov	10	0.0002	0				
o-Xylene		0.3	Oct/Nov	10	0.0002	0				

DISINFECTION BYPRODUCTS

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
a) TRIHALOMETHANES										
Bromodichloromethane			Oct/Nov	10	0.0004	10	0.0064	0.0015	0.0044	These byproducts are formed by chemical reaction of chlorine with
Bromoform			Oct/Nov	10	0.0009	0	0.0000	0.0000	0.0000	naturally occuring organic matter. The maintenance of a chloramine
Chloroform			Oct/Nov	10	0.0004	10	0.0076	0.0025	0.0051	residual within the City's distribution system provides protection
Dibromochloromethane			Oct/Nov	10	0.0006	10	0.0040	0.0010	0.0029	from microbiological contamination while minimizing further formation
Total THM (all samples this quarter)			Oct/Nov	10		10	0.0177	0.0050	0.0124	of these chemicals.
Total THM (system end, past 12 mo.)	0.1		Jan-Oct/00	10		10	0.0287	0.0119	0.0149	Standard is based on running annual average of system end samples.
b) HALOACETIC ACIDS										
Bromoacetic acid			Oct/Nov	5	0.0003	3	0.0004	0.0000	0.0002	While this group of disinfection byproducts is not regulated in Ontario,
Bromochloroacetic acid			Oct/Nov	5	0.0006	5	0.0019	0.0006	0.0014	the US-EPA has set a maximum contaminant level of 0.06 mg/L
Bromodichloroacetic acid			Oct/Nov	5	0.0006	5	0.0021	0.0006	0.0014	for a sum of 5 of these compounds.
Chloroacetic acid			Oct/Nov	5	0.001	0				
Chlorodibromoacetic acid			Oct/Nov	5	0.0005	4	0.0008	0.0000	0.0005	
Dibromoacetic acid			Oct/Nov	5	0.0002	5	0.0011	0.0004	0.0007	
Dichloroacetic acid			Oct/Nov	5	0.0004	5	0.0042	0.0012	0.0028	
Tribromoacetic acid			Oct/Nov	5	0.0005	0				
Trichloroacetic acid			Oct/Nov	5	0.0004	5	0.0024	0.0008	0.0018	
Total HAA-9			Oct/Nov	5		5	0.0123	0.0036	0.0088	
c) OTHERS										
Bromochloroacetonitrile			Oct/Nov	5	0.0002	5	0.0008	0.0004	0.0006	These chlorination byproducts are not currently regulated.
Chloropicrin			Oct/Nov	5	0.0002	0				
Dibromoacetonitrile			Oct/Nov	5	0.0002	5	0.0003	0.0002	0.0003	
1,1-Dichloro-2-propanone			Oct/Nov	5	0.0002	2	0.0003	0.0000	0.0001	
Dichloroacetonitrile			Oct/Nov	5	0.0002	5	0.0008	0.0003	0.0006	
1,1,1-Trichloro-2-propanone			Oct/Nov	5	0.0002	4	0.0004	0.0000	0.0003	
Trichloroacetonitrile			Oct/Nov	5	0.0002	0				

Notes: All parameters are measured in mg/L unless otherwise noted.
The results listed represent water from all four water treatment plants.

