OCTOBER - DECEMBER 2002

Water Quality

QUARTERLY REPORT

TORONTO

Works & Emergency Services

Water and Wastewater Services

Our fourth quarterly report for 2002

The province's 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 fourth quarterly report for 2002. Quarterly reports have been published since October 2000 in compliance with Ontario Drinking Water Protection Regulation.

This report duplicates text presented in previous reports by providing:

- a description of the water supply system;
- a description of the water treatment process; and
- a discussion of the quality assurance methods.

The report also updates:

- measures taken to comply with the regulation.

In addition, the report outlines:

- a summary of water quality analyses for the period from October through December 2002.

If you have any questions or comments about Toronto's system or this report, call the Waste and Water Education Line at (416) 392-4546.

What is the Drinking Water Protection Regulation?

On August 26, 2000, Ontario's Drinking Water Protection Regulation 459/00 (as amended by Regulation 506/01) 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.

In June of 2001, the Ministry of Environment (MOE) issued a technical clarification to the regulation through which an additional indicator of adverse water quality was defined. For chloraminated water, samples having a combined chlorine residual less than 0.25 mg/L are now considered as adverse. Consequently, an additional Table (B-2) summarizing samples with low chlorine residual during the quarter has been included in this report.

During this quarter (on December 13, 2002), the Safe Drinking Water Act proposed by the provincial government received Royal Assent. This Act is created by the Province in response to the "Part Two of the Report of the Walkerton Inquiry". The purpose of the Safe Drinking Water Act is to gather in one place all legislation and regulations relating to the treatment and distribution of drinking water, expand on existing policy and practice and introduce new features to protect drinking water in Ontario.

Also on December 13, 2002, Sustainable Water and Sewage Systems Act respecting the cost of water and waste water services received Royal Assent. This Act provides the framework for the implementation of full-cost accounting, asset management and full cost recovery for designated providers of water or waste water services to the public. Full-cost accounting and recovery for water and sewer services are steps

toward ensuring a sustainable supply of clean, safe drinking water in Ontario.

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 approximately 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, the 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 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. The Island Filtration Plant was in service during part of the period covered by this report. All of our plant operators are licensed under provincial regulation. The combined rated water production capacity at all plants is over 2,500 million litres per day. During this quarter, a total quantity of 126.3 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

While we have experienced intermittent taste and odour events, typically during the late summer, tap water remains safe to drink during such events. Taste and odour episodes are caused by trace amounts of naturally occurring compounds in the Lake. 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 and one-half of the third plant. 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. During this quarter, no taste and odour events were encountered.

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. 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).

6. Fluoridation

Fluoride is added to the water in a carefully controlled manner during the treatment process for control of dental caries. The Ontario Drinking Water Standards (ODWS) recommends that the concentration of fluoride be adjusted to 0.5 to 0.8 mg/L. The City has already been operating within this range. This level is lower than that in Health Canada's guideline.

While our target level for fluoride content of 0.8 mg/L falls within the ODWS recommended range,, we have requested further advice from Toronto's Medical Officer of Health on the level of fluoride that would be considered most beneficial to our community.

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. Typically, the level of chlorine residual leaving the filtration plants is 1.2 mg/L.

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 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 microbiologically 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. 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 this quarter 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 this quarter, the City conducted almost 12,000 bacteriological tests on samples from the filtration plants and the distribution system.

In December 2001, our microbiological monitoring program was amended to implement testing for E. Coli as a replacement for fecal coliform bacteria as recommended by the MOE staff.

The ODWS identifies conditions indicating adverse water quality, which require initiation of special sampling or corrective action. During the quarter, over 99 percent of the treated water samples fully met the objectives for acceptable microbiological quality as defined in ODWS.

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 0.08 NTU or lower.

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 other aspects of water quality. The average residual aluminum level in treated water at the City's plants was 0.05 mg/L or lower 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 17, 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. This unsurpassed level of diligence can clearly be seen in the attached tables.

A review of the organic chemical analytical results for the past quarter reveals that excluding DBPs, no organics were detected, 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. Chlorine is used 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 for this quarter and the annual average of system end samples was 0.014 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 average level of HAAs determined in this quarter, as indicated in Table A, was 0.011 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. Alternate disinfectants such as ozone 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 111 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?

Approximately 12,000 microbiological tests were carried out during the quarter, and 18 tests results indicated an adverse water quality condition as defined in the Regulation. Results of subsequent samples and vicinity samples were clear. Table B-1 summarizes the specifics of each exceedance and action taken to remedy.

About 1,300 samples were taken from the distribution system during the quarter, and only four samples had a total chlorine residual of less than 0.25 mg/L, which indicates an adverse water quality condition. Samples having low chlorine residuals indicate a possible deterioration in water quality, but not an unsafe condition. In all cases, the microbiological quality of the

samples was excellent. Local flushing was carried out until residuals increased to acceptable levels.

During the quarter, there were no occasions where the treated water total chlorine residual decreased below 0.25 mg/L at any of the production facilities.

Table B-2 summarizes the specifics and action taken to address each incident.

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 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
- Full implementation of continuous turbidity monitoring at individual filter outlets.

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

We have also stepped up the security measures and vigilance at our facilities to ensure the integrity of the water supply.

Summary

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

The contents of this report demonstrate Toronto's commitment to waterworks practices which continue to surpass the requirements of the Regulation in many areas.

