

Cana Well System Quarterly Report on Drinking Water Quality

April 2003 – June 2003



Submitted By



Treatment Group

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1. Drinking Water Quality

Ontario Drinking Water Protection Regulations.

Utilities Kingston is proud to present this quarterly report on drinking water quality. This report has been prepared in response to Operation Clean Water, an initiative of Ontario's Ministry of the Environment to ensure high quality drinking water for the residents of Ontario. The regulations put into law what was formerly the Ontario Drinking Water Objectives (ODWO), and sets requirements for public waterworks with regard to sampling and testing, levels of treatment, licensing of staff, and notification of authorities and the public about water quality. Further information on the Drinking Water Regulations can be found on the Ministry of the Environment web site at www.ene.gov.on.ca. This will be the last report prepared under O. Reg. 459/00, however Utilities Kingston will continue to make this information available to its customers in a similar manner. O. Reg. 170/03, which replaced Reg. 459, requires that an annual report be prepared for drinking water systems. The annual reports will be available in the same locations as were the quarterly reports.

For further information about this report please contact Randy Whan at rwhan@utilitieskingston.com or Philip Emon at pemon@utilitieskingston.com, or call 613-389-0562. Free copies of this report are available at 211 Counter St. or City Hall.

2. System Description

The Cana Well system was established in the early 1950's by a co-operative formed by homeowners living on Marian Crescent, Rochdale Crescent, and Cana Blvd. The system was operated privately by the co-operative, then by the Ministry of the Environment (MOE), until operation was assumed by the former Township of Pittsburgh. When the township amalgamated with the city of Kingston and Kingston Township in 1998, operation of the system passed into the care of Utilities Kingston. Staff from the Utilities Kingston Treatment Group operate the treatment system. The distribution system is maintained by the Utilities' Underground Infrastructure Department.

The water is supplied from a 150mm steel cased drilled well. Sodium hypochlorite is injected into the system after the pressure tank for disinfection.

The water then passes through detention tanks that allow time for the chlorine to be in contact with the water and achieve disinfection before it enters the distribution system. On-line analyzers monitoring chlorine residual and turbidity are remotely monitored, recorded and alarmed to ensure water quality.

The distribution system was also originally installed by the co-operative, and was constructed from a variety of materials which were available to the co-operative at the time of construction. Much of the distribution system was replaced in 2002, with the remaining scheduled for replacement in July of 2003.

Treatment Plant staff attend the well on a regular basis to make system checks, take bacteriological samples, and to test chlorine residuals in both the treated water and in the distribution system. All Operators are certified by the MOE.

3. What Was Done to Meet the Regulations?

Utilities Kingston has taken several measures to comply with the Drinking Water Regulations, including the use of accredited labs and licensed operators, making sampling results available to the public, as well as

implementing the notification protocol as part of standard operating procedures. Other measures taken include the installation of remotely monitored and alarmed instrumentation for monitoring water quality.

4. Water Quality and Sampling

Sampling requirements for a waterworks are specified by the Ontario Drinking Water Regulations (ODWR) as well as any Certificates of Approval (COA) issued for the specific waterworks. Since there are no sampling requirements outlined in the COA, sampling follows the schedule for groundwater supplies as listed in schedule 2 of the ODWR.

What is in your water?

Some parameters may be present in source water before it is treated. Here is a description of the various groups of parameters.

Microbiological parameters such as bacteria may come from wastewater treatment 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 as a result of urban storm runoff, industrial or domestic wastewater discharges, mining or agriculture. Some may be the result of the treatment and distribution of water (for example, lead from solder in plumbing and fixtures).

Organic parameters can be naturally occurring, but most organics of concern are synthetic. They originate from industrial discharges, urban storm runoff 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 byproducts such as trihalomethanes). **Volatile** organics such as solvents and certain industrial chemicals are often the result of vehicle emissions or industrial discharges.

5. Summary of Results

The data presented in the tables below lists the results of testing that was done to meet the regulations, as well as some additional testing that was carried out. Our interpretation of these results is that acceptable quality water which is safe to drink was produced by this well during this reporting period. To review this information yourself, look in the exceedance column to determine if there are any parameters to be concerned about. Then compare the result to the MAC/IMAC or AO/OG value. At that point you should investigate the particular parameters' potential health or aesthetic effects, and then, considering your own health situation, decide if there is cause for concern. Contact us at the numbers listed on page one if you have any questions, or talk to your doctor if you have specific health concerns.

