

1. Introduction

This provides the City of Owen Sound's Quarterly Drinking Water Quality Report for the Fourth Quarter of 2000. The Ontario Ministry of the Environment's recently tabled legislation, The Drinking Water Protection Regulation (Reg. 459/00), mandates this reporting requirement. Further information concerning this Regulation can be found either through the Ministry of Environment's Web Site at www.ene.gov.on.ca/envision/WaterReg/WaterReg.htm or by calling the local Ministry of the Environment Office at 371-2901.

This, and future reports, are available at:

Clerk's Office		City of Owen Sound's
Owen Sound City Hall	or	Public Works Division
808 2 nd Avenue East		1900 20th Street East
Owen Sound, Ontario		Owen Sound, Ontario
N4K 2N4		N4K 5N3

Or on the City's Web Site at www.city.owen-sound.on.ca

This report covers the period from October 1, 2000 to December 31, 2000.

2. Introduction

The City's Drinking Water is supplied by the Richard H. Neath Water Treatment Plant (R.H. Neath WTP), is located at 2600 3rd Avenue East in Owen Sound, Ontario. The facility was built in two phases. Plant 1 was constructed in 1967. In 1980 the facility was twinned with the addition on Plant 2. This expansion doubled the facility's capacity to provide a total treatment capacity of 60.48 ML/d. The facility provides potable water to approximately 22,000 residents, an expanding commercial base, and several large industrial customers.

3. Facility Background

The R.H. Neath WTP is a direct filtration plant with the following unit process components:

- raw water pumping
- pre-chlorination (including seasonal zebra mussel control)
- coagulant addition
- flash mixing
- flocculation
- filtration
- backwash capabilities
- post-chlorination
- fluoridation
- treated water storage
- municipal treated water pumping
- industrial treated water pumping

Facility Background Continued;

The R.H. Neath WTP contains two water treatment trains. Each treatment train is equipped with similar unit process components, but convey separate flow streams according to equipment on line, demand and their individual rated capacities. A process flow diagram of the R.H. Neath WTP is presented in Figure 1.

The raw water for the R.H. Neath WTP is supplied by a 0.9-meter diameter intake extending approximately 670 meters into Georgian Bay into the plant's low lift pumping station. The low lift pumping station contains 3 pumps, one of which is equipped with a diesel drive. Raw water is screened, pre-chlorinated at the low lift pumping station or at the mouth of the intake pipe during warmer weather for zebra mussel control, and pumped via the low lift pump station to the rapid mix tanks through twinned 35 centimetre diameter pipes, one for each of the two Plants.

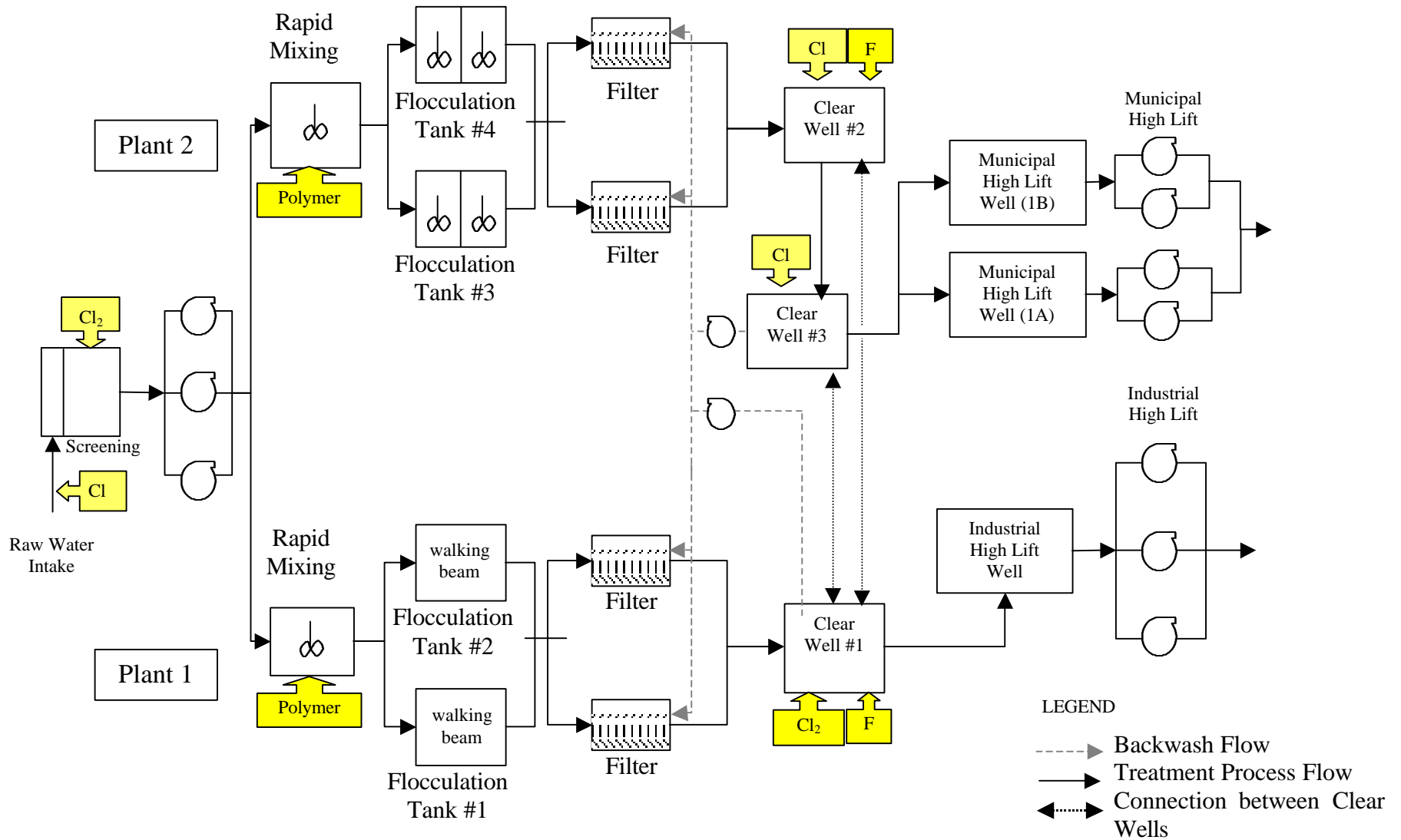
A coagulant, poly-aluminum chloride, is added to the raw water in the rapid mix tanks. Coagulated water from the rapid mix tanks is divided between the two parallel flocculation tanks in each Plant. Plant 1 uses walking beam flocculators and Plant 2 uses two stage tapered turbine mixing. Flocculation tank effluents are combined within each plant before being split between two parallel dual media filters for filtering. Filtered water from both Plants 1 and 2 is stored in Clear Wells 1 and 2, respectively, which are located below the process building. The treated water is post-chlorinated and fluoridated as it enters the Clear Wells.