The information in this report and previous quarterly reports 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 27, 2003

TABLE A
SUMMARY OF ANALYTICAL RESULTS
4th QUARTER 2002

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
Heterotrophic Plate Count (CFU/mL)	500*		10/01-12/31		1 CFU/mL					Indicates general bacterial presence.
F.J.Horgan Filtration Plant				551		76	8	0	0.12	
R.C.Harris Filtration Plant				551		69	14	0	0.10	
Island Filtration Plant				20		1	1	0	0.035	
R.L.Clark Filtration Plant				550		109	6	0	0.18	
Distribution				1301		299	230	0	0.30	
Background Bacteria (MF-CFU/100mL)	200*		10/01-12/31		1 CFU/100 mL					Indicates general bacterial presence.
F.J.Horgan Filtration Plant				551		6	1	0	0.008	
R.C.Harris Filtration Plant				551		4	1	0	0.0050	
Island Filtration Plant				20		0	0	0	0	
R.L.Clark Filtration Plant				550		0	0	0	0	
Distribution				1301		26	19	0	0.029	
Coliform Bacteria (CFU/100mL)	0*		10/01-12/31		1 CFU/100 mL					Indicates possible contamination by fecal material.
F.J.Horgan Filtration Plant				551		0	0	0	0	
R.C.Harris Filtration Plant				551		3	1	0	0.0038	
Island Filtration Plant				20		0	0	0	0	
R.L.Clark Filtration Plant				550		1	1	0	0.0013	
Distribution				1301		3	1	0	0.0016	
E. Coli Bacteria (CFU/100mL)	0*		10/01-12/31		1 CFU/100 mL					Indicates likely contamination by fecal material.
F.J.Horgan Filtration Plant				551		0	0	0	0	
R.C.Harris Filtration Plant				551		0	0	0	0	
Island Filtration Plant				20		0	0	0	0	
R.L.Clark Filtration Plant				550		0	0	0	0	
Distribution				1301		0	0	0	0	

Notes: * Counts exceeding these limits are indicative of adverse water quality.
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
Aluminum (mg/L)		0.1	10/01-12/31		0.005					Aluminum levels are slightly elevated during treatement as a result of
F.J.Horgan Filtration Plant				92		92	0.130	0.021	0.047	the use of alum to help in the removal of bacteria and particulates.
R.C.Harris Filtration Plant				91		91	0.190	0.014	0.041	
Island Filtration Plant				5		5	0.061	0.028	0.045	
R.L.Clark Filtration Plant				92		92	0.082	0.018	0.034	
Chlorine Residual (Total-mg/L)	3		10/01-12/31							Chloramine is the major component of the total chlorine residual.
F.J.Horgan Filtration Plant				Continuous		N/A	1.4	1.0	1.21	The maintenance of an adequate residual during water distribution is
R.C.Harris Filtration Plant				monitoring			2.0	0.70	1.19	essential to the protection of public health.
Island Filtration Plant				at plants.			1.9	0.87	1.23	
R.L.Clark Filtration Plant							1.5	0.76	1.20	
Distribution				1303		1303	1.4	0.22	1.05	
Fluoride (mg/L)	1.5		10/01-12/31							Naturally occuring fluoride levels are supplemented during treatment to
F.J.Horgan Filtration Plant				549		549	1.00	0.63	0.77	achieve the optimum level of 0.8 mg/L as recommended by the
R.C.Harris Filtration Plant				551		551	0.98	0.14	0.82	Medical Officer of Health.
Island Filtration Plant				20		20	0.86	0.59	0.74	
R.L.Clark Filtration Plant				550		550	1.00	0.17	0.64	
Turbidity (NTU)	1		10/01-12/31							Turbidity (cloudiness) of water is an indication of the presence of
F.J.Horgan Filtration Plant				Continuous		N/A	0.11	0.06	0.07	particles such as bacteria in the water. If excessive, this may interfere
R.C.Harris Filtration Plant				monitoring			0.14	0.02	0.04	with proper disinfection.
Island Filtration Plant				at plants.			0.13	0.05	0.08	
R.L.Clark Filtration Plant							0.07	0.02	0.04	

