



Kincardine Drinking Water System

2018 Annual Water Summary Report

1. INTRODUCTION AND BACKGROUND

The municipality owns and operates drinking water systems to provide residents with safe, potable water. These municipal drinking water systems are regulated under various legislation and legal documents including the Safe Drinking Water Act and Ontario Regulation 170/03 Drinking Water Systems. O. Reg. 170 requires that the municipality complete an annual water report (Section 11) and an annual summary report (Schedule 22). The information required for each of these reports has been combined into this one report.

The reports are available free of charge on the municipal website at www.kincardine.ca or by contacting the Water Services Department at waterservice@kincardine.ca. Requests will also be received in person or by telephone at the Municipal Administration Centre (1475 Concession 5, 519-396-3468) or the Water Services Office (155 Durham Street, Kincardine, 519-396-4660).

1.1. System Description

| | |
|--|----------------------------------|
| Drinking-Water System Number: | 220002716 |
| Drinking-Water System Name: | Kincardine Drinking Water System |
| Drinking-Water System Owner: | Municipality of Kincardine |
| Drinking-Water System Category: | Large Municipal Residential |
| Period being reported: | Year 2018 |

The Kincardine Drinking Water System (DWS) takes water from Lake Huron and treats it using a surface water treatment plant. The water treatment plant provides conventional filtration and consists of 2 Actiflo clarifiers, 4 filters, a chlorination system and an underground reservoir. The intake capacity is 18,750 m³/d and the treatment plant rated capacity is 11,563 m³/d. The chemicals used for treatment are Clar+ion A5, Magnafloc LT27AG, Actisand and chlorine gas. The distribution system serves the town of Kincardine and residents north of the town via a pipeline, plus the Huronville Subdivision Distribution System owned by the Township of Huron-Kinloss, with a total of over 3800 connections. There is a 3,360 m³ standpipe to provide water storage, pressure and fire protection for the distribution system. A Booster Chlorination Facility is located at the north end of the distribution system for the Inverhuron Provincial Park. In 2018, a Booster Station was commissioned for monitoring and increasing pressure and chlorination for lands to the north of Gary Street.

1.2. Major Expenses

The system incurred expenses necessary to install, repair or replace required equipment as follows:

- Treatment and Monitoring Equipment (\$22,868.73)
- SCADA repairs (\$98,271.44)
- Standpipe (\$4,507.14)
- New distribution infrastructure (\$18,220.73)
- Watermain Replacement (\$802,160.24)

2. WATER QUALITY MONITORING

Each municipal drinking water system is required to do testing to ensure that the water supplied to consumers is safe for consumption. Some of these tests such as chlorine residuals are done on site while others, like microbiological testing, must be performed by a licenced laboratory.

2.1. Microbiological Testing

O. Reg. 170 Schedule 10, requires the Kincardine DWS to take a minimum of one sample per week of raw, treated and distribution water with a minimum of eighteen distribution samples required every month. All raw, treated and distribution samples must be tested for Escherichia coli (E. coli) and total coliforms. All the treated samples and twenty five percent of the distribution samples must also be tested for heterotrophic plate count (HPC). Our internal sampling schedule exceeds the minimum requirements by having operations staff collect one raw, one treated and five distribution sample every week and have them tested for E. coli, total coliform and HPC.

Any E. coli or total coliform results above 0 in treated or distribution water must be reported to the Ministry of Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH).

Heterotrophic plate count is a colony count of general bacteria population. There is no adverse limit for HPC samples. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water.