Clear Wells 1, 2, and 3 are interconnected in order to provide equal water level in all wells. Treated water from Clear Well 1 is directed to the Industrial High Lift Pump Well for distribution to the pressurized Industrial Supply System through three Industrial high lift pumps, one of which is equipped with an auxiliary diesel engine. Treated water from Clear Well 1 flows into Clear Well 3 before it is directed into the Municipal High Lift Pump Wells for distribution to the municipal supply system through four municipal high lift pumps that pump treated water to the relevant distribution systems.

Filters are backwashed on a regular basis using treated water from Clear Well 1 and 3 on an alternating duty. Wastewater from the backwash process is returned untreated to Georgian Bay.

The facility boasts a state of the art Supervised Control And Data Acquisition (SCADA) System. The SCADA System continuously monitors all unit processes within the plant. It offers remote plant operations capabilities and full monitoring and alarm capabilities to facilitate operator intervention, either manually or through the Control system.

Figure 1: Process Schematic



4. Raw Water Quality

The turbidity and pH of raw water are measured on-line in the Low Lift Pump Well and are monitored by the SCADA system. Raw water samples, taken from the intake pipe prior to entering the Low Lift Pumping Station, are analyzed at the in-plant laboratory for turbidity once per day and aluminum concentration once per week. Tests for colour are performed daily, problems with colour usually are found during the seasonal spring/fall high runoff period.

5. Treated Water Quality

The treated water characteristics are monitored daily. The pH and chlorine residual of treated water are monitored by SCADA system at various points of the treatment process. Daily treated water samples are taken for in-plant laboratory analysis for fluoride and chlorine residual, as well as turbidity. Treated water is also tested for aluminum residual on a weekly basis. Treated water samples, from both the plant and distribution system, were taken twice per year for the Ministry of the Environment's DWSP. The DWSP samples are analyzed for approximately 200 parameters, including microbial, chemical, physical and radioactive water quality parameters. The City of Owen Sound no longer participates in the DWSP but instead has all treated water testing be done through accredited labs.

6. 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 Objective. There is not a MAC or IMAC for this parameter. It is an aspect of drinking water quality, namely taste, odour, colour and clarity that are perceivable to the senses.

Parameter

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

mg/l

milligrams per litre. This is a measure of the concentration of a parameter in water, also known as parts per million (ppm).

ug/l

microgram per litre. This is a measure similar to mg/l but 1000 times smaller, also known as parts per billion (ppb).

NTU

Nephelometric Turbidity Unit. This is a unit measurement for turbidity in a water sample.

n/a

Not applicable. Some columns may contain an n/a which means there is not a required value.

ns

No sample. This means that if for some reason a sample was not taken, or the sample was damaged during transportation or not analyzed in a certain time period, there will not be a result.

nd

Not detectable. This means that a value could not be detected with means of analysis.

P

Pending. Results of the test has not come back from the laboratory yet. Update to follow.

7. What is in your water?

Water contains various microbes, metal salts, and organic and inorganic substances generally referred to as parameters. These parameters may be present in source water before the treatment process. Here is a description of the various groups of parameters.

Microbiological parameters such as bacteria may come from sewage plants, livestock operations, septic systems and wildlife. Microbiological quality is the most important aspect of drinking water quality because of its association with dangerous water-borne diseases which can strike quickly.

