

The Regional Municipality of Durham

Orono Drinking Water System 2014 Annual Report

Drinking Water System Number: 220004769

Municipal Drinking Water License Number: 003-108

Drinking Water System Owner: The Regional Municipality of Durham

Drinking Water System Category: Large Municipal Residential

This Annual Report for the calendar year 2014 is designed to inform you about your drinking water system. This report has been prepared to satisfy Section 11 of Ontario Regulation (O. Reg.) 170/03. O. Reg. 170/03 sets requirements for drinking water systems with regard to sampling and testing, levels of treatment, certification of staff, and notification of authorities and the public about water quality. Hard copies of this report are available at the Regional Municipality of Durham Headquarters building located at 605 Rossland Road East, Whitby or on the [Region of Durham's website](http://www.durham.ca) at www.durham.ca. Further information on the Drinking Water Regulations can be found on the [Ministry of the Environment and Climate Change's website](http://www.ontario.ca/ministry-environment-and-climate-change) at www.ontario.ca/ministry-environment-and-climate-change.

Drinking Water System Process Description

General

The Orono Drinking Water System provides potable water to consumers in the Village of Orono in the Municipality of Clarington. Orono has three municipal wells designated Well No. 3, Well No. 4 and Well No. 5. Well No. 5 is currently not in service. Orono is a Class Two Distribution and Supply System with an approved combined capacity of 1,745 cubic metres per day (m³/d). The Orono treatment and distribution system is owned and operated by the Regional Municipality of Durham.

The water supply system includes the following three processes:

- Disinfection (sodium hypochlorite),
- Distribution, and
- Water storage/pressurization.

Raw Water Supply

Water is pumped from two municipal wells within the Village of Orono. Well No. 3 and Well No. 4 are each drilled to a depth of 13.7 metres (m). Water is delivered to the system by the well pumps.

Disinfection

The main pumphouse contains the disinfection equipment for both Well No. 3 and 4. The water is disinfected with sodium hypochlorite. The free chlorine residual and turbidity are monitored continuously by online analyzers.

Distribution System

The distribution system delivers the treated water through approximately 10.3 kilometres of watermains in two pressure zones, and includes a booster station and a 680 cubic metre standpipe for storage and pressure equalization.

Major Monetary expenses(above \$10,000)

Under Section 11 of O. Reg. 170/03, a description of any major expenses incurred during this reporting period to install, repair or replace required equipment must be included in the annual report. The details of major expenses for this drinking water system are as follows:

Well No. 4 rehabilitation - \$23,780.00

Tables

For a description of terms and abbreviations in all tables, refer to the glossary at the end of the report.

Orono Drinking Water System (DWS) Table 1

Summary of all Adverse Water Quality Incidents (AWQI) in 2014 Reported to Spills Action Centre in Accordance with Schedule 16-3 and 16-4 of O. Reg. 170/03.

| Incident Date | Parameter | Result | Corrective Action | Corrective Action Date |
|----------------------|-----------|--------|-------------------|------------------------|
| Not Applicable (N/A) | N/A | N/A | N/A | N/A |

Orono DWS Table 2

Membrane Filtration (MF) Testing Under Schedule 10 of O. Reg. 170/03.

| Type of Sample | Number of Samples | Range of Escherichia Coli MF Colony Forming Units per 100 millilitres | Range of Total Coliforms MF Colony Forming Units per 100 millilitres |
|----------------|-------------------|---|--|
| Raw | 104 | Non-Detect (ND) | ND - 3 |
| Treated | 2 | ND | ND |
| Distribution | 6 | ND | ND |

Orono DWS Table 3

Presence Absence (P/A) Testing Under Schedule 10 of O. Reg. 170/03.

| Type of Sample | Number of Samples | Escherichia Coli P/A per 100 millilitres | Total Coliforms P/A per 100 millilitres |
|----------------|-------------------|--|---|
| Treated | 104 | Absence (A) | A |
| Distribution | 152 | A | A |