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	10/07 - 12/03	10		10	87	79	83	Due to natural mineral content.
Ammonia, Total			10/01 - 12/31	1659		1659	0.75	0	0.245	Result of water chloramination.
Carbon Dioxide, Free				0						
Colour (True Colour Units)		5	10/01 - 12/31	191		191	1	1	1	
Conductivity (u mho/cm)			10/07 - 12/03	11		11	319	297	305	Indicator of dissolved solids.
Hardness		80-100	10/07 - 12/03	11		11	132	119	124	Moderate hardness due to mineral content.
Nitrilotriacetic Acid (NTA)	0.4		10/22 - 10/27	5	0.05	1	0.08	0	0.016	
Organic Nitrogen		0.15	10/07 - 12/03	11		11	0.374	0.127	0.205	
Oxygen, Dissolved			10/15 - 12/19	6		6	12.0	9.8	11.0	
pH (pH Units)		6.5-8.5	10/01 - 12/31	187		187	7.6	7.2	7.5	
Temperature (deg. C Raw water)		15	10/01 - 12/31	Continuous			18	1.5	7.6	
Total Dissolved Solids		500		0						Due to natural mineral content.
Total Organic Carbon		5	10/07 - 12/03	10		10	2.7	2.2	2.4	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			10/22 - 10/27	6	0.0005	0	0	0	0	
Arsenic	0.025		10/22 - 10/27	6	0.002	0	0	0	0	
Barium	1		10/22 - 10/27	6	0.005	6	0.025	0.022	0.023	Common mineral constituent.
Beryllium			10/22 - 10/27	6	0.001	0	0	0	0	
Boron	5		10/22 - 10/27	6	0.005	6	0.027	0.015	0.019	Common mineral constituent.
Cadmium	0.005		10/22 - 10/27	6	0.0001	0	0	0	0	
Calcium			10/22 - 10/27	6	0.5	6	34.8	34.2	34.6	Mineral largely responsible for water hardness.
Chloride		250	10/31 - 12/03	9	0.23	9	29	24	25	Common mineral constituent.
Chromium	0.05		10/22 - 10/27	6	0.005	0	0	0	0	
Cobalt			10/22 - 10/27	6	0.0001	0	0	0	0	
Copper		1	10/22 - 10/27	6	0.0005	5	0.0025	0	0.001	Common mineral constituent.
Cyanide	0.2		10/22 - 10/27	5	0.001	0	0	0	0	
Iron		0.3	10/22 - 12/05	11	0.001	10	0.015	0	0.004	Common mineral constituent.
Lead	0.01		10/22 - 10/27	6	0.0005	0	0	0	0	
Magnesium			10/22 - 10/27	6	0.05	6	9.0	8.5	8.8	Common mineral constituent.
Manganese		0.05	10/22 - 10/27	6	0.005	0	0	0	0	
Mercury	0.001		10/22 - 10/27	5	0.00005	0	0	0	0	
Molybdenum			10/22 - 10/27	6	0.001	6	0.001	0.001	0.001	
Nickel			10/22 - 10/27	6	0.001	0	0	0	0	
Nitrate	10		10/31 - 12/03	9	0.02	9	0.50	0.40	0.45	Natural constituent but may be elevated in agricultural areas.
Nitrite	1		10/22 - 12/03	12	0.02	0	0	0	0	
Phosphorous			10/22 - 10/27	6	0.05	0	0	0	0	
Potassium			10/22 - 10/27	6	0.1	6	1.5	1.4	1.5	Common mineral constituent.
Selenium	0.01		10/22 - 10/27	6	0.002	0	0	0	0	
Silica			11/16 - 11/19	4		4	1.0	0.98	1.00	Natural constituent increased by fluoridation.
Silver			10/22 - 10/27	6	0.0001	0	0	0	0	
Sodium		200	10/07 - 12/30	21	0.1	21	15.6	10.1	12.3	Natural constituent which may increase during winter snowmelt.
Strontium			10/22 - 10/27	6	0.001	6	0.171	0.163	0.168	Common mineral constituent.
Sulphate		500	10/31 - 12/03	9	0.36	9	35	27	31	Natural constituent increased during water dechlorination.
Thallium			10/22 - 10/27	6	0.00005	0	0	0	0	
Titanium			10/22 - 10/27	6	0.005	0	0	0	0	
Uranium	0.1		10/22 - 10/27	6	0.0001	6	0.0003	0.0002	0.0002	Common mineral constituent.
Vanadium			10/22 - 10/27	6	0.0005	5	0.0007	0	0.0005	Common mineral constituent.
Zinc		5	10/22 - 10/27	6	0.005	1	0.014	0	0.002	

