City of Owen Sound
Richard H. Neath Water Treatment Plant
2002

Quarterly Water Quality Report – April 1st – June 30th

Quarterly Water Report

We are pleased to present to you this Quarterly Report; it is designed to inform you about water quality and the services that are provided to you by the City of Owen Sound - Public Works Department - Water Treatment Section.

Mission

Our goal is to provide to you a safe and dependable supply of potable water.
We are committed to meeting or surpassing all mandatory Drinking water standards as required by the new Drinking Water Regulation, Ontario Regulation 459/00. (O.Reg. 459/00)
Public Works staff are committed to the task of meeting the needs of our community in providing to our ratepayers a superior product in an efficient, cost effective manner.

continued on page 2

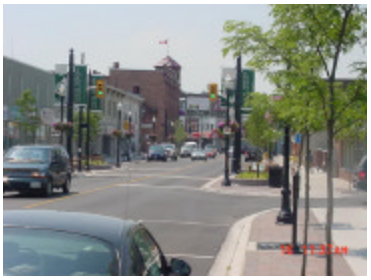
Inside This Issue

Richard H. Neath WTP Waterworks Operations Update

Water Treatment staff have continued to be proactive in meeting the challenges of the new Drinking Water Protection Regulation, which has standardized the monitoring and reporting requirements for all communities across Ontario.

XCG Consultants Ltd. has submitted to the City, options available in meeting the disinfection requirement of O. Reg 459/00. The options available were chlorination with additional contact time, superchlorination/dechlorination, chlorine dioxide, ozone, UV, and membrane filtration. One of these options will be selected in the near future.

The 8th Street East Reconstruction Project is close to being finished and the 2002 segment of the Big Dig is now complete.



(2nd Ave East – under construction & completed project)

(8th Street East – close to completion)

continued from page 1

Where is your water treated?

The City of Owen Sound drinking water is taken from Georgian Bay and is supplied to the community after treatment at the Richard H. Neath Water Treatment Plant (RHNWTP), which is located at 2600 3rd Avenue East in Owen Sound, Ontario.

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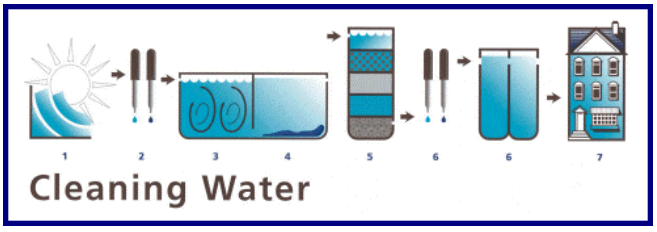
How is the your water treated?

The RHNWTP is a direct filtration water treatment facility, consisting of two individual treatment trains. Plant #1 was constructed in 1967, and in 1980 the facility was twinned with the addition on Plant #2. The facility is capable of producing 60.5 million liters of potable water per day (ML/d), providing water and fire protection to 8,890 private dwellings, and to an ever-expanding commercial base within the City, including several large industrial customers. (Canada Census; 1996)

Facility Process Information

The RHNWTP contains two water treatment trains each equipped with similar unit process components. A process flow diagram of the RHNWTP is presented in Figure 1.

Fig: 1 Water treatment train; representing raw water, chemical addition, mixing, filtration, chlorination, storage and delivery.



Facility Process Information Continued …

Raw water is drawn into the RHNWTP plant via a 0.9-meter diameter intake pipe extending 670 meters into Georgian Bay. Raw water is screened, pre-chlorinated and pumped to rapid mix tanks through two 35-centimeter diameter pipes.
A primary coagulant is added to the raw water prior to entering the rapid mix tanks and is then delivered to flocculation tanks in each Plant. "Floc" tank effluent is combined within each plant before being delivered to two dual media filters designed to remove unwanted particulates. Once filtered the water is then stored in "Clear Wells" which are located underground below the facility.

A **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition (SCADA) System assists operations staff in the collection of data and the monitoring of the many unit processes that are used in the water treatment process.

Raw Water Quality

Turbidity, pH and temperature are important physical characteristics of raw water that affect the treatment process of water.
Samples taken from the intake pipe prior to entering the Low Lift Pumping Station are analyzed for these characteristics on a daily basis and are considered when making chemical dose changes.

Treated Water Quality

Treated water characteristics are closely monitored on a continual basis. Temperature, turbidity, pH and chlorine residuals of the treated water are monitored constantly at various points of the treatment process, and are recorded by the SCADA system.
Treated water samples are collected daily and are analyzed in the laboratory for comparison purposes. These tests include chlorine residuals, fluoride concentration, turbidity and colour.