Orono DWS Table 4

Heterotrophic Plate Count (HPC) Testing Under Schedule 10 of O. Reg. 170/03.

| Type of Sample | Number of Samples | Range of HPC Samples Colony Forming Units per millilitre |
|----------------|-------------------|--|
| Treated | 106 | Non-Detect (ND) - 4 |
| Distribution | 78 | ND - 5 |

Orono DWS Table 5

Operational Testing Done Under Schedule 7 of O. Reg. 170/03.

| Test | Number of Samples | Range of Results | Unit of Measure | Parameter Description |
|-------------------------------------|-------------------|------------------|-------------------------------------|---|
| Turbidity - Raw Water | 173 | 0.04 - 0.30 | Nephelometric Turbidity Units (NTU) | Turbidity is a measure of particles in water. |
| Free Chlorine - Plant | Continuous | 1.56 - 2.77* | Milligram per Litre (mg/L) | Must be sufficient to ensure disinfection has been achieved. |
| Free Chlorine - Distribution | Continuous | 0.52 - 1.99* | mg/L | Recommended level of at least 0.20 mg/L in the distribution system to maintain secondary disinfection, 0.05 mg/L is the minimum required. |

*Results include all analyzers and grab samples.

Orono DWS Table 6

Summary of Treated Water Inorganic Parameters Tested Under Schedule 13 and 23 of O. Reg. 170/03.

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources ¹ |
|---------------------------|-------------------|--------------------------|-------|----------------------------|----------------------|---|
| Antimony | 10 | Non-Detect (ND) - 0.0008 | 0.006 | Milligram per Litre (mg/L) | No | Fire retardants, ceramics, electronics, solder. |
| Arsenic | 10 | ND - 0.0007 | 0.025 | mg/L | No | Mining. |
| Barium | 2 | 0.0749 - 0.0944 | 1.0 | mg/L | No | Metal refineries, oil drilling. |
| Boron | 2 | 0.012 - 0.021 | 5.0 | mg/L | No | Industrial. |
| Cadmium | 10 | ND | 0.005 | mg/L | No | Industrial. |
| Chromium | 10 | ND - 0.0046 | 0.05 | mg/L | No | Industrial. |
| Mercury | 2 | ND | 0.001 | mg/L | No | Industrial. |
| Selenium | 10 | ND - 0.0017 | 0.01 | mg/L | No | Refineries, mines, chemical manufacturing. |
| Sodium² | 9 | 22.1 - 36.0 | 20 | mg/L | Yes (9) ³ | Runoff from road salt. |
| Uranium | 2 | 0.0017 - 0.0018 | 0.02 | mg/L | No | Power generation. |
| Fluoride | 9 | 0.04 - 0.19 | 1.5 | mg/L | No | Mining. |
| Nitrite | 9 | ND | 1.0 | mg/L | No | Agriculture runoff, landfill leachate and animal waste. |
| Nitrate | 9 | 0.725 - 2.390 | 10.0 | mg/L | No | Fertilizer. |

1 Parameters may occur naturally in the environment.

2 Sodium does not have a Maximum Acceptable Concentration (M.A.C.); only an aesthetic objective of 200 mg/L Sodium results exceeding 20 mg/L are to be reported as per the Medical Officer of Health Schedule 16-3 (8) of O. Reg. 170/03.

3 Number in parenthesis represents number of exceedance(s).

Orono DWS Table 7

Summary of Lead Testing Under Schedule 15.1 of O. Reg. 170/03. No lead samples from plumbing were required in 2014.

| Location Type | Number of Samples | Range of Lead Results milligram per litre | MAC | Number of Exceedences |
|---------------|-------------------|---|------|-----------------------|
| Plumbing | 0 | Not Applicable (N/A) | 0.01 | N/A |
| Distribution | 4 | 0.0001 - 0.0012 | 0.01 | 0 |

Orono DWS Table 8

Summary of Treated Water Organic Parameters Tested Under Schedule 24 of O. Reg. 170/03.