6. Did We Exceed the Standards?

There were two exceedances for health-related parameters listed in the Ontario Drinking Water Standards for this reporting period. On Apr. 13, Apr. 29 and June 16, the on-line analyzer indicated an alarm for turbidity – a measure of particles in water. An operator was dispatched to check the station and the alarm was verified. Distribution system maintenance and abnormal flow conditions at the pump-house due to high use by customers created increases in flow on the water system causing a high turbidity. Chlorine residuals were monitored and bacteriological samples were taken at the time of the high turbidity events.

7. Vulnerable Populations

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as those who may have cancer and are undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers.

The water from the Cana well contains an elevated level of sodium (on average approximately 80 mg/l), **which when above 20 mg/l requires notification of both residents and the local Medical Officer of Health. This information is relevant only to those who may be on a sodium restricted diet.**

Consumption of sodium in excess of 10 grams per day by normal adults does not result in any apparent adverse health effects and sodium intake from water accounts for only a small fraction of daily intake. Sodium occurs naturally in the earth's crust and is not considered to be toxic. The aesthetic objective for sodium is 200 mg/l.

8. Definition & Terms

° C	- degrees Celsius	° F	- degrees Fahrenheit
kg	- kilogram	l	- litre
m	- meter	m ³	- cubic meter =1000 litres.
TCU	- True Colour Units	CaCO ₃	-Calcium carbonate
mg	- milligram	psi	- pounds per square inch
N/A	- Not applicable	N/D	- Non-detectable

mg/l - Milligrams per litre.
This is a measure of the concentration of a parameter in water, also called parts per million. (ppm)

ug/l - Micrograms per litre.
This is a measure of the concentration of a parameter in water, also called parts per billion.

ng/l - Nanograms per litre.
This is a measure of the concentration of a parameter in water, also called parts per trillion.

NTU - Nephelometric Turbidity Units - A measure of the amount of particles in water.

Parameter-A substance that we sample and analyze for in the water.

OG - Operational guideline. Set to ensure efficient treatment and distribution of water.

AO - Aesthetic objective. AOs are not health related, but may affect the taste, odour, colour or clarity of the water

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

8.1 Cana Well System - Raw, Treated and Distribution System Bacteriological and Related Sample Results

Microbiological Parameters	MAC or IMAC	AO or OG	Number of Samples	Number of Positive Results	Sampling Dates	Max. Result *	Exceedance?	Typical Source of Contaminant
Raw Water Total Coliform (counts/100ml)	**		26	1	4/2/03 - 6/30/03	4	N/A	Indicates possible presence of fecal matter. ** Raw water results are used for operational purposes.
Raw Water Escherichia coliform (counts/100ml)	**		26	0	4/2/03 - 6/30/03	0	N/A	Definite indicator of fecal contamination. ** Raw water results are used for operational purposes.
Microbiological Parameters	MAC or IMAC	AO or OG	Number of Samples	Number of Positive Results	Sampling Dates	Max. Result *	Exceedance?	Typical Source of Contaminant
Plant Effluent Total Coliform (P/A or counts/100ml)	*		26	0	4/2/03 - 6/30/03	N/A	No	Indicates possible presence of fecal matter. * Indicator of adverse water quality if detected
Plant Effluent Escherichia coliform (P/A or counts/100ml)	*		26	0	4/2/03 - 6/30/03	N/A	No	Definite indicator of fecal contamination. * Indicator of adverse water quality if detected
Plant Effluent Background (counts/100ml)	>200		0	0	4/2/03 - 6/30/03	N/A	No	Indicator of Deteriorating water quality.
Plant Effluent heterotrophic plate count (counts/ml)	>500		26	0	4/2/03 - 6/30/03	N/A	No	Indicator of Deteriorating water quality.
Microbiological Parameters	MAC or IMAC	AO or OG	Number of Samples	Number of Positive Results	Sampling Dates	Max. Result *	Exceedance?	Typical Source of Contaminant
Distribution System Total Coliform (P/A or counts/100ml)	*		38	0	4/2/03 - 6/30/03	N/A	No	Indicates possible presence of fecal matter. * Indicator of adverse water quality if detected
Distribution System Escherichia coliform (P/A or counts/100ml)	*		38	0	4/2/03 - 6/30/03	N/A	No	Definite indicator of fecal contamination. * Indicator of adverse water quality if detected
Distribution System Background (counts/100ml)	>200		0	0	4/2/03 - 6/30/03	N/A	No	Indicator of Deteriorating water quality.
Distribution System heterotrophic plate count (counts/ml)	>500		27	0	4/2/03 - 6/30/03	N/A	No	Indicator of Deteriorating water quality.
Parameters Related to Microbiological Quality	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Range	Exceedance?	Typical Source of Contaminant
Turbidity (NTU)	1		Continuous	Continuous	4/1/03 - 6/30/03	0.34 - 1.97	Yes	Turbidity is a measure of particles in water.
Free chlorine - Plant effluent (mg/l)	-		Continuous	Continuous	4/1/03 - 6/30/03	1.18 - 2.42	N/A	See below
Free chlorine - Distribution system (mg/l)	-		62	62	4/2/03 - 6/30/03	0.37 - 2.09	N/A	Recommended level of at least 0.20 mg/l in distribution system to maintain microbiological quality. 0.05 mg/l min.