Inorganic parameters such as salts and metals can be naturally occurring or a result of urban storm run-off, industrial or domestic wastewater discharge, mining or agriculture. Some may be a result of treatment and distribution of water (for example, lead from old solder in pipes).

Organic parameters can be naturally occurring, but most organics of concern are synthetic. They originate from industrial discharges, urban storm run-off and other sources. Included in this group are pesticides that originate from both rural and urban areas. Some may originate from treatment of drinking water (for example, chlorination by-products such as trihalomethanes).

Our certificate of approval from the Ministry of the Environment sets monitoring requirements. The following tables summarizes all sample results from our monitoring program for the period from October 1 through to December 31, 2000. The presence of these substances does not necessarily mean that the water poses a health risk.

8. Compliance with the Ontario Drinking Water Standards

During this quarter there were no health-related parameters that were exceeded.

The Raw Water sampling was not completed due to a sample failure, the sample bottles froze in transit to the lab. Re-sampling was conducted the first week of January.

• MOE Inspection

The Ministry of the Environment conducted a plant inspection on October 25, 2000. **Although there are several deficiencies identified in the Ministry Inspection none are related to health related issues of the Ontario Drinking Water Standards.**

The following is a list of items identified that require some form of action.

- a) Additional chlorination in the Municipal reservoir was installed without proper approval.
This issue is to be addressed in the forthcoming Engineers Report for the waterworks.
- b) The existing Permit to Take Water is in the name of the Owen Sound Public Utilities Commission.
Application was made December 20, 2000 to the Ministry of Environment in order change the operator's name to the City of Owen Sound.
- c) A single sample measured for Aluminum residual by the Ministry of Environment was analyzed at 0.192 mg/l which exceeds the operational guideline of 0.10 mg/l. Poly Aluminum Chloride is used in the plant as a filtration and coagulant aid.
In-plant testing indicate aluminum residuals meet operational guidelines with a yearly average of 0.060 mg/l. Plant staff have increased the analysis by external laboratories in order to confirm the exceedance. Staff will also be reviewing chemical use in order to optimize the aluminum residual in order to meet the Ministry's Operational Guideline.
- d) A deficiency in Raw Water Sampling under one of the plant's Certificate's of Approval #7-1237-91-926 was identified. Some parameters were not being analyzed as required.
Plant Staff corrected this deficiency and had the required analysis done during this quarter.
- e) The Ministry of Environment has stated they should be contacted during periods of deteriorating Raw Water Quality. The City agreed to this but also requested the Ministry further define deteriorating Raw Water Quality parameters.
- f) Daily testing of the Raw Water colour was not being conducted, it was done once weekly or if colour problems arose, it was done several times a day.
Plant Staff have incorporated daily testing of Raw Water colour as part of their testing.
- g) Continuous testing and recording of the Total Chlorine of the pre-chlorinated water was not being done as part of Certificate of Approval #7-1237-91-926.
Plant Staff were testing and recording Free Chlorine at the time of inspection. A Total Chlorine Analyzer was installed and arrangements have been made to integrate this instrument with the plant's SCADA system. This system should be fully integrated by February 28, 2001.
- h) Process wastewater (filter backwash) from the Plant is discharged untreated to Georgian Bay. The Ministry issued a Field Order- #006108 which requires the City to sample the waste discharge over a three month period and issue a report to the Ministry by March 31, 2001. This issue is also to be addressed in the forthcoming Engineer's report.
Plant Staff have commenced the required sampling.

It is anticipated by our next quarterly report these issues will be addressed or definitive action plans in place to address them.

- **Engineer's Report**

The Ontario Drinking Water Standards require a preparation of an Engineer's Report on the Water Treatment Plant. The City has retained Earth Tech (Canada) Inc. to prepare the first Engineer's Report. It is anticipated a full report will be completed by March 15, 2001 in order to comply with the Ministry March 31, 2001 deadline for submission.

9. Laboratory Services

All laboratories performing Drinking Water Analysis within the Province of Ontario are to be accredited for such testing by February 28, 2001.

In addition to the DWSP previously referred to. The City of Owen Sound utilizes two laboratories for its Water Sampling Program.

MDS Laboratories provides microbiological testing and analysis.

MDS is fully accredited for this testing.

Areco Canada Inc. provides analysis for inorganics, organics, pesticides & PCB's.

Areco Canada Inc. is currently accredited for most parameters. They have advised the City they will have accreditation for all parameters by February 26, 2001, in compliance with the Ontario Drinking Water Standards.

10. Contacts

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The following information contains the analytical results for this quarter. The raw water results for this quarter are pending. The report will be updated when all parameters are received.

Microbiological Parameters	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
E. Coli (counts/100 ml)	*	13	124	3	0	10/01-12/31	1.7	0	NO	Indicates presence of fecal matter.
Total Coliform (counts/100 ml)	*	13	124	5	0	10/01-12/31	24.5	0	NO	Indicates possible presence of fecal matter.