PESTICIDES

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Acifliorfen			Oct/Nov	5	0.0005	0				
Alachlor	0.005		Oct/Nov	5	0.000005	0				
Aldicarb	0.009		Oct/Nov	5	0.0004	0				
Aldrin	0.0007		Oct/Nov	5	0.000002	0				
Ametryne			Oct/Nov	5	0.00006	0				
Aminocarb			Oct/Nov	5	0.0003	0				
Atraton			Oct/Nov	5	0.0002	0				
Atrazine	0.005		Oct/Nov	5	0.00007	3	0.00012	0	0.000062	Commonly used agricultural pesticide.
Azinphos Methyl	0.02		Oct/Nov	5	0.00005	0				
Bendiocarb	0.04		Oct/Nov	5	0.0004	0				
Bentazon			Oct/Nov	5	0.0006	0				
alpha BHC			Oct/Nov	5	0.000002	0				
beta BHC			Oct/Nov	5	0.000002	0				
delta BHC			Oct/Nov	5	0.000002	0				
gamma BHC (Lindane)	0.004		Oct/Nov	5	0.000002	0				
Bromoxynil	0.005		Oct/Nov	5	0.0002	0				
Butylate			Oct/Nov	5	0.0002	0				
Carbaryl	0.09		Oct/Nov	5	0.00004	0				
Carbofuran	0.09		Oct/Nov	5	0.00003	0				
Carbophenothion			Oct/Nov	5	0.000002	0				
alpha Chlordane			Oct/Nov	5	0.000002	0				
gamma Chlordane			Oct/Nov	5	0.000002	0				
Oxy Chlordane			Oct/Nov	5	0.000002	0				
Chlordane	0.007		Oct/Nov	5	0.00002	0				
Chlorpyrifos (Dursban)	0.09		Oct/Nov	5	0.00002	0				
Chlorpyrifos methyl (Reldan)			Oct/Nov	5	0.00001	0				
Coumaphos			Oct/Nov	5	0.00005	0				
Cyanazine (Bladex)	0.01		Oct/Nov	5	0.0001	0				
Dalapon			Oct/Nov	5	0.0004	0				
DCPA (Dacthal)			Oct/Nov	5	0.000002	0				
DCPA, di acid			Oct/Nov	5	0.0005	0				
2,4-D	0.1		Oct/Nov	5	0.00002	0				
2,4-DB			Oct/Nov	5	0.00005	0				
2,4'-DDD	0.03		Oct/Nov	5	0.000002	0				
4,4'-DDD	0.03		Oct/Nov	5	0.000002	0				
2,4'-DDE	0.03		Oct/Nov	5	0.000002	0				
4,4'-DDE	0.03		Oct/Nov	5	0.000002	0				
O,P'-DDT (2,4'-DDT)	0.03		Oct/Nov	5	0.000002	0				
4,4'-DDT	0.03		Oct/Nov	5	0.000002	0				
Demeton-S			Oct/Nov	5	0.0002	0				
Desethylatrazine			Oct/Nov	5	0.0002	0				
Diallate,cis			Oct/Nov	5	0.00001	0				
Diallate,trans			Oct/Nov	5	0.00002	0				
Diazinon	0.02		Oct/Nov	5	0.00001	0				
Dicamba	0.12		Oct/Nov	5	0.0002	0				
Dichlofenthion			Oct/Nov	5	0.00002	0				
Dichloran			Oct/Nov	5	0.000002	0				
3,5-Dichlorobenzoic acid			Oct/Nov	5	0.0005	0				
Dichlorprop			Oct/Nov	5	0.0002	0				
Dichlorvos			Oct/Nov	5	0.0002	0				
Diclofop-methyl	0.009		Oct/Nov	5	0.00002	0				
Dicofol			Oct/Nov	5	0.00001	0				
Dieldrin	0.0007		Oct/Nov	5	0.000002	0				
Dimethoate	0.02		Oct/Nov	5	0.0001	0				
Dinoseb	0.01		Oct/Nov	5	0.0004	0				
Dioxathion			Oct/Nov	5	0.00006	0				
Diquat	0.07		Oct/Nov	5	0.0001	0				
Disulfoton			Oct/Nov	5	0.00002	0				
Diuron	0.15		Oct/Nov	5	0.00002	0				
Endosulfan I			Oct/Nov	5	0.000002	0				
Endosulfan II			Oct/Nov	5	0.000002	0				
Endosulfan sulfate			Oct/Nov	5	0.000002	0				
Endrin			Oct/Nov	5	0.000002	0				
Endrin aldehyde			Oct/Nov	5	0.000002	0				
Endrin ketone			Oct/Nov	5	0.000002	0				
Ethion			Oct/Nov	5	0.00001	0				
Glyphosphate	0.28		Oct/Nov	5	0.01	0				