8.2 Cana Well System - Treated Water

Table B - Volatile Organics	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Max. Result	Exceedance?	Typical Source of Contaminant
Benzene (ug/l)	5		1	0	4/7/03	N/D	No	Discharge from plastics manufacturing, leaking fuel tanks
Carbon tetrachloride (ug/l)	5		1	0	4/7/03	N/D	No	Discharge from chemical and industrial activities
1,2-dichlorobenzene (ug/l)	200		1	0	4/7/03	N/D	No	Discharge from industrial chemical factories
1,4-dichlorobenzene (ug/l)	5		1	0	4/7/03	N/D	No	Discharge from industrial chemical factories
1,2-dichloroethane (ug/l)	5		1	0	4/7/03	N/D	No	Discharge from industrial chemical factories
1,1-dichloroethene (ug/l)	14		1	0	4/7/03	N/D	No	Discharge from industrial chemical factories
Dichloromethane (ug/l)	50		1	0	4/7/03	N/D	No	Discharge from pharmaceutical and chemical factories
Ethylbenzene (ug/l)	24		1	0	4/7/03	N/D	No	Discharge from refineries, industrial chemical factories
Monochlorobenzene (ug/l)	80		1	0	4/7/03	N/D	No	Discharge from industrial and agricultural chemical factories and dry cleaning facilities
Tetrachloroethylene (ug/l)	30		1	0	4/7/03	N/D	No	Leaching from PVC pipes; discharge from factories, dry cleaners and auto shops (metal degreaser)
Toluene (ug/l)	24		1	0	4/7/03	N/D	No	Discharge from petro-chemical factories, leaking fuel tanks
Trichloroethylene (ug/l)	50		1	0	4/7/03	N/D	No	Discharge from metal degreasing sites and other factories
Chloroethene (Vinyl chloride) (ug/l)	2		1	0	4/7/03	N/D	No	Leaching from PVC pipes; discharge from plastics factories
Xylenes (ug/l)	300		1	0	4/7/03	N/D	No	Discharge from petro-chemical factories; fuel solvent

8.2 Cana Well System - Treated Water and Distribution System

Table B - Volatile Organics (THMs)	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Max. Result *	Exceedance?	Typical Source of Contaminant
Trihalomethanes, total: Treated Water (ug/l)	100		4	4	6/8/02 - 6/7/03	3.8	No	By-product of chlorination. * The MAC for THMs is based on a running annual average.
Bromodichloromethane: Treated Water (ug/l)			4	3	6/8/02 - 6/7/03	0.9	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Bromoform: Treated Water (ug/l)			4	3	6/8/02 - 6/7/03	0.8	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Chloroform: Treated Water (ug/l)			4	3	6/8/02 - 6/7/03	0.6	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Dibromochloromethane: Treated Water (ug/l)			4	4	6/8/02 - 6/7/03	1.6	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Trihalomethanes, total: Distribution System (ug/l)	100		4	4	6/8/02 - 6/7/03	32.7	No	By-product of chlorination. The MAC for THMs is based on a running annual average.
Bromodichloromethane: Distribution System (ug/l)			4	4	6/8/02 - 6/7/03	10.7	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Bromoform: Distribution System (ug/l)			4	3	6/8/02 - 6/7/03	4.3	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Chloroform: Distribution System (ug/l)			4	3	6/8/02 - 6/7/03	5.1	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)
Dibromochloromethane: Distribution System (ug/l)			4	4	6/8/02 - 6/7/03	12.60	N/A	By-product of chlorination. * (Running annual average - included above in total THMs)