* indicator of adverse water quality if detected in treated water

Parameter Related to Microbiological Quality	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
Turbidity - Filter # 1 (NTU)	1.0	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.05	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Filter # 2 (NTU)	1.0	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.05	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Filter # 3 (NTU)	1.0	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.05	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Filter # 4 (NTU)	1.0	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.04	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Finished (NTU)	1.0	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.09	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Raw (NTU)	n/a	Continuous monitoring		Continuous monitoring		10/01-12/31	1.28	n/a	n/a	Indicates a presence of suspended and colloidal matter. Indication of the clarity of the water.
Free Chlorine-Plant-Pre (mg/l)	n/a	Continuous monitoring		Continuous monitoring		10/01-12/31	0.15	n/a	n/a	First defence of contaminants.
Free Chlorine-Plant-Post 1	n/a	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.7	n/a	Additional protection against contaminants, also adds protection in the

(mg/l)										distribution system.
Free Chlorine-Plant-Post 2 (mg/l)	n/a	Continuous monitoring		Continuous monitoring		10/01-12/31	n/a	0.7	n/a	Additional protection against contaminants, also adds protection in the distribution system.
Free Chlorine-System (mg/l)	n/a	n/a	118	n/a	118	10/01-12/31	n/a	0.26	n/a	Recommended level of at least .20 mg/l in system to maintain microbiological quality in system.
Aluminum - Raw (mg/l)	n/a	13	n/a	13	n/a	10/01-12/31	0.005	n/a	n/a	Aluminum is effective in coagulation/filtration and used at our Water Plant. There isn't clear evidence that aluminum had any effect on health.
Aluminum - Treated (mg/l)	0.1	n/a	13	n/a	13	10/01-12/31	n/a	0.070	NO	Aluminum is effective in coagulation/filtration and used at our Water Plant. There isn't clear evidence that aluminum had any effect on health.
Colour - Raw (NTU)	n/a	70	n/a	70	n/a	10/01-12/31	1.1	n/a	n/a	The substances in water that impart a yellowish-brown color to the water. These substances are the result of iron, manganese, peat materials, plankton, aquatic weeds, and industrial waste present in the water.
Colour - Treated (NTU)	5	n/a	70	n/a	70	10/01-12/31	n/a	0.6	n/a	The substances in water that impart a yellowish-brown color to the water. These substances are the result of iron, manganese, peat materials, plankton, aquatic weeds, and industrial waste present in the water.

Inorganic Parameters	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
Fluoride-Treated (mg/l)	1.5	n/a	87	n/a	87	10/01-12/31	n/a	0.70	NO	Added to prevent tooth decay.
Fluoride-Raw (mg/l)	n/a	13	n/a	13	n/a	10/01-12/31	0.10	n/a	n/a	naturally occurring in our surface water (Georgian Bay).
Arsenic (mg/l)	0.025	n/a	1	n/a	1	10/01-12/31	n/a	<.002	NO	Present at low concentrations in most surface water.

Barium (mg/l)	1.0	n/a	1	n/a	1	10/01-12/31	n/a	0.014	NO	Commonly found in sedimentary rock such as limestone.
Boron (mg/l)	5.0	n/a	1	n/a	1	10/01-12/31	n/a	0.009	NO	Most commonly found as borate which is in antiseptic agents.
Cadmium (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	<.0001	NO	Cadmium compounds found in electroplating waste are the common source of drinking water contamination.
Chromium (mg/l)	0.05	n/a	1	n/a	1	10/01-12/31	n/a	<.005	NO	Chromium is not considered toxic, unless it is oxidized to its hexavalent form during chlorination.
Copper (mg/l)	1.0	n/a	1	n/a	1	10/01-12/31	n/a	<.0005	NO	Occurs naturally in the environment but is rarely found in raw water.
Iron (mg/l)	0.3	n/a	1	n/a	1	10/01-12/31	n/a	<.03	NO	Present in surface water as a result from anaerobic decay in sediments.
Lead (mg/l)	0.01	n/a	1	n/a	1	10/01-12/31	n/a	<.0005	NO	Present as a result of corrosion from lead pipes and domestic plumbing.
Manganese (mg/l)	0.05	n/a	1	n/a	1	10/01-12/31	n/a	<.005	NO	Present in surface waters seasonally when anaerobic decay in sediments occur.
Mercury (mg/l)	0.001	n/a	1	n/a	ns	10/01-12/31	n/a	<.00005	NO	Sources of mercury in drinking water include air pollution, metal refining operation and from natural mineral deposits.
Nitrate (mg/l)	10.0	n/a	1	n/a	1	10/01-12/31	n/a	<.02	NO	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.
Nitrite (mg/l)	1.0	n/a	1	n/a	1	10/01-12/31	n/a	<.02	NO	Seldom present in surface water because it oxidizes fairly rapidly.
Selenium (mg/l)	0.01	n/a	1	n/a	1	10/01-12/31	n/a	<.002	NO	Occurs naturally in surface waters as a result of geochemical processes such as weathering of rocks.
Uranium (mg/l)	0.1	n/a	1	n/a	1	10/01-12/31	n/a	0.0002	NO	Normally present in aqueous media as the uranyl ion.