The results from the 2018 sampling program are shown in the table below. Samples taken in addition to our sampling program for things like watermain repairs or construction projects are not included here.

| Water Source | Number of Samples | Range of Total Coliform Results (#-#) | Range of E. coli Results (#-#) | Number of HPC Samples | Range of HPC Results (#-#) |
|--------------|-------------------|---------------------------------------|--------------------------------|-----------------------|----------------------------|
| Raw | 52 | 0 – 8,800 | 0 – 144 | 52 | 0 – >2000 |
| Treated | 52 | 0 – 0 | 0 – 0 | 52 | 0 – 0 |
| Distribution | 260 | 0 – 3 | 0 – 0 | 255 | 0 – 17 |

2.2. Chemical Testing

The Safe Drinking Water Act Reg 170 Schedule 13 requires periodic testing of the water for chemical parameters. The Kincardine DWS is required to test for nitrite/nitrate, trihalomethane and haloacetic acid on a quarterly basis. The tables below outline these as well as other inorganic and organic parameters that are required to be tested for annually and include the date and result of the most recent test. Any result displayed as less than (<) are below the method detection limit of the licenced lab.

Sodium and fluoride are not found in significant levels in the treated water and fluoride is not added to the drinking water. Sodium and fluoride are only required to be tested for every five years.

If the concentration of a parameter is above half of the Maximum Acceptable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by O. Regulation 170. There were no parameters above the half MAC that were required to be tested for quarterly in 2018.

| Inorganic Parameter | Sample Date | Result Value | Unit of Measure | Exceedance |
|---------------------|-------------|--------------|-----------------|------------|
| Antimony | Oct 15/18 | 0.09 | ug/L | No |
| Arsenic | Oct 15/18 | 0.2 | ug/L | No |
| Barium | Oct 15/18 | 13.9 | ug/L | No |
| Boron | Oct 15/18 | 15 | ug/L | No |
| Cadmium | Oct 15/18 | <0.003 | ug/L | No |
| Chromium | Oct 15/18 | 0.22 | ug/L | No |
| Mercury | Oct 15/18 | 0.02 | ug/L | No |
| Selenium | Oct 15/18 | 0.09 | ug/L | No |
| Sodium | Nov 5/18 | 4.46 | mg/L | No |
| Uranium | Oct 15/18 | 0.020 | ug/L | No |
| Fluoride | Oct 15/18 | < 0.06 | mg/L | No |
| Nitrite | Jan 8/18 | <0.003 | mg/L | No |
| | Apr 9/18 | <0.003 | | |
| | July 16/18 | <0.003 | | |
| | Oct 15/18 | <0.003 | | |
| Nitrate | Jan 8/18 | 0.400 | mg/L | No |
| | Apr 9/18 | 0.368 | | |
| | July 16/18 | 0.290 | | |
| | Oct 15/18 | 0.295 | | |

| Organic Parameter | Sample Date | Result Value | Unit of Measure | Exceedance |
|--------------------------------------|-------------|--------------|-----------------|------------|
| Alachlor | Oct 15/18 | < 0.02 | ug/L | No |
| Atrazine + N-dealkylated metabolites | Oct 15/18 | 0.03 | ug/L | No |
| Azinphos-methyl | Oct 15/18 | < 0.05 | ug/L | No |
| Benzene | Oct 15/18 | < 0.32 | ug/L | No |
| Benzo(a)pyrene | Oct 15/18 | < 0.004 | ug/L | No |
| Bromoxynil | Oct 15/18 | < 0.33 | ug/L | No |
| Carbaryl | Oct 15/18 | < 0.05 | ug/L | No |
| Carbofuran | Oct 15/18 | < 0.01 | ug/L | No |
| Carbon Tetrachloride | Oct 15/18 | < 0.16 | ug/L | No |
| Chlorpyrifos | Oct 15/18 | < 0.02 | ug/L | No |
| Diazinon | Oct 15/18 | < 0.02 | ug/L | No |
| Dicamba | Oct 15/18 | < 0.20 | ug/L | No |
| 1,2-Dichlorobenzene | Oct 15/18 | < 0.41 | ug/L | No |
| 1,4-Dichlorobenzene | Oct 15/18 | < 0.36 | ug/L | No |