8.2 Cana Well System - Treated Water

Table C - Inorganics	MAC/ IMAC	AO/ OG	Number of Samples	Number of Detectable Results	Sampling Dates	Maximum Result	Exceedance?	Typical Source of Contaminant
Arsenic (ug/l)	25		0	0		N/A	No	Naturally occurring in surface waters / mine drainage
Barium (ug/l)	1000		0	0		N/A	No	Erosion of natural deposits. Discharge from metal refineries, oil drilling wastes.
Boron (ug/l)	5000		0	0		N/A	No	Erosion of natural deposits, industrial waste effluents.
Cadmium (ug/l)	5		0	0		N/A	No	Industrial discharge
Chromium (ug/l)	50		0	0		N/A	No	Industrial residues
Copper (ug/l)	1000		0	0		N/A	No	Domestic plumbing (Aesthetic objective)
Iron (ug/l)		300	6	6	4/7/03 - 6/16/03	710	AO Exceedance	Leaching from natural deposits and plumbing materials, industrial wastes. (Aesthetic objective)
Lead (ug/l) Treated Water	10		0	0		N/A	No	Internal corrosion of household plumbing, erosion of natural deposits.
Lead (ug/l) Distribution System	10		0	0		N/A	No	Internal corrosion of household plumbing, erosion of natural deposits.
Manganese (ug/l)		50	6	6	4/7/03 - 6/16/03	80	AO Exceedance	Erosion of natural deposits.
Mercury (ug/l)	0.1		0	0		N/A	No	Erosion of natural deposits, industrial discharges.
Nitrate (N) (mg/l)	1		3	0	4/7/03 - 6/5/03	<0.1	No	Runoff from fertilizer use, erosion of natural deposits
Nitrite (N) (mg/l)	10		3	0	4/7/03 - 6/5/03	<0.1	No	A natural component of water at this level.
Selenium (ug/l)	10		0	0		N/A	No	Discharge from refineries, mines, chemical manufacture
Uranium (ug/l)	20		0	0		N/A	No	Erosion of natural deposits.

8.2 Cana Well System - Treated Water

Table D - Pesticides & PCBs	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Max. Result	Exceedance?	Typical Source of Contaminant
Alachlor (Lasso) (ug/l)	5		1	0	4/7/03	N/D	No	Agricultural herbicide
Aldicarb (ug/l)	9		1	0	4/7/03	N/D	No	Agricultural insecticide
Aldrin+dieldrin (ug/l)	0.7		1	0	4/7/03	N/D	No	Residue from banned insecticide
Atrazine (ug/l)	5		1	0	4/7/03	N/D	No	Agricultural herbicide
Azinphos-methyl (Guthion) (ug/l)	20		1	0	4/7/03	N/D	No	Insecticide
Bendiocarb (ug/l)	40		1	0	4/7/03	N/D	No	Insecticide
Bromoxynil (ug/l)	5		1	0	4/7/03	N/D	No	Agricultural herbicide
Carbaryl (ug/l)	90		1	0	4/7/03	N/D	No	Agricultural/Forestry/ Household insecticide
Carbofuran (ug/l)	90		1	0	4/7/03	N/D	No	Agricultural insecticide
Chlordane (Total) (ug/l)	7		1	0	4/7/03	N/D	No	Residue from banned insecticide
Chlorpyrifos (Dursban) (ug/l)	90		1	0	4/7/03	N/D	No	Agricultural/ Household insecticide
Cyanazine (Bladex) (ug/l)	10		1	0	4/7/03	N/D	No	Agricultural/ Residential herbicide
Diazinon (ug/l)	20		1	0	4/7/03	N/D	No	Agricultural/ Livestock Operation/ Residential insecticide
Dicamba (ug/l)	120		1	0	4/7/03	N/D	No	Agricultural herbicide
2,4-dichlorophenol (ug/l)	900		1	0	4/7/03	N/D	No	Industrial contamination/ reaction with chlorine
DDT (ug/l)	30		1	0	4/7/03	N/D	No	Residue from banned insecticide
2,4-dichlorophenoxyacetic acid (2,4-D) (ug/l)	100		1	0	4/7/03	N/D	No	Agricultural/ Residential herbicide
Diclofop-methyl (ug/l)	9		1	0	4/7/03	N/D	No	Agricultural herbicide
Dimethoate (ug/l)	20		1	0	4/7/03	N/D	No	Agricultural/ Livestock Operation/ Forestry insecticide
Dinoseb (ug/l)	10		1	0	4/7/03	N/D	No	Herbicide residue
Diquat (ug/l)	70		1	0	4/7/03	N/D	No	Agricultural/ Aquatic herbicide
Diuron (ug/l)	150		1	0	4/7/03	N/D	No	Agricultural/ Industrial/ herbicide
Glyphosate (ug/l)	280		1	0	4/7/03	N/D	No	Agricultural/Forestry/ Household herbicide