Volatile Organic	MAC or	# of Samples	# of	Sampling	Range	Exceeded	Typical Source
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Parameters	IMAC or AO	Detectable Results		Date	?		of Contaminant			
		Raw	Treated		Raw	Treated				
Benzene (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Present in gasoline and other refined petroleum products.
Carbon Tetrachloride (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Found in ground water from old industrial sites where chlorinated solvents were made or used.
1,2-Dichlorobenzene (mg/l)	0.2	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Used in a variety of chemical blends such as degreasing agents.
1,4-Dichlorobenzene (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Persistent synthetic material found in toilet pucks and mothballs.
1,2-Dichloroethane (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Released into the environment via atmospheric emissions and discharge from industrial waste.
1,1-Dichloroethylene (mg/l)	0.014	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Imported and used in the food packaging and the textile industry.
Dichloromethane (mg/l)	0.05	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Used extensively as an industrial solvent and degreasing agent.
Ethylbenzene (mg/l)	0.0024	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Used as a gasoline and paint additive.
Monochlorobenzene (mg/l)	0.03	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	May be present in industrial discharges.
Tetrachloroethylene (mg/l)	0.03	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Found in ground water , primarily after improper disposal or dumping of cleaning solvents.
Toluene (mg/l)	0.024	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	May be found in industrial effluents.
Trichloroethylene (mg/l)	0.05	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Introduced into ground and surface water via industrial spills or illegal disposal of effluents.
Trihalomethanes	0.1	n/a	1	n/a	1	10/01-12/31	n/a	0.02	NO	The principle source of trihalomethanes in drinking water is the

(mg/l)										action of chlorine with organics left in the water after filtration.
Vinyl Chloride (mg/l)	0.002	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used in making PVC plastic items such as water main pipes and other common plastic items.
Xylene (mg/l)	0.3	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Used as an industrial solvent and in organic synthesis.

Pesticides & PCBs Parameters	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
Alachlor (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Introduced into ground and surface water during herbicide applications. Banned in Canada in 1985.
Aldicarb (mg/l)	9.0	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Carbamate insecticide which is highly soluble and has a high potential to enter ground water.
Aldrin + Dieldrin (mg/l)	0.0007	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Aldrin & dieldrin are organochlorine pesticides used to control soil insects. Banned in Canada in 1994.
Atrazine (mg/l)	0.005	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Highly persistent herbicide that is moderately mobile in soil.
Azinphos-methyl (mg/l)	0.02	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	An organophosphorus insecticide used against foliage-feeding insects.
Bendiocarb (mg/l)	0.04	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Carbamate insecticide used to control specific insects in buildings and greenhouses.
Bromoxynil (mg/l)	0.005	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used in Ontario to control specific weed seedlings in grain crops.
Carbaryl (mg/l)	0.09	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Broad spectrum carbamate insecticide used in agriculture and forestry.
Carbofuran	0.09	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Carbamate insecticide used in agricultural for control of foliar pests. Also

(mg/l)										used to control root maggot, wire worm & some species of nematodes.
Chlordane(Total) (mg/l)	0.007	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Carbamate insecticide used in agriculture to control foliar pests.
Chlorpyrifos (mg/l)	0.09	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organophosphorus insecticide used for the control of insects on agricultural crops for domestic use, and flea and tick control.
Cyanazine (mg/l)	0.01	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Triazine herbicide registered for control of weeds in crop and non-crop areas
Diazinon (mg/l)	0.02	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organophosphorous insecticide that is used to control foliar and soil dwelling pests.
Dicamba (mg/l)	0.12	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Benzoic acid herbicide used in lawn care.
2,4-Dichlorophenol (mg/l)	0.9	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Highly odorous synthetic materials which are most often present in water due to the action of chlorine on phenolic precursors.
DDT (mg/l)	0.03	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Persistent in the environment and concerns with potential biomagnification resulting in environmental damage. Banned in 1988.
2,4-D (mg/l)	0.1	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Herbicide used for control of broadleaf weeds in cereal crops and lawns.
Diclofop-methyl (mg/l)	0.009	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used in the control of annual grasses in vegetable crops. Relatively soluble in water.
Dimethoate (mg/l)	0.02	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organophosphorous miticide and insecticide used for fly control in livestock pens.
Dinoseb (mg/l)	0.01	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Contact herbicide and desiccant. It's no longer used in Ontario.
Diquat (mg/l)	0.07	n/a	1	n/a	ns	10/01-12/31	n/a	<.01	NO	Used primarily as an aquatic herbicide.
Diuron (mg/l)	0.15	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Herbicide used to control vegetation in crop areas. Its moderately soluble in water.
Glyphosate	0.28	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Non-selective herbicide used for weed control. Its very soluble in water.

