

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

Quarterly Water Quality Report – January 1st – March 31st



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.

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Richard H. Neath WTP Waterworks Operations Update



Water Treatment staff have been 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.

Operations personnel are monitoring and optimizing the treatment process used at the facility and are initiating changes that will improve consistency in finished water quality.

The City has retained the services of XCG Consultants Ltd. to look into the options available in treating filter backwash effluent and in meeting the MOE disinfection guidelines for Giardia removal.

Preliminary assessments have been made and the Consulting Firm is now in the process of providing information regarding the options available in meeting the objectives stated.

Water Distribution staff have been actively involved in assisting the Engineering firms of Pryde – Schropp – MaComb Inc. and Henderson Paddon & Associates in the preliminary stages of design for the 8th Street East Reconstruction project and the “Big Dig” 2002 that is to get underway early this spring.



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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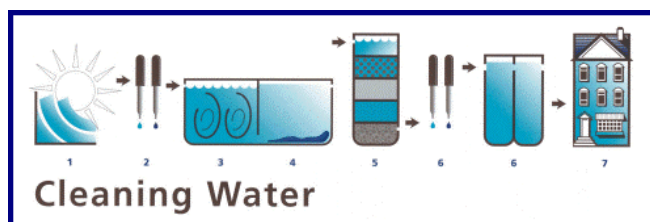
How is the your water treated?

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

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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 the most important aspect of drinking water quality because of 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 areas.

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 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.

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 are no exceedances from our external testing laboratories.

Internal Testing

There were 12 reportable occurrences of adverse water quality in two different locations associated with low chlorine residual. These occurrences were reported to the Ministry of Health and the Ministry of the Environment.

The geographic areas of concern are the Grey Sauble Conservation Authority Building on Inglis Falls Road, and the second is Greenwood Cemetery, on 2nd Ave East.

When an adverse result is identified, remedial action is taken, in the form of flushing a hydrant. The average residual acquired after flushing these areas is 0.32 mg/L free Chlorine.

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

Or

www.e-owensound.com/water/

Testing Results

Table A - Microbiological Parameters	MAC, IMAC, or AO	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
		R	Tr	R	Tr	R	Tr		
E. Coli (counts/100 ml)	*	13	129	0	0	0-520	0	NO	Indicates presence of fecal matter.
Total Coliform (counts/100 ml)	*	13	129	0	0	0-1500	0	NO	Indicates possible presence of fecal matter.
* indicator of adverse water quality if detected in treated water									

Parameter Related to Microbiological Quality	MAC, IMAC, or AO	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
		R	Tr	R	Tr	R	Tr		
Turbidity - Finished (NTU)	1.0		CM		CM	n/a	.03-.30	NO	Indicates a small presence of particulates in water after filtration.
Turbidity - Raw (NTU)	n/a		CM		CM	.43-3.99	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		CM		CM	.10-.32	n/a	n/a	First line of defense of contaminants. A free chlorine residual indicates that the chlorine demand has been met, and available chlorine is available.
Free Chlorine-Post Cl2 (mg/l)	n/a		CM		CM	n/a	.97-1.02	n/a	Additional protection against contaminants, also adds protection in the distribution system.
Aluminum - Raw (mg/l)	n/a	11	n/a	3	n/a	.000-.001	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	11	n/a	11	n/a	.024-.051	NO	Aluminum is effective in coagulation/filtration and used at our Water Plant. There isn't clear evidence that aluminum has any effect on health.
Colour - Raw (NTU)	n/a	90	n/a	4	n/a	0-3	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.

Parameters Related to Microbial Quality Continued ...

Colour - Treated (NTU)	5	n/a	90	n/a	1	n/a	0-1	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.
Fluoride-Treated (mg/l)	1.5	n/a	69	n/a	69	n/a	.06-.47	NO	Added to prevent tooth decay.
Fluoride-Raw (mg/l)	n/a	9	n/a	6	n/a	.03-.10	n/a	n/a	naturally occurring in our surface water (Georgian Bay).