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources |
|--------------------------------------|-------------------|-----------------|------|------------------------|----------------|---|
| Alachlor | 2 | Non-Detect (ND) | 5 | microgram/litre (ug/L) | No | Agricultural herbicide. |
| Aldicarb | 2 | ND | 9 | ug/L | No | Agricultural insecticide. |
| Aldrin + Dieldrin | 2 | ND | 0.7 | ug/L | No | Residue from banned insecticide. |
| Atrazine + N-dealkylated metabolites | 2 | ND | 5 | ug/L | No | Agricultural herbicide. |
| Azinphos-methyl | 2 | ND | 20 | ug/L | No | Insecticide. |
| Bendiocarb | 2 | ND | 40 | ug/L | No | Insecticide. |
| Benzene | 2 | ND | 5 | ug/L | No | Plastics manufacturing, leaking fuel tanks. |
| Benzo(a)pyrene | 2 | ND | 0.01 | ug/L | No | Formed from the incomplete burning of organic matter. |
| Bromoxynil | 2 | ND | 5 | ug/L | No | Agricultural herbicide. |

Orono DWS Table 8 continued

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources |
|---|-------------------|-----------------|-----|------------------------|----------------|--|
| Carbaryl | 2 | Non-Detect (ND) | 90 | microgram/litre (ug/L) | No | Agricultural, forestry, household insecticide. |
| Carbofuran | 2 | ND | 90 | ug/L | No | Agricultural insecticide. |
| Carbon Tetrachloride | 2 | ND | 5 | ug/L | No | Chemical and industrial activities. |
| Chlordane (Total) | 2 | ND | 7 | ug/L | No | Residue from banned insecticide. |
| Chlorpyrifos | 2 | ND | 90 | ug/L | No | Agricultural, household insecticide. |
| Cyanazine | 2 | ND | 10 | ug/L | No | Agricultural, residential herbicide. |
| Diazinon | 2 | ND | 20 | ug/L | No | Agricultural, livestock, operation, residential insecticide. |
| Dicamba | 2 | ND | 120 | ug/L | No | Agricultural herbicide. |
| 1,2-Dichlorobenzene | 2 | ND | 200 | ug/L | No | Chemical and industrial factories. |
| 1,4-Dichlorobenzene | 2 | ND | 5 | ug/L | No | Chemical and industrial factories. |
| Dichlorodiphenyltrichloroethane (DDT) + metabolites | 2 | ND | 30 | ug/L | No | Residue from banned insecticide. |
| 1,2-Dichloroethane | 2 | ND | 5 | ug/L | No | Industrial chemical factories. |
| 1,1-Dichloroethylene (vinylidene chloride) | 2 | ND | 14 | ug/L | No | Industrial chemical factories. |
| Dichloromethane | 2 | ND | 50 | ug/L | No | Pharmaceutical and chemical factories. |

Orono DWS Table 8 continued

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources |
|--|-------------------|-----------------|-----|------------------------|----------------|--|
| 2,4-dichlorophenol | 2 | Non-Detect (ND) | 900 | microgram/litre (ug/L) | No | Industrial contamination, reaction with chlorine. |
| 2,4-Dichlorophenoxy acetic acid (2,4-D) | 2 | ND | 100 | ug/L | No | Agricultural, residential herbicide. |
| Diclofop-methyl | 2 | ND | 9 | ug/L | No | Agricultural herbicide. |
| Dimethoate | 2 | ND | 20 | ug/L | No | Agricultural, livestock, operation, residential insecticide. |
| Dinoseb | 2 | ND | 10 | ug/L | No | Herbicide residue. |
| Diquat | 2 | ND | 70 | ug/L | No | Agricultural, aquatic herbicide. |
| Diuron | 2 | ND | 150 | ug/L | No | Agricultural, industrial herbicide. |
| Glyphosate | 2 | ND | 280 | ug/L | No | Agricultural, forestry, household herbicide. |
| Heptachlor + Heptachlor Epoxide | 2 | ND | 3 | ug/L | No | Residue from banned insecticide. |
| Lindane (Total) | 2 | ND | 4 | ug/L | No | Agricultural, pharmaceutical insecticide. |
| Malathion | 2 | ND | 190 | ug/L | No | Pest control insecticide. |
| Methoxychlor | 2 | ND | 900 | ug/L | No | Agricultural, livestock, operation, residential insecticide. |
| Metolachlor | 2 | ND | 50 | ug/L | No | Agricultural herbicide. |