(mg/l)										
Heptachlor + heptachlor epoxide (mg/l)	0.003	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organochlorine insecticide once used in agriculture. Banned in 1969.
Lindane(Total) (mg/l)	0.004	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used in pharmaceutical preparations for human lice and mite shampoos.
Malathion (mg/l)	0.19	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Insecticide used on fruits and vegetables. It has low mammalian toxicity.
Methoxychlor (mg/l)	0.9	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organochlorine insecticide that's non-persistent and non-accumulative in biological tissue.
Metolachlor (mg/l)	0.05	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Selective herbicide used for pre-emergence and pre-plant weed control.
Metribuzin (mg/l)	0.08	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Triazine herbicide used to control grass infestations in agricultural crops.
Paraquat (mg/l)	0.01	n/a	1	n/a	ns	10/01-12/31	n/a	<.01	NO	Highly toxic herbicide used to control non-crop and industrial weeds.
Parathion (mg/l)	0.05	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Organophosphorous insecticide used in agriculture to control foliar pests.
Pentachlorophenol (mg/l)	0.06	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used extensively as a pesticide and wood preservative.
Phorate (mg/l)	0.002	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Insecticide used to control corn rootworm.
Picloram (mg/l)	0.19	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Herbicide used for broadleaf weed and brush control. Can be persistent in soil for up to a year after application.
PCB (mg/l)	0.003	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Among the most persistent pollutants in the global ecosystem. They are no longer manufactured.
Prometryne (mg/l)	0.001	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Herbicide used selectively to control annual grasses and broadleaf weeds in crops and non-crops.
Simazine	0.01	n/a	1	n/a	1	10/01-12/31	n/a	nd	NO	Herbicide which is used for pre-emergence weed control in annual

(mg/l)										row crops.
Temephos (mg/l)	0.28	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Insecticide used to control mosquito and blackfly larvae.
Terbufos (mg/l)	0.001	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Insecticide used for insect control in corn.
2,3,4,6-Tetrachlorophenol (mg/l)	0.1	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	It is an aesthetic parameter. It has an unpleasant taste to the water.
Trichlorophenol (mg/l)	0.005	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Used in the manufacturing of pesticides. It is an animal carcinogen but inadequate for human carcinogenicity.
Trifluralin (mg/l)	0.045	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Herbicide used for weed control in summer fallow and for controlling annual grasses in wheat, barley and canola.
2,4,5-T (mg/l)	0.28	n/a	1	n/a	ns	10/01-12/31	n/a	nd	NO	Herbicide that was once an important stem/foilage treatment for deciduous brush on road sides and power lines. No longer used in Can.

Amended Certificate of Approval Additional Testing (Zebra Mussel Control)	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
Alkalinity (mg/l)	30-500	1	n/a	1	n/a	10/01-12/31	73	n/a	NO	Measure of the resistance of the water to the effects of acids added to water. 30-500 is an operational guideline.
Hardness (mg/l)	80-100	1	n/a	1	n/a	10/01-12/31	91	n/a	NO	Caused by dissolved calcium and magnesium. Hard water has a tendency to form scale deposits and can form excessive scum with regular soaps.
Calcium (mg/l)	n/a	1	n/a	1	n/a	10/01-12/31	25.5	n/a	NO	Naturally occurring minerals in a water source. It appears to be virtually harmless to all organisms.
Sodium (mg/l)	200	1	n/a	1	n/a	10/01-12/31	3.8	n/a	NO	Sodium is not toxic. Consumption of sodium in excess of 10 grams per day by normal adults doesn't have any apparent adverse health affect.
Iron (mg/l)	0.3	1	n/a	1	n/a	10/01-12/31	0.06	n/a	NO	May be present in surface waters as a result of anaerobic decay in sediments and complex formations.
Copper	1.0	1	n/a	1	n/a	10/01-12/31	0.03	n/a	NO	Copper occurs naturally. Rarely present in raw water. Copper is

(mg/l)										used extensively in plumbing.
Lead (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Lead is only present as a result of corrosion of lead solder, lead containing brass fittings/pipes which could be in domestic plumbing.
Zinc (mg/l)	5.0	1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	The concentration of zinc may be considerably higher at the consumers tap in standing water because of corrosion taking place in galvanized pipe.
Arsenic (mg/l)	0.025	1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Present at low concentrations in most surface water.
Aluminum (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	0.05	n/a	NO	Aluminum is effective in coagulation/filtration and used at our Water Plant. There isn't clear evidence that aluminum had any effect on health.
Manganese (mg/l)	0.05	1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Objectable in water supplies because it stains laundry and fixtures black, and at excessive concentrations causes undesirable tastes in beverages.
Conductivity (uS/cm)		1	n/a	1	n/a	10/01-12/31	202	n/a	NO	Measure of the ability of fluid to carry a charge which is directly related to the concentration of dissolved substances.
Chloride (mg/l)	250	1	n/a	1	n/a	10/01-12/31	7.4	n/a	NO	Non-toxic material present in small amounts in drinking water and produce a detectable salty taste.
Sulphate (mg/l)	500	1	n/a	1	n/a	10/01-12/31	15.5	n/a	NO	Above 500 mg/L, it can have a laxative effect, however regular users adapt to the level. Problems occur to visitors only.
Ammonia + Ammonium (N) (mg/l)		1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Very toxic to fish and aquatic life. Reduces the oxygen carrying capacity of blood.
Total Kjeldahl Nitrogen (mg/l)		1	n/a	1	n/a	10/01-12/31	0.16	n/a	NO	Represents the nitrogen equivalent available from ammonia and organic nitrogen.
Nitrate (mg/l)	10.0	1	n/a	1	n/a	10/01-12/31	0.8	n/a	NO	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.
Nitrite (mg/l)	1.0	1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Seldom present in surface water because it oxidizes fairly rapidly.
Dissolved Organic Carbon (mg/l)	5	1	n/a	1	n/a	10/01-12/31	3	n/a	NO	High concentration is an indicator of possible water quality deterioration during storage and distribution due to the carbon being a growth nutrient.
Phenols		1	n/a	1	n/a	10/01-12/31	nd	n/a	NO	Mainly used to make plastics.