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 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			11/04-11/09	5	0.0003	0				
Acenaphthylene			11/04-11/09	5	0.0004	0				
Acrolein			10/07-12/02	17	0.001	0				
Acrylonitrile			10/07-12/02	17	0.001	0				
Anisole			11/04-11/09	5	0.00001	0				
Anthanthrene			11/04-11/09	5	0.0009	0				
Anthracene			11/04-11/09	5	0.0001	0				
Aroclor1016	0.003		11/04-11/09	5	0.00002	0				
Aroclor1221	0.003		11/04-11/09	5	0.00002	0				
Aroclor1232	0.003		11/04-11/09	5	0.00002	0				
Aroclor1242	0.003		11/04-11/09	5	0.00002	0				
Aroclor1248	0.003		11/04-11/09	5	0.00002	0				
Aroclor1254	0.003		11/04-11/09	5	0.00002	0				
Aroclor1260	0.003		11/04-11/09	5	0.00002	0				
Benzene	0.005		10/07-12/02	17	0.0001	0				
Benzidine			11/04-11/09	5	0.0028	0				
Benzo(a)anthracene			11/04-11/09	5	0.0002	0				
Benzo(a)pyrene	0.00001		11/04-11/09	5	0.00001	0				
Benzo(b)chrysene			11/04-11/09	5	0.0009	0				
Benzo(b/j)fluoranthene			11/04-11/09	5	0.0004	0				
Benzo(e)pyrene			11/04-11/09	5	0.0005	0				
Benzo(g,h,i)perylene			11/04-11/09	5	0.0008	0				
Benzo(k)fluoranthene			11/04-11/09	5	0.0005	0				
Biphenyl			11/04-11/09	5	0.0006	0				
Bromobenzene			10/07-12/02	17	0.0004	0				
Bromochloromethane			10/07-12/02	17	0.0004	0				
4-Bromophenyl-phenylether			11/04-11/09	5	0.0005	0				
n-Butylbenzene			10/07-12/02	17	0.0003	0				
sec-Butylbenzene			10/07-12/02	17	0.0002	0				
tert-Butylbenzene			10/07-12/02	17	0.0002	0				
Butylbenzylphthalate			11/04-11/09	5	0.0002	0				
Camphene			11/04-11/09	5	0.0005	0				
Carbon tetrachloride	0.005		10/07-12/02	17	0.0005	0				
4-Chloro-3-methylphenol			11/04-11/09	5	0.0005	0				
Chlorobenzene	0.08	0.03	10/07-12/02	17	0.0002	0				
Bis(2-Chloroethoxy)methane			11/04-11/09	5	0.0005	0				
Bis(2-Chloroethyl)ether			11/04-11/09	5	0.0004	0				
Bis(2-Chloroisopropyl)ether			11/04-11/09	5	0.0007	0				
1-Chloronaphthalene			11/04-11/09	5	0.0006	0				
2-Chloronaphthalene			11/04-11/09	5	0.0004	0				
2-Chlorophenol			11/04-11/09	5	0.0003	0				
4-Chlorophenyl-phenylether			11/04-11/09	5	0.0005	0				
2-Chlorotoluene			10/07-12/02	17	0.0002	0				
4-Chlorotoluene			10/07-12/02	17	0.0005	0				
Chrysene			11/04-11/09	5	0.0003	0				
Coronene			11/04-11/09	5	0.0009	0				
Di-n-butylphthalate			11/04-11/09	5	0.0005	0				
Di-n-octylphthalate			11/04-11/09	5	0.0006	0				
Dibenz(a,h)anthracene			11/04-11/09	5	0.0008	0				
1,2-Dibromo-3-chloropropane			10/07-12/02	17	0.0006	0				
1,2-Dibromoethane			10/07-12/02	17	0.0004	0				
Dibromomethane			10/07-12/02	17	0.0004	0				
2,4-Dichloroanisole			11/04-11/09	5	0.00001	0				
1,2-Dichlorobenzene	0.2	0.003	10/07-12/02	17	0.0003	0				
1,3-Dichlorobenzene			10/07-12/02	17	0.0002	0				
1,4-Dichlorobenzene	0.005	0.001	10/07-12/02	17	0.0004	0				
3,3-Dichlorobenzidine			11/04-11/09	5	0.0006	0				
1,1-Dichloroethane			10/07-12/02	17	0.0002	0				
1,2-Dichloroethane	0.005		10/07-12/02	17	0.0002	0				
1,1-Dichloroethylene	0.014		10/07-12/02	17	0.0002	0				
cis-1,2-Dichloroethylene			10/07-12/02	17	0.0005	0				
trans-1,2-Dichloroethylene			10/07-12/02	17	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		10/07-12/02	17	0.0003	0				
2,4-Dichlorophenol	0.9	0.0003	11/04-11/09	6	0.0009	0				
2,6-Dichlorophenol			11/04-11/09	5	0.0004	0				
1,2-Dichloropropane			10/07-12/02	17	0.0002	0				
1,3-Dichloropropane			10/07-12/02	17	0.0003	0				
2,2-Dichloropropane			10/07-12/02	17	0.0005	0				
1,1-Dichloropropene			10/07-12/02	17	0.0002	0				
cis-1,3-Dichloropropene			10/07-12/02	17	0.0002	0				
trans-1,3-Dichloropropene			10/07-12/02	17	0.0002	0				
Diethylphthalate			11/04-11/09	5	0.0004	0				
7,12-Dimethylbenz(a)anthracene			11/04-11/09	5	0.0003	0				
2,4-Dimethylphenol			11/04-11/09	5	0.0005	0				
Dimethylphthalate			11/04-11/09	5	0.0006	0				
4,6-Dinitro-2-methylphenol			11/04-11/09	5	0.0004	0				
2,4-Dinitrophenol			11/04-11/09	5	0.001	0				
2,4-Dinitrotoluene			11/04-11/09	5	0.0005	0				
2,6-Dinitrotoluene			11/04-11/09	5	0.0004	0				
Dioxin & Furan	0.000000015									Not previoulsy found in any samples analyzed to date.
Diphenyl ether			11/04-11/09	5	0.0005	0				
1,2-Diphenylhydrazine(Azobenzene)			11/04-11/09	5	0.0003	0				
Ethylbenzene		0.0024	10/07-12/02	17	0.0001	0				
Bis(2-Ethylhexyl)phthalate			11/04-11/09	5	0.001	0				
Fluoranthene			11/04-11/09	5	0.0002	0				
Fluorene			11/04-11/09	5	0.0004	0				
Geosmin			11/04-11/09	5	0.00001	0				
Hexachlorobenzene			11/04-11/09	5	0.000002	0				
Hexachlorobutadiene			11/04-11/09	5	0.000002	0				
Hexachlorocyclopentadiene			11/04-11/09	5	0.000005	0				
Hexachloroethane			11/04-11/09	5	0.000005	0				
Indeno(1,2,3-cd)pyrene			11/04-11/09	5	0.0008	0				
Indole			11/04-11/09	5	0.0006	0				
2-Isobutyl-3-methoxypyrazine			11/04-11/09	5	0.00001	0				
Isophorone			11/04-11/09	5	0.0003	0				
2-Isopropyl-3-methoxypyrazine			11/04-11/09	5	0.00001	0				
Isopropylbenzene			10/07-12/02	17	0.0002	0				
p-Isopropyltoluene			10/07-12/02	17	0.0004	0				
2-Methylisoborneol (MIB)			11/04-11/09	5	0.00001	0				