| Organic Parameter | Sample Date | Result Value | Unit of Measure | Exceedance |
|--|-------------|--------------|-----------------|------------|
| 1,2-Dichloroethane | Oct 15/18 | < 0.35 | ug/L | No |
| 1,1-Dichloroethylene (vinylidene chloride) | Oct 15/18 | < 0.33 | ug/L | No |
| Dichloromethane | Oct 15/18 | < 0.35 | ug/L | No |
| 2-4 Dichlorophenol | Oct 15/18 | < 0.15 | ug/L | No |
| 2,4-Dichlorophenoxy acetic acid (2,4-D) | Oct 15/18 | < 0.19 | ug/L | No |
| Diclofop-methyl | Oct 15/18 | < 0.40 | ug/L | No |
| Dimethoate | Oct 15/18 | < 0.03 | ug/L | No |
| Diquat | Oct 15/18 | < 1 | ug/L | No |
| Diuron | Oct 15/18 | < 0.03 | ug/L | No |
| Glyphosate | Oct 15/18 | < 1 | ug/L | No |
| Malathion | Oct 15/18 | < 0.02 | ug/L | No |
| 2 methyl-4-chlorophenoxyacetic acid (MCPA) | Oct 15/18 | < 0.00012 | mg/L | No |
| Metolachlor | Oct 15/18 | < 0.01 | ug/L | No |
| Metribuzin | Oct 15/18 | < 0.02 | ug/L | No |
| Monochlorobenzene | Oct 15/18 | < 0.3 | ug/L | No |
| Paraquat | Oct 15/18 | < 1 | ug/L | No |
| Pentachlorophenol | Oct 15/18 | < 0.15 | ug/L | No |
| Phorate | Oct 15/18 | < 0.01 | ug/L | No |
| Picloram | Oct 15/18 | < 1 | ug/L | No |
| Polychlorinated Biphenyls (PCB) | Oct 15/18 | < 0.04 | ug/L | No |
| Prometryne | Oct 15/18 | < 0.03 | ug/L | No |
| Simazine | Oct 15/18 | < 0.01 | ug/L | No |
| Terbufos | Oct 15/18 | < 0.01 | ug/L | No |
| Tetrachloroethylene | Oct 15/18 | < 0.35 | ug/L | No |
| 2,3,4,6-Tetrachlorophenol | Oct 15/18 | < 0.20 | ug/L | No |
| Triallate | Oct 15/18 | < 0.01 | ug/L | No |
| Trichloroethylene | Oct 15/18 | < 0.44 | ug/L | No |
| 2,4,6-Trichlorophenol | Oct 15/18 | < 0.25 | ug/L | No |
| Trifluralin | Oct 15/18 | < 0.02 | ug/L | No |
| Vinyl Chloride | Oct 15/18 | < 0.17 | ug/L | No |

Trihalomethane (THM) distribution sampling is required quarterly and must also be expressed as a running annual average. The limit as set in the Ontario Drinking Water Quality Standards is 100 ug/L. THMs are a by-product of the disinfection process.

| Date Sampled | THM Result Value (ug/L) | Running Annual Average (ug/L) | Exceedance |
|---------------|-------------------------|-------------------------------|------------|
| January 8/18 | 19 | 22.5 | No |
| April 9/18 | 16 | 23.5 | No |
| July 16/18 | 17 | 19.5 | No |
| October 15/18 | 28 | 20.0 | No |

Sampling and testing for Haloacetic Acid (HAA) in the distribution system was a new requirement as of 2017. The limit as set in the Ontario Drinking Water Quality Standards is 80 ug/L and starting in 2020 must also be expressed as a running annual average. HAAs are a by-product of the disinfection process.

| Date Sampled | HAA Result Value (ug/L) | Running Annual Average (ug/L) | Exceedance |
|---------------------|--------------------------------|--------------------------------------|-------------------|
| January 8/18 | <5.3 | 5.5 | No |
| April 9/18 | <5.3 | 5.5 | No |
| July 16/18 | <5.3 | 5.3 | No |
| October 15/18 | 15.3 | 7.8 | No |