(mg/l)											
Trihalomethanes (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	0.0007	n/a	NO	Synthetic organics found in chlorinated drinking water. The four most commonly detected are bromoform, chloroform, bromodichloromethane, and chlorodibromomethane. The principal source in drinking water is the action of chlorine with natural organics left in the water after filtration.	

TABLE 1 ODWS Raw Water	MAC or IMAC or AO	# of Samples		# of Detectable Results		Sampling Date	Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated		Raw	Treated		
Alachlor (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Introduced into ground and surface water during herbicide applications. Banned in Canada in 1985.
Aldicarb (mg/l)	0.009	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Found in ground water from old industrial sites where chlorinated solvents were made or used.
Aldrin + Dieldrin (mg/l)	0.0007	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in a variety of chemical blends such as degreasing agents.
Arsenic (mg/l)	0.025	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Persistent synthetic material found in toilet pucks and mothballs.
Atrazine + N-dealkylated metabolites (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Released into the environment via atmospheric emissions and discharge from industrial waste.
Azinphos-methyl (mg/l)	0.02	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Imported and used in the food packaging and the textile industry.
Barium (mg/l)	1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used extensively as an industrial solvent and degreasing agent.
Bendiocarb (mg/l)	0.04	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used as a gasoline and paint additive.
Benzene (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	May be present in industrial discharges.

Benzo(a)pyrene (mg/l)	0.00001	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Found in ground water , primarily after improper disposal or dumping of cleaning solvents.
Boron (mg/l)	5	1	n/a	1	n/a	10/01-12/31	P	n/a	P	May be found in industrial effluents.
Bromoxynil (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Introduced into ground and surface water via industrial spills or illegal disposal of effluents.
Cadmium (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	The principle source of trihalomethanes in drinking water is the action of chlorine with organics left in the water after filtration.
Carbaryl (mg/l)	0.09	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in making PVC plastic items such as water main pipes and other common plastic items.
Carbofuran (mg/l)	0.09	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Carbamate insecticide used in agricultural for control of foliar pests. Also used to control root maggot, wire worm & some species of nematodes.
Carbon Tetrachloride (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Found in ground water from old industrial sites where chlorinated solvents were made or used.
Chloramines (mg/l)	3	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Produced when ammonia is added to chlorinated water during the disinfection stage.
Chlordane (Total) (mg/l)	0.007	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Carbamate insecticide used in agriculture to control foliar pests.
Chlorpyrifos (mg/l)	0.09	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organophosphorus insecticide used for the control of insects on agricultural crops for domestic use, and flea and tick control.
Chromium (mg/l)	0.05	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Chromium is not considered toxic, unless it is oxidized to its hexavalent form during chlorination.
Cyanazine (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Triazine herbicide registered for control of weeds in crop and non-crop areas
Cyanide (mg/l)	0.2	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in metals plating and refining industries, and industrial effluents and are the major potential sources of cyanide contamination.
Diiazinon (mg/l)	0.02	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organophosphorous insecticide that is used to control foliar and soil dwelling pests.

Dicamba (mg/l)	0.12	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Benzoic acid herbicide used in lawn care.
1,2-Dichlorobenzene (mg/l)	0.2	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in a variety of chemical blends such as degreasing agents.
1,4-Dichlorobenzene (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Persistent synthetic material found in toilet pucks and mothballs.
DDT (mg/l)	0.03	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Persistent in the environment and concerns with potential biomagnification resulting in environmental damage. Banned in 1988.
1,2-dichloroethane (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Released into the environment via atmospheric emissions and discharge from industrial waste.
1,1-Dichloroethylene (mg/l)	0.014	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Imported for use in the food industry and textile industry for furniture and automotive upholstery, drapery fabric and outdoor furniture.
Dichloromethane (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used extensively as an industrial solvent and degreasing agent.
2,4-Dichlorophenol (mg/l)	0.9	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Highly odorous synthetic materials which are most often present in water due to the action of chlorine on phenolic precursors.
2,4-D (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used for control of broadleaf weeds in cereal crops and lawns.
Diclofop-methyl (mg/l)	0.009	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in the control of annual grasses in vegetable crops. Relatively soluble in water.
Dimethoate (mg/l)	0.02	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organophosphorous miticide and insecticide used for fly control in livestock pens.
Dinoseb (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Contact herbicide and desiccant. It's no longer used in Ontario.
Dioxin and Furan (mg/l)	0.0000000	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Formed in very small amounts in combustion processes.
Diquat (mg/l)	0.07	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used primarily as an aquatic herbicide.