Amended Certificate of Approval Additional Testing (Zebra Mussel Control) Raw Chlorinated Water	MAC, IMAC, or AO	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
		R	Tr	R	Tr	R	Tr		
Alkalinity (mg/l)	30-500	1	n/a	1	n/a	87	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	117	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	30.8	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	4.9	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	0.06	n/a	n/a	May be present in surface waters as a result of anaerobic decay in sediments and complex formations.
Copper (mg/l)	1.0	1	n/a	1	n/a	0.02	n/a	NO	Copper occurs naturally. Rarely present in raw water. Copper is used extensively in plumbing.
Conductivity (uS/cm)		1	n/a	1	n/a	238	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	8.9	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	15.4	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.

Amended COA Testing Continued

Total Kjeldahl Nitrogen (mg/l)		1	n/a	1	n/a	0.21	n/a	NO	Represents the nitrogen equivalent available from ammonia and organic nitrogen.
Nitrate (mg/l)	10.0	1	n/a	1	n/a	0.7	n/a	NO	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.
Dissolved Organic Carbon (mg/l)	5	1	n/a	1	n/a	1	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.
Trihalomethanes (mg/l)	0.1	1	n/a	1	n/a	4.9	n/a	NO	The principle source of trihalomethanes in drinking water is the action of chlorine with organics left in the water after filtration.

Table B - Volatile Organics Parameters	MAC, IMAC, or AO	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
		R	Tr	R	Tr	R	Tr		
Trihalomethanes (mg/l)	0.1	n/a	1	n/a	1		0.0126	NO	The principle source of trihalomethanes in drinking water is the action of chlorine with organics left in the water after filtration.

Table C - Inorganic Parameters	MAC or IMAC or AO	# of Samples		# of Detectable Results		Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated	Raw	Treated		
Barium (mg/l)	1.0	n/a	1	n/a	1	n/a	0.01	NO	Commonly found in sedimentary rock such as limestone.
Boron (mg/l)	5.0	n/a	1	n/a	1	n/a	0.02	NO	Most commonly found as borate, which is in antiseptic agents.
Iron (mg/l)	0.3	n/a	1	n/a	1	n/a	0.02	NO	Present in surface water as a result from anaerobic decay in sediments.
Nitrate (mg/l)	10.0	n/a	1	n/a	1	n/a	0.7	NO	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.

Table D - Pesticides & PCBs Parameters	MAC, IMAC, or AO	# of Samples		# of Detectable Results		Range		Exceed ?	Typical Source of Contaminant
		R	Tr	R	Tr	R	Tr		
* nothing to report									

TABLE 1 ODWS Raw Water	MAC or IMAC or AO	# of Samples		# of Detectable Results		Range		Exceeded ?	Typical Source of Contaminant
		Raw	Treated	Raw	Treated	Raw	Treated		
Barium (mg/l)	1	1	n/a	1	n/a	0.01	n/a	NO	Used extensively as an industrial solvent and degreasing agent.
Boron (mg/l)	5	1	n/a	1	n/a	0.01	n/a	NO	May be found in industrial effluents.
Dioxin and Furan (pg/l)	15	1	n/a	1	n/a	<3.3	n/a	NO	Formed in very small amounts in combustion processes.
Nitrate (as nitrogen) (mg/l)	10	1	n/a	1	n/a	0.7	n/a	NO	Present in water as a result of plant and animal matter, agricultural fertilizers and treated wastewater contamination.
Nitrate + Nitrite (as nitrogen) (mg/l)	10	1	n/a	1	n/a	0.7	n/a	NO	Total of the two, nitrate + nitrite.
Turbidity (mg/l)	1	1	n/a	1	n/a	0.9	n/a	NO	Indicates a presence of suspended and colloidal matter. Indication of the clarity of the water.