1-Methylnaphthalene			11/04-11/09	5	0.0007	0				
2-Methylnaphthalene			11/04-11/09	5	0.0006	0				
2-Methylphenol (o-Cresol)			11/04-11/09	5	0.0004	0				
4 & 3-Methylphenol (p & m-Cresol)			11/04-11/09	5	0.0005	0				
Methyl-tert-butyl ether (MTBE)			10/07-12/02	17	0.0002	0				
Naphthalene			10/07-12/02	17	0.0004	0				
5-Nitroacenaphthene			11/04-11/09	5	0.0006	0				
Nitrobenzene			11/04-11/09	5	0.0005	0				
2-Nitrophenol			11/04-11/09	5	0.0004	0				
4-Nitrophenol			11/04-11/09	5	0.0015	0				
n-Nitroso-di-n-propylamine			11/04-11/09	5	0.0004	0				
n-Nitrosodimethylamine (NDMA)	0.000009		11/04-11/09	5	0.00002	0				
n-Nitrosodiphenylamine/Diphenylamine			11/04-11/09	5	0.0005	0				
Nonylphenol			11/04-11/09	5	0.0004	0				
Pentachlorobenzene			11/04-11/09	5	0.000002	0				
Pentachlorophenol	0.06	0.03	11/04-11/09	6	0.0001	0				
Perylene			11/04-11/09	5	0.0005	0				
Phenanthrene			11/04-11/09	5	0.0002	0				
Phenol			11/04-11/09	5	0.0004	0				
n-Propylbenzene			10/07-12/02	17	0.0002	0				
Pyrene			11/04-11/09	5	0.0002	0				
Styrene			10/07-12/02	17	0.0002	0				
2,3,4,6-Tetrachloroanisole			11/04-11/09	5	0.00001	0				
1,2,3,4-Tetrachlorobenzene			11/04-11/09	5	0.000002	0				
1,2,3,5-Tetrachlorobenzene			11/04-11/09	5	0.000002	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
1,2,4,5-Tetrachlorobenzene			11/04-11/09	5	0.000002	0				
1,1,1,2-Tetrachloroethane			10/07-12/02	17	0.0003	0				
1,1,2,2-Tetrachloroethane			10/07-12/02	17	0.0004	0				
Tetrachloroethylene	0.03		10/07-12/02	17	0.0004	0				
2,3,4,5-Tetrachlorophenol			11/04-11/09	5	0.0006	0				
2,3,4,6-Tetrachlorophenol	0.1	0.001	11/04-11/09	6	0.0001	0				
2,3,5,6-Tetrachlorophenol			11/04-11/09	5	0.0005	0				
Toluene		0.024	10/07-12/02	17	0.0001	0				
2,4,6-Trichloroanisole			11/04-11/09	5	0.00001	0				
2,3,6-Trichloroanisole			11/04-11/09	5	0.00001	0				
1,2,3-Trichlorobenzene			11/04-11/09	5	0.000005	0				
1,2,4-Trichlorobenzene			11/04-11/09	5	0.000005	0				
1,3,5-Trichlorobenzene			11/04-11/09	5	0.000003	0				
1,1,1-Trichloroethane			10/07-12/02	17	0.0003	0				
1,1,2-Trichloroethane			10/07-12/02	17	0.0003	0				
Trichloroethylene	0.05		10/07-12/02	17	0.0002	0				
2,4,6-Trichlorophenol	0.005	0.002	11/04-11/09	6	0.0002	0				
2,3,4-Trichlorophenol			11/04-11/09	5	0.0006	0				
2,3,5-Trichlorophenol			11/04-11/09	5	0.0005	0				
2,4,5-Trichlorophenol			11/04-11/09	5	0.0007	0				
1,2,3-Trichloropropane			10/07-12/02	17	0.0004	0				
2,3,6-Trichlorotoluene			11/04-11/09	5	0.000002	0				
2,4,5-Trichlorotoluene			11/04-11/09	5	0.000002	0				
a,2,6-Trichlorotoluene			11/04-11/09	5	0.000002	0				
1,2,4-Trimethylbenzene			10/07-12/02	17	0.0003	0				
1,3,5-Trimethylbenzene			10/07-12/02	17	0.0005	0				
Vinyl Chloride	0.002		11/04-11/09	4	0.0002	0				
m- & p-Xylene		0.3	10/07-12/02	17	0.0002	0				
o-Xylene		0.3	10/07-12/02	17	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			10/07-12/02	17	0.0004	17	0.0075	0.0032	0.0049	These byproducts are formed by chemical reaction of chlorine with
Bromoform			10/07-12/02	17	0.0009	0				naturally occuring organic matter. The maintenance of a chloramine
Chloroform			10/07-12/02	17	0.0004	17	0.0099	0.0030	0.0053	residual within the City's distribution system provides protection
Dibromochloromethane			10/07-12/02	17	0.0006	17	0.0048	0.0019	0.0033	from microbiological contamination while minimizing further formation
Total THM (all samples this quarter)			10/07-12/02	17		17	0.0204	0.0091	0.0135	of these chemicals.
Total THM (system end, past 12 mo.)	0.1			12		12	0.0222	0.0097	0.0142	Standard is based on running annual average of system end samples.
b) HALOACETIC ACIDS										
Bromoacetic acid			11/04-11/09	6	0.0003	0				While this group of disinfection byproducts is not regulated in Ontario,
Bromochloroacetic acid			11/04-11/09	6	0.0006	6	0.0034	0.0010	0.0022	the US-EPA has set a maximum contaminant level of 0.06 mg/L
Bromodichloroacetic acid			11/04-11/09	6	0.0006	6	0.0037	0.0010	0.0019	for a sum of 5 of these compounds.
Chloroacetic acid			11/04-11/09	6	0.001	0				
Chlorodibromoacetic acid			11/04-11/09	6	0.0007	6	0.0016	0.0005	0.0010	
Dibromoacetic acid			11/04-11/09	6	0.0002	6	0.0012	0.0006	0.0010	
Dichloroacetic acid			11/04-11/09	6	0.0004	6	0.0050	0.0019	0.0029	
Tribromoacetic acid			11/04-11/09	6	0.0009	0				
Trichloroacetic acid			11/04-11/09	6	0.0004	6	0.0044	0.0011	0.0022	
Total HAA-9			11/04-11/09	6		6	0.0193	0.0061	0.0111	
c) OTHERS										
Bromochloroacetonitrile			11/04-11/09	5	0.0002	5	0.0008	0.0004	0.0005	These chlorination byproducts are not currently regulated.
Chloropicrin			11/04-11/09	5	0.0002	0				
Dibromoacetonitrile			11/04-11/09	5	0.0002	5	0.0005	0.0004	0.0004	
1,1-Dichloro-2-propanone			11/04-11/09	5	0.0002	1	0.0003	0.0000	0.0001	
Dichloroacetonitrile			11/04-11/09	5	0.0002	5	0.0008	0.0003	0.0004	
1,1,1-Trichloro-2-propanone			11/04-11/09	5	0.0002	2	0.0004	0.0000	0.0002	
Trichloroacetonitrile			11/04-11/09	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
Acifluorfen			11/04-11/09	6	0.0005	0				