Diuron (mg/l)	0.15	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used to control vegetation in crop areas. Its moderately soluble in water.
Fluoride (mg/l)	1.5	1	n/a	1	n/a	10/01-12/31	P	n/a	P	naturally occurring in our surface water (Georgian Bay).
Glyphosate (mg/l)	0.28	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Non-selective herbicide used for weed control. Its very soluble in water.
Heptachlor - Heptachlor Epoxide (mg/l)	0.003	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organochlorine insecticide once used in agriculture. Banned in 1969.
Lead (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Lead is only present as a result of corrosion of lead solder, lead containing brass fittings/pipes which could be in domestic plumbing.
Lindane (Total) (mg/l)	0.004	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in pharmaceutical preparations for human lice and mite shampoos.
Malathion (mg/l)	0.19	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Insecticide used on fruits and vegetables. It has low mammalian toxicity.
Mercury (mg/l)	0.001	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Sources of mercury in drinking water include air pollution, metal refining operation and from natural mineral deposits.
Methoxychlor (mg/l)	0.9	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organochlorine insecticide that's non-persistent and non-accumulative in biological tissue.
Metolachlor (mg/l)	0.05	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Selective herbicide used for pre-emergence and pre-plant weed control.
Metribuzin (mg/l)	0.08	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Triazine herbicide used to control grass infestations in agricultural crops.
Monochlorobenzene (mg/l)	0.08	1	n/a	1	n/a	10/01-12/31	P	n/a	P	May be present in industrial discharges.
Nitrate (as nitrogen) (mg/l)	10	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.
Nitrite (as nitrogen) (mg/l)	1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Seldom present in surface water because it oxidizes fairly rapidly.

Nitrate + Nitrite (as nitrogen) (mg/l)	10	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Total of the two, nitrate + nitrite.
Nitrioltriacetic Acid (NTA) (mg/l)	0.4	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Mainly used in laundry detergents, most is eventually disposed of in domestic wastewater.
Nitrosodimethylamine (NDMA) (mg/l)	0.000009	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Rarely used but has been used as an antioxidant, as an additive for lubricants, and as a softener of copolymers.
Paraquat (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Highly toxic herbicide used to control non-crop and industrial weeds.
Parathion (mg/l)	0.05	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Organophosphorous insecticide used in agriculture to control foliar pests.
Pentachlorophenol (mg/l)	0.06	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used extensively as a pesticide and wood preservative.
Phorate (mg/l)	0.002	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Insecticide used to control corn rootworm.
Picloram (mg/l)	0.19	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used for broadleaf weed and brush control. Can be persistent in soil for up to a year after application.
Polychlorinated Biphenyls (PCB) (mg/l)	0.003	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Among the most persistent pollutants in the global ecosystem. They are no longer manufactured.
Prometryne (mg/l)	0.001	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used selectively to control annual grasses and broadleaf weeds in crops and non-crops.
Selenium (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Occurs naturally in surface waters as a result of geochemical processes such as weathering of rocks.
Simazine (mg/l)	0.01	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide which is used for pre-emergence weed control in annual row crops.
Temephos (mg/l)	0.28	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Insecticide used to control mosquito and blackfly larvae.
Terbufos (mg/l)	0.001	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Insecticide used for insect control in corn.

Tetrachloroethylene (mg/l)	0.03	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Introduced into ground and surface water via industrial spills or illegal disposal of effluents.
2,3,4,6-Tetrachlorophenol (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	It is an aesthetic parameter. It has an unpleasant taste to the water.
Triallate (mg/l)	0.23	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used for control of wild oats in grain crops, mustard and sugar beets.
Trichloroethylene (mg/l)	0.05	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Introduced into ground and surface water via industrial spills or illegal disposal of effluents.
2,4,6-Trichlorophenol (mg/l)	0.005	1	n/a	1	n/a	10/01-12/31	P	n/a	P	It is used in the manufacturing of pesticides.
2,4,5-T (mg/l)	0.28	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide that was once an important stem/foilage treatment for deciduous brush on road sides and power lines. No longer used in Can.
Trifluralin (mg/l)	0.045	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Herbicide used for weed control in summer fallow and for controlling annual grasses in wheat, barley and canola.
Trihalomethanes (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Synthetic organics found in chlorinated drinking water. The four most commonly detected are bromoform, chloroform, bromodichloromethane, and chlorodibromomethane. The principal source in drinking water is the action of chlorine with natural organics left in the water after filtration.
Turbidity (mg/l)	1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Indicates a presence of suspended and colloidal matter. Indication of the clarity of the water.
Uranium (mg/l)	0.1	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Normally present in aqueous media as the uranyl ion.
Vinyl Chloride (mg/l)	0.002	1	n/a	1	n/a	10/01-12/31	P	n/a	P	Used in making PVC plastic items such as water main pipes and other common plastic items.