The Kincardine DWS does not have significant levels of lead and so is currently under a reduced-sampling program. Under this sampling program, O. Reg 170 Schedule 15.1 requires sampling for lead every three years and lead-related parameters every year. Lead was required to be sampled in 2018.

| Parameter | Location Type | Number of Samples | Range of Results |
|--------------------------|----------------------|--------------------------|-------------------------|
| Lead | Distribution | 6 | 0.03 – 0.56 |
| pH | Distribution | 6 | 6.44 – 7.46 |
| Alkalinity (mg/L) | Distribution | 6 | 62 – 68 |

2.3. Operational Monitoring

The free chlorine residual must be monitored continuously on the treated water at the point of entry into the distribution system. A minimum of seven distribution samples must be taken weekly and tested for free chlorine residual. In addition, free chlorine levels are monitored continuously within the treatment process and at one location in the distribution system.

As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken.

At the Kincardine Water Treatment Plant, turbidity is monitored continuously on the raw water, after each Actiflo unit, after each filter and at the point of entry into the distribution system. Turbidity is measured in nephelometric turbidity units (NTU).

Filter and point of entry turbidity is reported to the ministry’s Spills Action Centre if it is greater than 1 NTU for greater than 15 minutes. There were no reportable turbidity spikes greater than 1 NTU in 2018.

| Treated Water at Point of Entry into the Distribution System | Number of Grab Samples | Range of Results (#-#) |
|---|-------------------------------|-------------------------------|
| Turbidity | Continuous monitoring | 0.05 – 1.99 |
| Chlorine | Continuous monitoring | 0.79 – 2.00 |

| Distribution Water | Number of Grab Samples | Range of Results (#-#) |
|-------------------------------|-------------------------------|-------------------------------|
| Free Chlorine Residual | 365 | 0.52 – 1.65 |

The Ministry of the Environment, Conservation and Parks *Procedure for Disinfection of Drinking Water in Ontario* requires that the turbidity on each filter effluent line is less than or equal to 0.3 NTU 95% of the time each month.

| Month | Filter #1 | Filter #2 | Filter #3 | Filter #4 |
|------------------|------------------|------------------|------------------|------------------|
| January | 99.90% | 99.92% | Out of service | 99.99% |
| February | 99.90% | 99.86% | Out of service | 99.99% |
| March | 99.71% | 98.70% | Out of service | 99.84% |
| April | 99.95% | 99.67% | Out of service | 99.84% |
| May | 100.00% | 99.71% | Out of service | 99.90% |
| June | 100.00% | 99.66% | 97.99% | 99.95% |
| July | 100.00% | 99.71% | 99.85% | 99.97% |
| August | 99.98% | 99.97% | 99.81% | 99.95% |
| September | 99.99% | 100.00% | 97.66% | 99.98% |
| October | 99.93% | 99.99% | 96.83% | 100.00% |
| November | 99.94% | 99.96% | Out of service | 99.99% |
| December | 100.00% | 99.99% | Out of service | 99.92% |

3. WATER QUANTITY

The following tables list the quantities and flow rates of the water supplied to the distribution system during the reporting period covered by this report, including monthly average and maximum daily flows, and a comparison to the rated capacity specified in the system Municipal Drinking Water Licence. The rated capacity is 11,563 m³/day. There is no maximum flow rate specified for water supplied to the distribution system.

| Month | Average Daily Flow (m³/day) | % Average Day Flow/ Rated Capacity | Maximum Daily Flow (m³/day) | % Maximum Day Flow/ Rated Capacity |
|------------------|---|---|---|---|
| January | 2,160 | 19% | 3,039 | 26% |
| February | 2,173 | 19% | 2,486 | 21% |
| March | 2,138 | 18% | 2,861 | 25% |
| April | 2,191 | 19% | 2,533 | 22% |
| May | 2,925 | 25% | 4,155 | 36% |
| June | 4,100 | 35% | 5,502 | 48% |
| July | 4,680 | 40% | 6,190 | 54% |
| August | 3,775 | 33% | 4,551 | 39% |
| September | 3,058 | 26% | 3,905 | 34% |
| October | 2,584 | 22% | 3,878 | 34% |
| November | 2,263 | 20% | 2,518 | 22% |
| December | 2,383 | 21% | 3,432 | 30% |
| Annual | 2,869 | 25% | 6,190 | 54% |