PESTICIDES

PARAMETER	STANDARD MAC/IMAC	OBJECTIVE AO/OG	SAMPLING DATE	NUMBER OF SAMPLES	METHOD DETECTION LIMIT	NUMBER OF DETECTABLE RESULTS	RESULTS MAX.	RESULTS MIN.	RESULTS AVG.	COMMENTS
Heptachlor	0.003		Oct/Nov	5	0.000002	0				
Heptachlor epoxide	0.003		Oct/Nov	5	0.000002	0				
3-Hydroxy carbofuran			Oct/Nov	5	0.0008	0				
Isodrin			Oct/Nov	5	0.000002	0				
Linuron			Oct/Nov	5	0.0004	0				
Malathion	0.19		Oct/Nov	5	0.00003	0				
Methoxychlor	0.9		Oct/Nov	5	0.000003	0				
Metolachlor	0.05		Oct/Nov	5	0.0003	0				
Metribuzin (Sencor)	0.08		Oct/Nov	5	0.0001	0				
Mevinphos (Phosdrin)			Oct/Nov	5	0.00007	0				
Mexacarbate			Oct/Nov	5	0.0002	0				
Mirex			Oct/Nov	5	0.000002	0				
Octachlorostyrene			Oct/Nov	5	0.000002	0				
Paraquat	0.01		Oct/Nov	5	0.0002	0				
Parathion ethyl	0.05		Oct/Nov	5	0.00001	0				
Parathion methyl			Oct/Nov	5	0.00002	0				
PCNB(Pentachloronitrobenzene)			Oct/Nov	5	0.000002	0				
Perthane			Oct/Nov	5	0.00001	0				
Phorate	0.002		Oct/Nov	5	0.00002	0				
Picloram	0.19		Oct/Nov	5	0.0007	0				
Prometon			Oct/Nov	5	0.0001	0				
Prometryn	0.001		Oct/Nov	5	0.00006	0				
Propazine			Oct/Nov	5	0.00006	0				
Propham			Oct/Nov	5	0.0001	0				
Propoxur(Baygon)			Oct/Nov	5	0.00005	0				
Ronnel (Fenchlorophos)			Oct/Nov	5	0.00004	0				
Secbumeton			Oct/Nov	5	0.0002	0				
Siduron			Oct/Nov	5	0.0002	0				
Simazine	0.01		Oct/Nov	5	0.00008	0				
Strobane			Oct/Nov	5	0.00005	0				
SWEP			Oct/Nov	5	0.0004	0				
2,4,5-T	0.28	0.02	Oct/Nov	5	0.0002	0				
Temephos (Abates)	0.28		Oct/Nov	5	0.00009	0				
Terbufos	0.001		Oct/Nov	5	0.00002	0				
Terbuthylazine			Oct/Nov	5	0.0002	0				
Terbutryn			Oct/Nov	5	0.00006	0				
Toxaphene			Oct/Nov	5	0.00005	0				
2,4,5-TP(Silvex)			Oct/Nov	5	0.00002	0				
Tri-m-cresylphosphate			Oct/Nov	5	0.00006	0				
Tri-o-cresylphosphate			Oct/Nov	5	0.00006	0				
Tri-p-cresylphosphate			Oct/Nov	5	0.00006	0				
Triallate	0.23		Oct/Nov	5	0.00006	0				
Triethylphosphate			Oct/Nov	5	0.0001	0				
Trifluralin	0.045		Oct/Nov	5	0.000003	0				
Triphenylphosphate			Oct/Nov	5	0.0002	0				

Notes: All parameters are measured in mg/L unless otherwise noted.
The results listed represent water from all four water treatment plants.