Orono DWS Table 8 continued

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources |
|---|-------------------|-----------------|-----|------------------------|----------------|---|
| Metribuzin | 2 | Non-Detect (ND) | 80 | microgram/litre (ug/L) | No | Agricultural herbicide. |
| Monochlorobenzene | 2 | ND | 80 | ug/L | No | Industrial and agricultural chemical factories and dry cleaning facilities. |
| Paraquat | 2 | ND | 10 | ug/L | No | Agricultural, aquatic herbicide. |
| Parathion | 2 | ND | 50 | ug/L | No | Agricultural insecticide. |
| Pentachlorophenol | 2 | ND | 60 | ug/L | No | Pesticide, wood preservative residue. |
| Phorate | 2 | ND | 2 | ug/L | No | Agricultural insecticide. |
| Picloram | 2 | ND | 190 | ug/L | No | Industrial herbicide. |
| Polychlorinated Biphenyls (PCB) | 2 | ND | 3 | ug/L | No | Residue from various industrial uses. |
| Prometryne | 2 | ND | 1 | ug/L | No | Agricultural herbicide. |
| Simazine | 2 | ND | 10 | ug/L | No | Agricultural herbicide. |
| Trihalomethane (THM) - Distribution (annual average) | 4 | 32.3 | 100 | ug/L | No | By-product of chlorination of drinking water. |
| Temephos | 2 | ND | 280 | ug/L | No | Insecticide for mosquito, black fly control. |
| Terbufos | 2 | ND | 1 | ug/L | No | Agricultural insecticide. |
| Tetrachloroethylene | 2 | ND | 30 | ug/L | No | Leaching from PVC pipes; discharge from factories; dry cleaners and auto shops (metal degreaser). |

Orono DWS Table 8 continued

| Parameter | Number of Samples | Results Range | MAC | Unit of Measure | MAC Exceedance | Potential Sources |
|---|-------------------|-----------------|-----|------------------------|----------------|---|
| 2,3,4,6 - Tetrachlorophenol | 2 | Non-Detect (ND) | 100 | microgram/litre (ug/L) | No | Wood preservative. |
| Triallate | 2 | ND | 230 | ug/L | No | Agricultural herbicide. |
| Trichloroethylene | 2 | ND | 5 | ug/L | No | Metal degreasing sites and other factories. |
| 2,4,6-Trichlorophenol | 2 | ND | 5 | ug/L | No | Pesticide manufacturing. |
| 2,4,5-Trichlorophenoxy acetic acid (2,4,5-T) | 2 | ND | 280 | ug/L | No | Industrial herbicide residue. |
| Trifluralin | 2 | ND | 45 | ug/L | No | Agricultural herbicide. |
| Vinyl Chloride | 2 | ND | 2 | ug/L | No | Leaching from PVC pipes; discharge from plastics factories. |

Orono DWS Table 9

Inorganic or Organic Parameter(s) that Exceed Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.

No inorganic or organic parameters exceeded half the maximum allowable concentration in 2014.

| Parameter | Result | Unit of Measure | Date of Sample |
|----------------------------|--------|-----------------|----------------|
| Not Applicable (NA) | NA | NA | NA |