Alachlor	0.005		11/04-11/09	5	0.000005	0				
Aldicarb	0.009		11/04-11/09	5	0.0004	0				
Aldrin	0.0007		11/04-11/09	5	0.000002	0				
Ametryn			11/04-11/09	5	0.00006	0				
Aminocarb			11/04-11/09	5	0.0003	0				
Atraton			11/04-11/09	5	0.0002	0				
Atrazine	0.005		11/04-11/09	5	0.00007	3	0.0001	0	0.00005	Commonly used agricultural pesticide.
Azinphos Methyl	0.02		11/04-11/09	5	0.00005	0				
Bendiocarb	0.04		11/04-11/09	5	0.0004	0				
Bentazon			11/04-11/09	6	0.0006	0				
alpha BHC			11/04-11/09	5	0.000002	0				
beta BHC			11/04-11/09	5	0.000002	0				
delta BHC			11/04-11/09	5	0.000002	0				
gamma BHC (Lindane)	0.004		11/04-11/09	5	0.000002	0				
Bromoxynil	0.005		11/04-11/09	6	0.0002	0				
Butylate			11/04-11/09	5	0.0002	0				
Carbaryl	0.09		11/04-11/09	5	0.00004	0				
Carbofuran	0.09		11/04-11/09	5	0.00003	0				
Carbophenothion			11/04-11/09	5	0.000002	0				
alpha Chlordane			11/04-11/09	5	0.000002	0				
gamma Chlordane			11/04-11/09	5	0.000002	0				
Oxy Chlordane			11/04-11/09	5	0.000002	0				
Chlordane	0.007		11/04-11/09	5	0.00002	0				
Chlorpyrifos (Dursban)	0.09		11/04-11/09	5	0.00002	0				
Chlorpyrifos methyl (Reldan)			11/04-11/09	5	0.00001	0				
Coumaphos			11/04-11/09	5	0.00005	0				
Cyanazine (Bladex)	0.01		11/04-11/09	5	0.0001	0				
Dalapon			11/04-11/09	6	0.0004	0				
DCPA (Dacthal)			11/04-11/09	6	0.000002	0				
DCPA, di acid			11/04-11/09	5	0.0005	0				
2,4-D	0.1		11/04-11/09	6	0.0004	0				
2,4-DB			11/04-11/09	6	0.0009	0				
2,4'-DDD	0.03		11/04-11/09	5	0.000002	0				
4,4'-DDD	0.03		11/04-11/09	5	0.000002	0				
2,4'-DDE	0.03		11/04-11/09	5	0.000002	0				
4,4'-DDE	0.03		11/04-11/09	5	0.000002	0				
O,P'-DDT (2,4'-DDT)	0.03		11/04-11/09	5	0.000002	0				
4,4'-DDT	0.03		11/04-11/09	5	0.000002	0				
Demeton-S			11/04-11/09	5	0.0002	0				
Desethylatrazine			11/04-11/09	5	0.0002	0				
Diallate,cis			11/04-11/09	5	0.00001	0				
Diallate,trans			11/04-11/09	5	0.00002	0				
Diazinon	0.02		11/04-11/09	5	0.00001	0				
Dicamba	0.12		11/04-11/09	6	0.0004	0				
Dichlofenthion			11/04-11/09	5	0.00002	0				
Dichloran			11/04-11/09	5	0.000002	0				
3,5-Dichlorobenzoic acid			11/04-11/09	6	0.0005	0				
Dichlorprop			11/04-11/09	6	0.0004	0				
Dichlorvos			11/04-11/09	5	0.0002	0				
Diclofop-methyl	0.009		11/04-11/09	5	0.00002	0				
Dicofol			11/04-11/09	5	0.00001	0				
Dieldrin	0.0007		11/04-11/09	5	0.000002	0				
Dimethoate	0.02		11/04-11/09	5	0.0001	0				
Dinoseb	0.01		11/04-11/09	6	0.0004	0				
Dioxathion			11/04-11/09	5	0.00006	0				
Diquat	0.07		11/04-11/09	4	0.0001	0				
Disulfoton			11/04-11/09	5	0.00002	0				
Diuron	0.15		11/04-11/09	5	0.00002	0				
Endosulfan I			11/04-11/09	5	0.000002	0				
Endosulfan II			11/04-11/09	5	0.000002	0				
Endosulfan sulfate			11/04-11/09	5	0.000002	0				
Endrin			11/04-11/09	5	0.000002	0				
Endrin aldehyde			11/04-11/09	5	0.000002	0				
Endrin ketone			11/04-11/09	5	0.000002	0				
Ethion			11/04-11/09	5	0.00001	0				
Glyphosate	0.28		11/04-11/09	4	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		11/04-11/09	5	0.000002	0				
Heptachlor epoxide	0.003		11/04-11/09	5	0.000002	0				
Isodrin			11/04-11/09	5	0.000002	0				
Linuron			11/04-11/09	5	0.0004	0				
Malathion	0.19		11/04-11/09	5	0.00003	0				
Methoxychlor	0.9		11/04-11/09	5	0.000003	0				
Metolachlor	0.05		11/04-11/09	5	0.0003	0				
Metribuzin (Sencor)	0.08		11/04-11/09	5	0.0001	0				
Mevinphos (Phosdrin)			11/04-11/09	5	0.00007	0				
Mexacarbate			11/04-11/09	5	0.0002	0				
Mirex			11/04-11/09	5	0.000002	0				
Octachlorostyrene			11/04-11/09	5	0.000002	0				
Paraquat	0.01		11/04-11/09	4	0.0002	0				
Parathion ethyl	0.05		11/04-11/09	5	0.00001	0				
Parathion methyl			11/04-11/09	5	0.00002	0				
PCNB(Pentachloronitrobenzene)			11/04-11/09	5	0.000002	0				
Perthane			11/04-11/09	5	0.00001	0				
Phorate	0.002		11/04-11/09	5	0.00002	0				
Picloram	0.19		11/04-11/09	6	0.0007	0				
Prometon			11/04-11/09	5	0.0001	0				
Prometryn	0.001		11/04-11/09	5	0.00006	0				
Propazine			11/04-11/09	5	0.00006	0				
Propham			11/04-11/09	5	0.0001	0				
Propoxur(Baygon)			11/04-11/09	5	0.00005	0				
Ronnel (Fenchlorophos)			11/04-11/09	5	0.00004	0				
Secbumeton			11/04-11/09	5	0.0002	0				
Siduron			11/04-11/09	5	0.0002	0				
Simazine	0.01		11/04-11/09	5	0.00008	0				
Strobane			11/04-11/09	5	0.00005	0				
SWEP			11/04-11/09	5	0.0004	0				
2,4,5-T	0.28	0.02	11/04-11/09	6	0.0002	0				
Temephos (Abates)	0.28		11/04-11/09	5	0.00009	0				
Terbufos	0.001		11/04-11/09	5	0.00002	0				
Terbuthylazine			11/04-11/09	5	0.0002	0				
Terbutryn			11/04-11/09	5	0.00006	0				
Toxaphene			11/04-11/09	5	0.00005	0				
2,4,5-TP(Silvex)			11/04-11/09	6	0.0002	0				
Tri-m-cresylphosphate			11/04-11/09	5	0.00006	0				
Tri-o-cresylphosphate			11/04-11/09	5	0.00006	0				
Tri-p-cresylphosphate			11/04-11/09	5	0.00006	0				
Triallate	0.23		11/04-11/09	5	0.00006	0				
Triethylphosphate			11/04-11/09	5	0.0001	0				
Trifluralin	0.045		11/04-11/09	5	0.000003	0				
Triphenylphosphate			11/04-11/09	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.