What is in your water?

Natural water contains various elements, which may include, microbes, metal salts, organic and inorganic substances. There are referred to as physical and chemical parameters. These parameters may be present in water before the treatment process. What follows is a description of the various groups of parameters.

What is in you water? Continued ……

Microbiological parameters - such as bacteria may come from surface runoff, effluent discharges, (sewage plants, livestock operations, septic systems and storm sewers). Microbiological quality is an important aspect of drinking water quality due to its association with water-borne diseases, which may impact human health.

Organic parameters occur naturally, but most organic compounds, which are of concern, are produced synthetically. They can originate from industrial discharges, urban storm run-off and many other point sources. Included in this group of contaminants are pesticides that are used in both rural and urban applications.

Inorganic parameters such as salts and metals can be naturally occurring or can enter the raw water source as a result of urban run-off from industrial or domestic processes which discharge wastewater into the environment.

Pesticides, Herbicides & PCB's Pesticides are designed or formulated to kill or control animal pests. Herbicides are used to control plant growth. Polychlorinated biphenyls (PCB's) are a class of organics compounds used by industry that are known to cause adverse health effects in domestic water supplies.

The City of Owen Sound strictly follows a policy that prohibits the use any herbicides or pesticides on City owned property.

Where do contaminants come from?

Contamination of our watershed and ground water resources is cause for public concern. The point sources that allow for contaminants to enter into the hydrologic cycle are many and are varied. However, they are usually anthropogenic in nature. In order to reduce contamination of our water source, we believe it is the responsibility of the individual and commercial enterprise to reduce and eliminate pollution of this precious resource.

In order to ensure that tap water is safe to drink, the Ministry of the Environment regulates the limit or amount of certain contaminants in water provided by public water systems.

What do we test for?

As per the Ontario Drinking Water Regulation, O.Reg 459/00 and the Certificate of Approval issued for the waterworks, the following parameters are tested;

- **Microbial – Table A – ODWS**

E. Coli, Total Coliform, Background Counts, Heterotrophic Plate Counts

- **Organics – Table B – ODWS**

Benzene, Carbon Tetrachloride, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, 1.2-Diclhoroethane, 1,1-Dichloroethylene, Ethylbenzene, Monochlorobenzene, Tetrachloroethylene, Toluene, Trihalomethanes, Trichloroethylene, Vinyl Chloride, and Xylene.

- **Inorganics – Table C – ODWS**

Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nitrate, Nitrite, Selenium, and Uranium.

- **Pesticides, Herbicides & PCBs – Table D – ODWS**

Alachlor, Aldicarb, Aldrin+Dieldrin, Atrazine, Azinphos-methyl, Bendiocarb, Bromoxynil, Carbaryl, Carbofuran, Chlordane(Total), Chlorpyrifos, Cyanazine, Diazinon, Dicamba, 2,4-Dichlorophenol, DDT, 2,4-D, Diclofop-methyl, Dimethoate, Dinoseb, Diquat, Diuron, Glyphosate, Heptachlor epoxide, Lindane(Total), Malathion, Methoxychlor, Metolachlor, Metribuzin, Paraquat, Parathion, Pentachlorophenol, Phorate, Picloram, PCB, Prometryne, Simazine, Temephos, Terbufos, 2,3,4,6-Tetrachlorophenol, Triallate, 2,4,6-Trichlorophenol, Trifluralin, and 2,4,5-T.

As per Ministry of Environment Certificates of Approval requirements the following samples are also collected;

- **Zebra Mussel Control System – Certificate of Approval**

Alkalinity, Hardness, Calcium, Sodium, Iron, Copper, Lead, Zinc, Arsenic, Aluminum, Manganese, Conductivity, Chloride, Sulphate, Ammonia+Ammonium (N), Total Kjeldahl Nitrogen, Nitrate, Nitrite, Dissolved Organic Carbon, Phenols, and Trihalomethanes, pH, Turbidity, Temperature, and Total Chlorine Residual.

- **Raw Water Source - ODWS**

Table 1 of the Ontario Drinking Water Standards must be analyzed once a year. These samples are analyzed for 76 different parameters, which consist of a variety of the above listed.

NOTE: The Testing Results section only shows the parameters that had detectable results.

Common Definitions of Terms Used in Water Treatment Analysis

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

R
Raw water – untreated water

Tr
Treated Water Sample – treated water

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

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

ns
No sample.

mg/l
milligrams per litre. This corresponds to one part of liquid in one million parts of liquid (parts per million (ppm).

ug/l
micrograms per litre. This corresponds to one part of liquid in one billion parts of liquid (parts per billion (ppb).