8.2 Cana Well System - Treated Water

Table D - Pesticides & PCBs	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Max. Result	Exceedance?	Typical Source of Contaminant
Heptachlor+heptachlor epoxide (ug/l)	3		1	0	4/7/03	N/D	No	Residue from banned insecticide
Lindane (Total) (g-BHC Hexachlorocyclohexane) (ug/l)	4		1	0	4/7/03	N/D	No	Agricultural/ Pharmaceutical insecticide
Malathion (ug/l)	190		1	0	4/7/03	N/D	No	Fruit & Vegetable / pest control insecticide
Methoxychlor (ug/l)	900		1	0	4/7/03	N/D	No	Agricultural/ Livestock Operation/ Residential insecticide
Metolachlor (ug/l)	50		1	0	4/7/03	N/D	No	Agricultural herbicide
Metribuzin (Sencor) (ug/l)	80		1	0	4/7/03	N/D	No	Agricultural herbicide
Paraquat (ug/l)	10		1	0	4/7/03	N/D	No	Agricultural/ Aquatic herbicide
Parathion (ug/l)	50		1	0	4/7/03	N/D	No	Agricultural insecticide
Pentachlorophenol (ug/l)	60		1	0	4/7/03	N/D	No	Pesticide/ wood preservative residue
Phorate (Thimet) (ug/l)	2		1	0	4/7/03	N/D	No	Agricultural insecticide
Picloram (ug/l)	190		1	0	4/7/03	N/D	No	Industrial herbicide
PCB; total (ug/l)	3		1	0	4/7/03	N/D	No	Residue from various industrial uses
Prometryne (ug/l)	1		1	0	4/7/03	N/D	No	Agricultural herbicide
Simazine (ug/l)	10		1	0	4/7/03	N/D	No	Agricultural herbicide or its residue
Temephos (ug/l)	280		1	0	4/7/03	N/D	No	Insecticide for Mosquito/Black fly control
Terbufos (ug/l)	1		1	0	4/7/03	N/D	No	Agricultural insecticide
2,3,4,6-tetrachlorophenol (ug/l)	100		1	0	4/7/03	N/D	No	Wood preservative
Triallate (ug/l)	230		1	0	4/7/03	N/D	No	Agricultural herbicide
2,4,6-trichlorophenol (ug/l)	5		1	0	4/7/03	N/D	No	Pesticide manufacturing
Trifluralin (ug/l)	45		1	0	4/7/03	N/D	No	Agricultural herbicide
2,4,5-trichlorophenoxyacetic acid (2,4,5-T) (ug/l)	280		1	0	4/7/03	N/D	No	Industrial herbicide residue

8.2 Cana Well System - Treated Water

Non-Regulated Sample Results	MAC or IMAC	AO or OG	Number of Samples	Number of Detectable Results	Sampling Dates	Max. Result	Exceedance?	Parameter Description
Alkalinity (mg/l as CaCO ₃)		500	0	0		N/A	No	A measure of the resistance of the water to the effects of acids. Expressed as calcium carbonate.
Aluminum (ug/l)		100	0	0		N/A	No	May be naturally present or a residual from the coagulation process.
Ammonia N (mg/l)			0	0		N/A	No	Occurs naturally from organic nitrogen containing compounds.
Calcium (mg/l)			0	0		N/A	No	Naturally occurring.
Chloride (mg/l)		250	0	0		N/A	No	A common naturally occurring non-toxic material that may produce a salty taste in water.
Colour (TCU)		5	3	0	4/7/03 - 6/5/03	<2	No	Typically the result of organic matter in surface waters.
Conductivity (Us/cm)			0	0		N/A	No	A measure of ability of water to carry an electric current due to the presence of ions.
Fluoride (mg/l)	1.5		1	1		0.50	No	Naturally occurring.
Hardness (mg/l)		100	3	3	4/7/03 - 6/5/03	574	AO Exceedance	Naturally occurring from dissolved calcium and magnesium.
Sodium (mg/l)		200	7	7	4/7/03 - 6/16/03	94.8	No	Occurs naturally in the earth's crust.
Sulphate (mg/l)		500	0	0		N/A	No	An inorganic constituent that may cause tastes at high levels.
Total Kjeldahl Nitrogen (mg/l)			0	0		N/A	No	Indicator of organic contamination or the potential for taste and odour problems.
Zinc (ug/l)	5000		0	0		N/A	No	An inorganic constituent that may cause tastes.