January 29, 2001

TABLE B
SAMPLES INDICATING ADVERSE WATER QUALITY
FOURTH QUARTER - 2000

SAMPLE DATE	SAMPLE LOCATION	MICROBIOLOGICAL INDICATOR	MAC	TEST RESULT	ACTION TAKEN: NOTIFICATION MOE	NOTIFICATION MOH	RESAMPLE	VICINITY SAMPLES	TEST RESULTS	COMMENTS
PRODUCTION - During the quarter, 6,677 samples met bacteriological standards. Three samples were in exceedance of MAC:										
4-Nov	R.L. Clark F.P.	Total Coliform	0	1	X	X	X	X	0	Isolated total coliform presence in plant treated water. All subsequent and vicinity samples clear.
27-Nov			0	1	X	X	X	X	0	
10-Dec			0	1	X	X	X	X	0	
DISTRIBUTION - During the quarter, 4,849 samples met bacteriological standards. Eleven samples were in exceedance of MAC:										
20-Oct	The Queensway at South Kingsway	Background Colonies	200	330	X	X	X	X	0	Local condition at service station. Incoming, vicinity and resamples clear.
24-Oct	Bloor Street West at Prince Edward Drive	Background Colonies	200	580	X	X	X	X	0	Local condition at service station. Incoming, vicinity and resamples clear.
25-Oct	Bloor Street East of Yonge	Heterotrophic Plate Count	500	820	X	X	X	X	0	Local condition at office building. Incoming, vicinity and resamples clear.
30-Oct	Sheppard East at Victoria Park	Total Coliform	0	1	X	X	X	X	0	Local condition at service station. Incoming and vicinity samples clear.
31-Oct	Sheppard East at Victoria Park	Background Colonies	200	300	X	X	X	X	0	Resample at service station. Incoming, vicinity and resamples clear.
30-Oct	Granard Blvd.	Total Coliform	0	3	X	X	X	X	0-2	Samples from surface mains. Resident advised to boil water
1-Nov	(Eglinton & Bellamy)		0	2	X	X	X	X	0	as precaution on November 2. Consecutive resamples and vicinity samples clear from refurbished local water mains.
1-Nov	Granard Blvd. (Eglinton & Bellamy)	Heterotrophic Plate Count	500	1100	X	X	X	X	0	Sample from surface mains. Consecutive resamples and vicinity samples clear from refurbished local mains.
4-Nov	Finch Avenue East at Kennedy	Total Coliform	0	1	X	X	X	X	0	Local condition at service station. Incoming, vicinity and resamples clear.
9-Nov	Sheppard Ave. West at Wilson	Background Colonies	200	420	X	X	X	X	0	Local condition at service station. Incoming, vicinity and resamples clear.
13-Nov	Kingston Road at Main Street	Background Colonies	200	2000	X	X	X	X	0	Local condition at donut shop. Incoming, vicinity and resamples clear.

NOTES: For Microbiological Indicators, MAC (Maximum Acceptable Concentration) and Test Results units are:
Total Coliform Bacteria (CFU/100 mL)
Background Colonies (CFU/100 mL)
Heterotrophic Plate Count (CFU/mL)