TABLE B-1
SAMPLES INDICATING ADVERSE WATER QUALITY
MICROBIOLOGICAL
FOURTH QUARTER (OCTOBER TO DECEMBER) - 2002

SAMPLE DATE	SAMPLE LOCATION	MICROBIOLOGICAL INDICATOR	MAC	TEST RESULT	ACTION TAKEN: NOTIFICATION MOE	NOTIFICATION MOH	RESAMPLE	VICINITY SAMPLES	TEST RESULTS	COMMENTS
PRODUCTION - During this quarter 6,684 samples met bacteriological standards. Only four samples indicated adverse water quality.										
06-Oct	R.C. Harris F.P. Output	Total Coliform	0	1	X	X	X	X	0	Anomalous total coliform presence in the plant treated water sample. Subsequent samples clear. Sampling error suspected.
24-Oct	R.C. Harris F.P. Output	Total Coliform	0	1	X	X	X	X	0	Anomalous total coliform presence in the plant treated water sample. Subsequent samples clear. Sampling error suspected.
27-Oct	R.C. Harris F.P. Output	Total Coliform	0	1	X	X	X	X	0	Anomalous total coliform presence in the plant treated water sample. Subsequent samples clear. Sampling error suspected.
27-Dec	R.L. Clark F.P. Output	Total Coliform	0	1	X	X	X	X	0	Anomalous total coliform presence in the plant treated water sample. Subsequent samples clear. Sampling error suspected.
DISTRIBUTION - During the quarter, 5,190 samples met bacteriological standards. Nine samples collected by the City staff indicated adverse water quality. **Note 1: Three additional samples processed by the Ministry of Health laboratory showed adverse water quality. However, these samples were not collected by the City staff and may be influenced by sampling protocol or local plumbing system and may be reflective of local conditions.**										
01-Oct	69 Clement Road On bypass main	Total Coliform	0	2	X	X	X	X	0	Flushing carried out until vicinity and resamples were clear. Watermain rehabilitation work underway.
01-Oct	28 Laurelwood Crescent On bypass main	Total Coliform Background Colonies	200	400	X	X	X	X	0	Flushing carried out until vicinity and resamples were clear. Watermain rehabilitation work underway.
03-Oct	717 - Petrocanada 3100 Ellesmere Road	Total Coliform	0	1	X	X	X	X	0	Vicinity and resamples clear.
03-Oct	George Little Public School 125 Orton Park	Total Coliform	0	1	X	X	X	X	0	All vicinity and resamples clear.
21-Oct	Honeyman Beef 130 The West Mall	Total Coliform	0	9	X	X	X	X	0	See Note 1 above. Original sample was collected by Public Health Inspector and analyzed by MOH Laboratory. Resamples and vicinity samples clear.

