

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

Quarterly Water Quality Report – July 1<sup>st</sup> – September 30<sup>th</sup>



## 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 is 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.

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## Richard H. Neath WTP Waterworks Operations Update



*(Richard H. Neath Water Treatment Plant- front entrance)*

XCG Consultants has completed their project on selecting the process requirements needed to meet CT requirement that are mandatory in the new Ontario Regulation 459/00 (O. Reg 459/00). From the options investigated, UV disinfection with clearwell baffling was the primary choice. Other items that were looked at were a backwash residue management system, and electrical upgrading needed to maximize plant efficiency. City Council has approved the above items and the project should begin early next year.

During this quarter a rigorous flushing program took effect. The City's Water Section looks after and maintains 519 fire hydrants and 87 flush hydrants (underground). All fire hydrants and flush hydrants were flushed. The purpose of this flushing program is listed below;

- Hydrants are exercised, making sure that they open and close properly,
- The general condition of the hydrant is checked, this includes the inspection of the paint, lugs, gaskets, and any leakage,
- Technical data is collected including static flows and pressures,
- Water Quality data is collected including visible inspection of water clarity, chlorine residuals at the beginning and end of the flush, and the amount of time flushed at each location.

## 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 3<sup>rd</sup> Avenue East in Owen Sound, Ontario.

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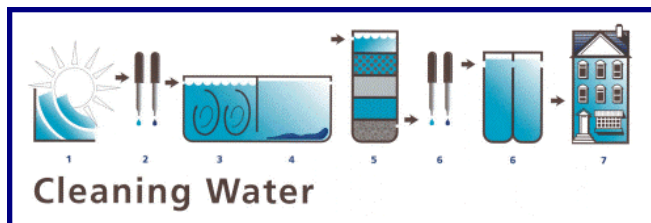
## How is the your water treated?

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

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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 **Supervisory Control And Data Acquisition (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 your 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-Dichloroethane, 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 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.

### **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 5 exceedances of the guideline.

1. VLA – Total Coliform 2 cfu/100ml.
2. VLA- Total Coliform overgrowth  
Background >200,
3. Water Plant Header- Aluminum .127 mg/L
4. 3599 3<sup>rd</sup> Ave East – Total coliform 2 cfu/100 ml
5. 1755 17<sup>th</sup> Street – Nitrosodimethylamine .019ug/L.

The outcome of resampling of the above parameters met all guideline requirements.

### **Internal Testing**

23 reportable occurrences of adverse water quality in 7 different locations as a result of chlorine residuals being below 0.05 mg/L. These occurrences were reported to the MOH and the MOE

The geographic areas of concern are the Southwest and Southeast quadrants of the City in the Greenwood Cemetery area, Hwy 6&10, and West of Somers Street.

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 with the low chlorine residuals was 0.51 mg/L.

## Where can I get a copy of this Report?

### **1. Clerk's Office**

Owen Sound City Hall  
808 2<sup>nd</sup> Avenue East  
Owen Sound, Ontario  
N4K 2N4

### **2. City of Owen Sound's Public Works Division**

1900 20th Street East  
Owen Sound, Ontario  
N4K 5N3

**Or**

### **3. City's Web site(s)**

[www.city.owen-sound.on.ca/water](http://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 ml	14	148	0	0	0-0	0-0	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 ml	14	148	4	3	0-70	0-8	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 Counts	200	cfu/100 ml	14	148	10	5	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	500	cfu/ml	n/a	20	n/a	6	n/a	0-308	NO	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	.02-.12	NO	Quantified and measured as Nephelometric Turbidity Units (NTU), turbidity is an indicator of water clarity.
Turbidity - Raw	n/a	NTU	CM		CM		.25-1.95	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		.07-.38	n/a	n/a	The sum of the concentration of molecular chlorine, (Cl <sub>2</sub> ) hypochlorous acid, (HOCl) and hypochlorite ion (OCl <sup>-</sup> ) available after chlorine demand has been met.
Free Chlorine-Post Cl <sub>2</sub>	n/a	mg/L	CM		CM		n/a	.92-1.28	n/a	The sum of the concentration of molecular chlorine, (Cl <sub>2</sub> ) hypochlorous acid, (HOCl) and hypochlorite ion (OCl <sup>-</sup> ) available after chlorine demand has been met.
Aluminum - Raw	n/a	mg/L	14	n/a	4	n/a	.000-.003	n/a	n/a	The use of aluminum salts in drinking water treatment is common place.
Aluminum - Treated	0.1	mg/L	n/a	16	n/a	16	n/a	.005-.127	YES	The use of aluminum salts in drinking water treatment is common place.
Colour - Raw	n/a	TCU	92	n/a	15	n/a	0-16	n/a	n/a	Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials. This is an aesthetic objective only.
Colour - Treated	5	TCU	n/a	92	n/a	7	n/a	0-11	YES	Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials. This is an aesthetic objective only.
Nitrate (as nitrogen)	10	mg/L	1	n/a	1	n/a	n/a	0.4	NO	This limit has been established as the result of the relationship of breakdown products and incidence of infantile methaemoglobinaemia.

Amended Certificate of Approval Additional Testing (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	73	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	93	n/a	NO	A quality of water measured as calcium carbonate, comprising dissolved compounds of calcium, magnesium and other divalent and trivalent metallic elements.
Calcium	n/a	mg/L	1	n/a	1	n/a	25.7	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	3.2	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	0.15	n/a	n/a	Iron may be present in surface and ground water supplies.
Copper	1.0	mg/L	1	n/a	1	n/a	0.13	n/a	NO	Copper is commonly found in drinking water.
Lead	0.01	mg/L	1	n/a	1	n/a	0.001	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.
Aluminum	0.1	mg/L	1	n/a	1	n/a	0.2	n/a	NO	The use of aluminum salts in drinking water treatment is common place.
Manganese	0.05	mg/L	1	n/a	1	n/a	0.014	n/a	n/a	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	209	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	6.8	n/a	NO	Chlorides are salts resulting from the combination of chlorine with a metal such as sodium chloride (NaCl) and magnesium chloride (MgCl <sub>2</sub> ).
Sulphate	500	mg/L	1	n/a	1	n/a	14	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.
Ammonia + Ammonium (N)		mg/L	1	n/a	1	n/a	0.01	n/a	NO	Ammonia concentration is usually reported as total (NH <sub>3</sub> /NH <sub>4</sub> -N) ammonia nitrogen.
Total Kjeldahl Nitrogen		mg/L	1	n/a	1	n/a	0.26	n/a	NO	Represents the nitrogen equivalent available from ammonia and organic nitrogen.
Nitrate	10.0	mg/L	1	n/a	1	n/a	0.3	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	0.9	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	0.1	mg/L	1	n/a	1	n/a	0.0079	n/a	NO	THM's (chloroform, bromodichloromethane, chlorodibromomethane and bromoform) are formed as a result of the reaction of chlorine and organic material in drinking water.

Table B - Volatile Organic Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Trihalomethanes	0.1	mg/L	n/a	1	n/a	1	n/a	0.0358	NO	THM's (chloroform, bromodichloromethane, chlorodibromomethane and bromoform) are formed as a result of the reaction of chlorine and organic material in drinking water.

Table C – Inorganic Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Not Tested										

Table D – Pesticides & PCB's Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Nothing to report.										

Table 1 – Raw Water Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
			R	Tr	R	Tr	R	Tr		
Not Tested.										