January 29, 2001

TABLE C

MEASURES TAKEN TO COMPLY WITH REGULATIONS

REGULATION ISSUE	REQUIREMENT	PAST PRACTICES	ADDITIONAL MEASURES TAKEN	COMMENTS
Minimum level of treatment	Chemically assisted filtration and continuous chlorination	All water treatment plants employ continuous coagulation, filtration and continuous two-stage chlorination processes.	None required.	Level of treatment surpasses minimum level defined in regulations.
Microbiological Sampling and Analysis	**Parameters**: - Total Coliform - Fecal Coliform or EColi - Heterotophic Plate Count or Background Colonies on 25% of samples **Frequency**: - Raw water Source - weekly - Plant treated water - weekly - Distribution system - 340 monthly	 - Total Coliform - Fecal Coliform - Background Colonies - Heterotophic Plate Count on all samples. - twice daily - every four hours - 400 monthly	None required.	Sampling and analytical program scope surpasses regulatory requirements.
Operational Parameter Analysis	- **Individual Filter Turbidity** - continuous monitoring or grab sample every 4 hours - **Chlorine Residual** - continuous monitoring - simultaneous sampling with microbiological sampling - **Fluoride** - continuous monitoring or daily grab samples	Continuous monitoring at Horgan, Clark and Island Plants - Continuous monitoring - Simultaneous sampling with microbiological sampling - Continuous monitoring and grab samples six times daily	Grab samples every 4 hours at Harris Plant. None required. None required. None required.	Individual filter turbidimeters being installed at Harris Plant to enable continuous monitoring.
Inorganic Analysis	14 parameters annually	34 parameters quarterly	None required.	Surpasses regulatory requirements.
Nitrates/Nitrites Analysis	Quarterly	Quarterly	None required.	
Organics Analysis	14 volatile organic parameters quarterly	55 volatile organics quarterly 95 additional organics quarterly	None required.	Surpasses regulatory requirements.
Disinfection By-Products Analysis	Trihalomethanes quarterly at end of distribution system	- Trihalomethanes monthly including distribution system end - 9 Haloacetic Acids quarterly - 7 additional DBP's quarterly	None required.	Surpasses regulatory requirements.
Pesticides & PCB Analysis	44 parameters quarterly	112 parameters quarterly	None required.	Surpasses regulatory requirements.

REGULATION ISSUE	REQUIREMENT	PAST PRACTICES	ADDITIONAL MEASURES TAKEN	COMMENTS
Laboratory Accreditation	- All microbiological analyses required to be carried out by an accredited laboratory.	All microbiological analyses conducted by in-house laboratories.	Accreditation obtained by in-house Central Lab for carrying out all microbiological analyses.	
	- Mandatory laboratory accreditation required for analyses of specific parameters effective 31 Oct. 2000 and 28 Feb. 2001.	Analyses of other parameters carried out by in-house and external laboratories	Process underway for obtaining accreditation of in-house Central Lab for additional parameters.	Analyses of required parameters through external laboratories pending accreditation of in-house lab
Licensing of Waterworks Staff	Personnel performing analyses of regulated operational parameters must possess a Water Treatment or Water Distribution licence.	Analyses of operational parameters are carried out by plant operators who possess Water Treatment licences.	None required.	
Adverse Water Quality	Immediate verbal notification by laboratory to owner, Medical Officer of Health (MOH) and Ministry of the Environment(MOE) of sample results indicating adverse water quality condition or MAC exceedance. Owner must also verbally notify MOH and MOE, followed by written report within 24 hours. Owner to undertake corrective action in consultation with MOH.	In-house laboratory notifies owner and MOH/MOE on behalf of owner. Owner undertakes corrective action in consultation with MOH.	Owner now also notifies MOH and MOE and issues written follow-up report.	
Posting Warning Notice	Warning notice to be posted if owner does not comply with microbiological sampling and analysis requirements or if corrective action not taken.	Verbal or written notification to affected public if water should not be consumed as a precaution. Written notification if water deemed unsafe.	Warning notices to be posted as required by regulation.	
Public Information	Water quality information package containing a copy of each report or record of water sample analysis by accredited laboratory or licenced operator, approval and order or direction under the Act and every quarterly report must be made available for inspection by the public.	Annual summary of water quality available to the public on request.	Water Quality Public Information binder meeting the requirements is available for review on request by the public, effective August 26, 2000.	Information binder being updated on a daily basis.
Quarterly Reports	Reports to consumers on operation of waterworks and quality of drinking water required for third quarter 2000 and each quarter thereafter.		Notification to consumers about availability of quarterly reports through distribution of Waterwatch publication, posting of notices and posting on Internet.	
Engineer's Reports	Reports prepared by independent engineer required every three years to include results of assessment of waterworks infrastructure, operational procedures, water source, potential for contamination, monitoring program and recommendations for improvements.	Engineering studies are undertaken on an ongoing basis to address strategic as well as specific water supply operational and quality issues.	Consulting engineers to be engaged to prepare reports for submission to MOE by May 2001.	