CM
Continuous Monitoring of a parameter.

MAC
Maximum **A**cceptable **C**oncentration.

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 **M**aximum **A**cceptable **C**oncentration.

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 **O**bjective.

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.

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

Parameters Exceeded?

Exceedance of O. Reg 459/00

External Testing

During this quarter, there were 3 exceedances of the guideline.

1. 3591 3rd Ave. East – Total Coliform 1 cfu/100ml.
2. 1755 17th Street East – Total Coliform Overgrowth Background >200, HPC >500.
3. 1755 17th Street – Nitrosodimethylamine .013ug/L.

The outcome of resampling met all guideline requirements.

Internal Testing

16 reportable occurrences of adverse water quality in 5 different locations as a result chlorine residuals being below 0.05 mg/L.

These occurrences were reported to the Ministry of Health and the Ministry of the Environment.

The geographic areas of concern are the Southwest quadrant of the City in the Greenwood Cemetery area.

When an adverse result is identified, remedial action is taken, in the form of flushing a hydrant in the affected area. The average free chlorine residual acquired after flushing these areas was 0.34 mg/L.

Where can I get a copy of this Report?

Clerk's Office
Owen Sound City Hall
808 2nd Avenue East
Owen Sound, Ontario
N4K 2N4

Or

City of Owen Sound's
Public Works Division
1900 20th Street East
Owen Sound, Ontario
N4K 5N3

Or

City's Web site(s)

www.city.owen-sound.on.ca\water

Testing Results

Table A - Microbiological Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
E. Coli	1	cfu/100 m	15	153	1	0	0-1	0	NO	E. coli bacteria are used as in indicator bacteria and should not be detected/present in any drinking water sample. The presence of E. coli suggests the possibility of pathogenic bacteria being present in the drinking water.
Total Coliform	1	cfu/100 m	15	153	4	2	0-Over grown	1-Over grown	**YES**	The Coliform group of bacteria has been the most commonly used indicator of water quality. Their presence in drinking water indicates inadequate filtration and/or disinfection.
Background	200	cfu/100 m	14	153	7	17	0->2000	0->200	**YES**	A method of measuring bacterial content in water which can be used to measure water quality deterioration in distribution systems.
Heterotrophic Plate Counts (HPC)	500	cfu /1ml	3	52	3	15	<2-62	<2-500	**YES**	HPC is a method of measuring the aerobic bacterial content in water and as a measure of water quality in reservoirs and distribution systems.

Parameter Related to Microbiological Quality	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Turbidity - Finished	1.0	NTU	CM		CM		n/a	0.05	NO	Quantified and measured as Nephelometric Turbidity Units (NTU), turbidity is an indicator of water clarity.
Turbidity - Raw	n/a	NTU	CM		CM		0.79	n/a	n/a	Quantified and measured as Nephelometric Turbidity Units (NTU), turbidity is an indicator of water clarity.
Free Chlorine-Plant-Pre	n/a	mg/L	CM		CM		.13-.39	n/a	n/a	The sum of the concentration of molecular chlorine, (Cl2) hypochlorous acid, (HOCl) and hypochlorite ion (OCl-) available after chlorine demand has been met.
Free Chlorine-Post Cl2	n/a	mg/L	CM		CM		n/a	.97-1.21	n/a	The sum of the concentration of molecular chlorine, (Cl2) hypochlorous acid, (HOCl) and hypochlorite ion (OCl-) available after chlorine demand has been met.
Aluminum - Raw	n/a	mg/L	11	n/a	5	n/a	.000-.010	n/a	n/a	The use of aluminum salts in drinking water treatment is common place. Current regulation requires that an operational guideline of 0.1 mg/L be maintained in treated water.
Aluminum - Treated	0.1	mg/L	n/a	11	n/a	11	n/a	.022-.049	NO	The use of aluminum salts in drinking water treatment is common place. Current regulation requires that an operational guideline of 0.1 mg/L be maintained in treated water.
Colour - Raw	n/a	TCU	91	n/a	42	n/a	0-13	n/a	n/a	The aesthetic objective for colour in drinking water is 5 true colour units (TCU). Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials.