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

TABLE B-1
SAMPLES INDICATING ADVERSE WATER QUALITY
MICROBIOLOGICAL
FOURTH QUARTER (OCTOBER TO DECEMBER) - 2002

SAMPLE DATE	SAMPLE LOCATION	MICROBIOLOGICAL INDICATOR	MAC	TEST RESULT	ACTION TAKEN: NOTIFICATION MOE	NOTIFICATION MOH	RESAMPLE	VICINITY SAMPLES	TEST RESULTS	COMMENTS
25-Oct	6 Lia Crescent	Total Coliform Background Colonies	200	800	X	X	X	X	0	Disused house, internal problem.
30-Oct	75 Yorkminster Road On bypass main	Total Coliform	0	2	X	X	X	X	0	Flushing carried out until vicinity and resamples were clear. Watermain rehabilitation work underway.
31-Oct	39 Sedegley On bypass main	Total Coliform	0	1	X	X	X	X	0	Flushing carried out until vicinity and resamples were clear. Watermain rehabilitation work underway.
01-Nov	90 The Queensway Sampling Station	Total Coliform	0	1	X	X	X	X	0	Vicinity and resamples clear.
05-Nov	37 Sedegley Drive On bypass main	Total Coliform	0	26	X	X	X	X	0	Flushing carried out until vicinity and resamples were clear. Watermain rehabilitation work underway.
06-Nov	Maple Leaf Consumer Foods 150 Bartor Road	Total Coliform	0	4	X	X	X	X	0	See Note 1 on previous page. Original sample was collected by Public Health Inspector and analyzed by MOH Laboratory. Resamples and vicinity samples clear.
08-Nov	11 Sedegley Drive Unit #17	Total Coliform	0	1	X	X	X	X	0	Vicinity and resamples clear.
11-Dec	Bel Park Foods 125 Belfield Road	Total Coliform	0	1	X	X	X	X	0	See Note 1 on previous page. Original sample was collected by Public Health Inspector and analyzed by MOH Laboratory. Resamples and vicinity samples clear.
20-Dec	6 Lia Crescent	Heterotrophic Plate Count	500	580	X	X	X	X	0	Disused house, internal problem. Issue at this residence only. Original sample was collected by Public Health Inspector.

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

TABLE B-2
SAMPLES INDICATING ADVERSE WATER QUALITY
CHLORINE RESIDUAL
FOURTH QUARTER (OCTOBER TO DECEMBER) - 2002

SAMPLE DATE	SAMPLE LOCATION	TEST RESULT	ACTION TAKEN: NOTIFICATION MOE	NOTIFICATION MOH	RESAMPLE	VICINITY SAMPLES	TEST RESULTS	COMMENTS
PRODUCTION - During the quarter, none of the samples had total chlorine residual in the treated water less than 0.25 mg/L.								
Please note that an adverse water test on November 9, 2001 at Island Filtration Plant was inadvertently not reported in previous Water Quality Report. The incident is reported below.								
09-Nov-01	Island Filtration Plant	<0.25	X	X	X	X		During plant start-up, treated water total chlorine residual was less than 0.25 mg/L for a five to seven minute duration as a result of over dechlorination. Island plant is a seasonal plant; revised start-up procedures are now in place to prevent recurrence of a similar incident.
DISTRIBUTION - During the quarter, 1,299 samples met residual chlorine standards. Only four samples had a total chlorine residual less than 0.25 mg/L.								
23-Oct	6 Lia Crescent	0.18	X	X	X	X	0.26 to 0.59	Disused house, internal problem.
25-Oct	Tim Horton's 133 The West Mall	0.04	X	X	X	X	0.69 to 1.11	Resample and vicinity samples clear.
25-Oct	1 Westside Drive Unit #2	0.16	X	X	X	X	0.49 to 1.10	Resample and vicinity samples clear.
27-Nov	803-Mini Lube 4230 Dundas St. W	0.22	X	X	X	X	0.56 to 1.13	Resample and vicinity samples clear.

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

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; E. Coli since December 2001 - 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 until continuous monitoring system operational None required. None required. None required.	Installation of filter turbidimeters at Harris Plant to enable continuous monitoring was completed in 2001
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	over 50 volatile organics quarterly over 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	over 110 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 and a range of organic compounds.	
	- 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	All targets for obtaining accreditation of in-house Central Lab for additional parameters have been met.	
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 continues to be updated on a daily basis and is available in Metro Hall, 18th Floor, 55 John Street, Toronto.
Quarterly Reports	Reports to consumers on operation of waterworks and quality of drinking water required - starting with the third quarter of 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.	Engineers' Reports for four water treatment plants submitted to MOE on May 31, 2001 as required by regulations.	Subsequent Engineers' Reports for four water treatment plants are due on May 31, 2004.

Revised: January 19, 2003