

# City of Owen Sound Richard H. Neath Water Treatment Plant 2003

Quarterly Water Quality Report – January 1<sup>st</sup> – March 31<sup>st</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)*

Upgrade work at the water plant that was scheduled to be completed by June 30, 2003 will be extended to the end of this year, due to MOE approval delays. A July start has been set, and the project should be completed by September.

An MOE inspection of the Richard H. Neath facility was conducted on January 20<sup>th</sup>, 2003. Several items were identified that need to be addressed. Details of the inspection are available, by contacting the Water Treatment Supervisor or Water/Wastewater Superintendent.

The high temperatures in March caused a large amount of surface run-off (agricultural, snow, decayed vegetation), which in turn, caused problems for the water plant. For approximately 3 weeks, the chlorine demand practically doubled to deal with the high colored, high turbidity raw water. Plant staff worked hard to maintain a clear aesthetically pleasing tasting product, to its customers.

During this quarter, due to the extreme winter conditions, there were 18 broken water mains, and approximately 30 frozen customer services, including a 6" water main. This kept our water distribution crew quite busy.

Our first annual compliance report is now available. A copy of the report is available at the Public Works office located at 1900 20<sup>th</sup> Street East, and the Water Plant located at 2600 3<sup>rd</sup> Avenue East.

## 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?

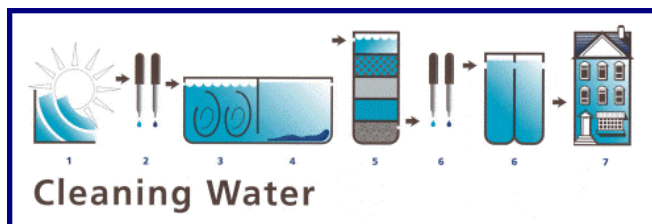
The RHNWTP is a direct filtration water treatment facility, consisting of two individual treatment trains. Plant #1 was constructed in 1967, and in 1980 the facility was twinned with the addition on Plant #2. The facility capacity is rated at 27,276 m<sup>3</sup>/day, providing water and fire protection 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 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-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;

- **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**

#### **Microbial/physical/chemical exceedances**

During this quarter, there were 0 exceedances of the guideline.

#### **In-Plant Testing Results**

There were 2 reportable occurrences for turbidity over 1 NTU leaving the plant. These occurrences were reported to the MOH and the MOE

When these adverse results were identified, remedial action was taken. The action consisted of coagulant dosage adjustments, along with increased backwashes to keep filters clean.

## **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)

## Test 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	15	129	9	0	0-35	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	15	129	14	0	0-1000	0	NO	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	15	129	15	1	30-10000	0-2	NO	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	25	n/a	1	n/a	0-6	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	.05-1.54	YES	Quantified and measured as Nephelometric Turbidity Units (NTU), turbidity is an indicator of water clarity.
Turbidity - Raw	n/a	NTU	CM		CM		.34-11.45	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		.05-.20	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	1.09-1.25	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 (In-Plant Test)	n/a	mg/L	12	n/a	0	n/a	0.000	n/a	n/a	The use of aluminum salts in drinking water treatment is common place. This is an operational guideline, medical studies have not provided clear evidence that residual aluminum has any effect on health.
Aluminum - Treated ( In-Plant Test)	0.1	mg/L	n/a	12	n/a	12	n/a	.034-0.098	NO	The use of aluminum salts in drinking water treatment is common place. This is an operational guideline, medical studies have not provided clear evidence that residual aluminum has any effect on health.
Colour - Raw	n/a	TCU	89	n/a	19	n/a	0-17	n/a	n/a	Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials.
Colour - Treated	5	TCU	n/a	89	n/a	14	n/a	0-8	YES	Sources of colour can include natural metallic ions, humic and fulvic acids and organic materials. This is an aesthetic objective only.

## Parameters related to Microbial quality continued ...

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.
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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 - Municipal Header	0.1	mg/L	n/a	1	n/a	1	n/a	0.0067	NO	THM's (chloroform, bromodichloromethane, 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	n/a	0.0319	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 or IMAC or AO	Units	# of Samples		# of Detectable Results		Range		Exceeded ?	Typical Source of Contaminant
			Raw	Treated	Raw	Treated	Raw	Treated		
Fluoride-Raw	n/a	mg/L	10	n/a	10	n/a	.09-.24	n/a	n/a	Fluoride is naturally occurring and is also added to the treated water to promote dental health.
Fluoride-Treated	1.5	mg/L	n/a	88	n/a	88	n/a	.19-.64	NO	Fluoride is naturally occurring and is also added to the treated water to promote dental health.
Aluminum - Treated (External Lab Test)	0.1	mg/L	n/a	1	n/a	1	n/a	0.220	YES	The use of aluminum salts in drinking water treatment is common place. This is an operational guideline, medical studies have not provided clear evidence that residual aluminum has any effect on health.
Barium	1.0	mg/L	n/a	1	n/a	1	n/a	0.015	NO	Commonly found in sedimentary rock such as limestone.
Boron	5.0	mg/L	n/a	1	n/a	1	n/a	0.01	NO	Most commonly found as borate which is in antiseptic agents.

Table D - Pesticides & PCBs Parameters	MAC, IMAC, or AO	Units	# of Samples		# of Detectable Results	Tr	Range		Exceed ?	Typical Source of Contaminant
			R	Tr			R	Tr		
Nothing detected this quarter										

TABLE 1 ODWS Raw Water	MAC or IMAC or AO	Units	# of Samples		# of Detectable Results	Tr	Range		Exceeded ?	Typical Source of Contaminant
			Raw	Treated			Raw	Treated		
Not tested at this time										