Colour - Treated	5	TCU	n/a	91	n/a	34	n/a	0-10	n/a	The aesthetic objective for colour in drinking water is 5 true colour units (TCU). Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials.
Fluoride-Treated	1.5	mg/L	n/a	89	n/a	89	n/a	.15-.53	NO	Fluoride is naturally occurring and is also added to the treated water to promote dental health.
Fluoride-Raw	n/a	mg/L	10	n/a	7	n/a	.00-.27	n/a	n/a	Fluoride is naturally occurring and is also added to the treated water to promote dental health.

Certificate of Approval (Zebra Mussel Control) Raw Chlorinated Water	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Alkalinity	30-500	mg/L	1	n/a	1	n/a	76	n/a	NO	Alkalinity is a measure of the ability of a substance to neutralize an acid and is measured as calcium carbonate.
Hardness	80-100	mg/L	1	n/a	1	n/a	91	n/a	NO	A quality of water measured as calcium carbonate, compromising dissolved compounds of calcium, magnesium and other divalent and trivalent metallic elements.
Calcium	n/a	mg/L	1	n/a	1	n/a	25.1	n/a	NO	Calcium compounds, when dissolved define water hardness. The presence of calcium in water is a factor contributing to the formation of scale and insoluble compounds in water mains
Sodium	200	mg/L	1	n/a	1	n/a	3.9	n/a	NO	An element found in drinking water in variable concentrations. Sodium is associated with specific health risks such as high blood pressure and heart disease.
Iron	0.3	mg/L	1	n/a	1	n/a	0.03	n/a	NO	Iron may be present in surface and ground water supplies. The aesthetic objective for iron is set at 0.3 mg/L.
Copper	1.0	mg/L	1	n/a	1	n/a	0.02	n/a	NO	Copper is commonly found in drinking water. The aesthetic objective for copper is set at 1.0 mg/L.
Conductivity (uS/cm)		uS/cm	1	n/a	1	n/a	205	n/a	NO	The measure of a substance to conduct an electrical current and correlates water quality to water components, such as dissolved solids.
Chloride	250	mg/L	1	n/a	1	n/a	7.4	n/a	NO	Chlorides are salts resulting from the combination of chlorine with a metal such as sodium chloride (NaCl) and magnesium chloride (MgCl2).
Sulphate	500	mg/L	1	n/a	1	n/a	15.4	n/a	NO	Sulphate is second to bicarbonate as the major anion in hard water reservoirs. Sulphates can be naturally occurring or anthropogenic in nature.
Total Kjeldahl Nitrogen		mg/L	1	n/a	1	n/a	0.16	n/a	NO	Represents the nitrogen equivalent available from ammonia and
Nitrate	10.0	mg/L	1	n/a	1	n/a	0.7	n/a	NO	This limit has been established as the result of the relationship of breakdown products and incidence of infantile methaemoglobinaemia.

Dissolved Organic Carbon	5	mg/L	1	n/a	1	n/a	1	n/a	NO	Is a measure of the fraction of total organic carbon (TOC), in water that passes through a 0.45-micron pore-diameter filter. TOC is used to determine the overall organic content of water and plays a role in the formation of disinfection by-products.
Trihalomethanes (THM's)	0.1	mg/L	1	n/a	1	n/a	0.0024	n/a	NO	THM's (chloroform, bomodichloromethane, chlorodibromomethane and bromoform) are formed as a result of the reaction of chlorine and organic material in drinking water.

Table B - Volatile Organics Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Trihalomethanes – Treated Header	0.1	mg/L	n/a	1	n/a	1		0.0195	NO	THM's (chloroform, bomodichloromethane, chlorodibromomethane and bromoform) are formed as a result of the reaction of chlorine and organic material in drinking water.
Trihalomethanes – Dist. System	0.1	mg/L	n/a	1	n/a	1		0.0276	NO	THM's (chloroform, bomodichloromethane, chlorodibromomethane and bromoform) are formed as a result of the reaction of chlorine and organic material in drinking water.

Table C - Inorganic Parameters	MAC or IMAC or AO	Units	# of Samples		# of Detectable Results		Range		Exceeded ?	Typical Source of Contaminant
			Raw	Treated	Raw	Treated	Raw	Treated		
Fluoride-Treated	1.5	mg/L	n/a	89	n/a	89	n/a	.15-.53	NO	Fluoride is naturally occurring and is also added to the treated water to promote dental health.
Fluoride-Raw	n/a	mg/L	10	n/a	7	n/a	.00-.27	n/a	n/a	Fluoride is naturally occurring and is also added to the treated water to promote dental health.
Nitrate	10.0	mg/L	n/a	1	n/a	1	n/a	0.5	NO	This limit has been established as the result of the relationship of breakdown products and incidence of infantile methaemoglobinaemia.