| Month | Average Daily Flow Rate (L/s) | Maximum Daily Flow Rate (L/s) |
|------------------|--------------------------------------|--------------------------------------|
| January | 27.8 | 142.0 |
| February | 24.2 | 142.0 |
| March | 25.0 | 180.0 |
| April | 26.0 | 144.0 |
| May | 35.2 | 145.5 |
| June | 49.5 | 146.1 |
| July | 53.4 | 145.8 |
| August | 43.0 | 142.4 |
| September | 35.0 | 144.1 |
| October | 29.5 | 143.1 |
| November | 26.0 | 143.2 |
| December | 27.6 | 146.5 |
| Annual | 33.5 | 180.0 |

4. ADVERSE WATER QUALITY INCIDENTS AND NON-COMPLIANCE FINDINGS

Any adverse results from microbiological samples, chemical samples or observations of operational conditions that indicate adverse water quality are reported to the Spills Action Centre (SAC) of the Ministry of the Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH). All adverse conditions are responded to immediately and corrective actions taken.

On March 5, a contractor hit a watermain and there was the possibility that improperly disinfected water was directed towards users of the system. As a precaution, the municipality issued a boil water notice to users in the affected area. Follow-up sampling showed that there was no contamination in the water and users were notified that the precautionary boil water notice was lifted.

On June 14, a distribution valve was closed during a construction project creating a watermain dead end and resulted in no chlorine residual being detected in the water on June 16. Opening the valve and flushing immediately restored the chlorine residual.

On August 29, notification was given by the licenced lab that a distribution sample collected had tested positive for total coliform. Ministry of the Environment, Conservation and Parks corrective actions were followed and the resample showed that the water was not contaminated.

| Incident Date | Parameter | Result | Unit of Measure | Corrective Action | Corrective Action Date |
|---------------------------------|---|--------|-----------------|---|------------------------|
| March 5, 2018 AWQI #138849 | Improperly disinfected water possibly directed to users | | | The watermain was repaired, the distribution flushed, samples collected and users put under a precautionary boil water advisory | March 5, 2018 |
| June 16, 2018 AWQI #139835 | Distribution Chlorine Residual | 0.0 | mg/L | The affected area was flushed and the distribution residual restored | June 16, 2018 |
| August 29, 2018 AWQI #142365 | Total Coliform | 3 | cfu/100mL | Flushed and resampled | August 29, 2018 |

The annual Ministry of the Environment, Conservation and Parks Inspection took place on September 5, 2018. The inspection report did not identify any non-compliance issues or report on any Best Practice suggestions and received a final inspection rating of 100.00%.

O. Reg 170 Schedule 22 requires the municipality to identify any requirements of the Act, Regulations, Drinking Water Works Permit, Municipal Drinking Water Licence and any Order that the system failed to meet during the reporting period. These are detailed in the following table including the duration and the measures taken to correct each failure.

| Drinking Water Legislation | Requirements the System Failed to Meet | Duration | Corrective Actions |
|---|--|-----------------|--|
| DWWP #088-202, Schedule B, Section 2.3 MECP Watermain Disinfection Procedure | Post repair flushing was not done and a distribution chlorine residual was not collected after watermain break repairs were completed | January 7 and 8 | Staff were reminded of this requirement |
| Safe Drinking Water Act Section 18(1) and O. Reg. 170, Schedule 16, Sections 16-7 (2) | A written report for AWQI #138849 was not submitted to SAC or MOH within 24 hours | March 5, 2018 | A written report was submitted within 30 hours |
| O.Reg 170 Schedule 6 6-5.(1)3 | Filter turbidity was not reviewed within 72 hours of the end of each month to confirm the turbidity was ≤ 0.3 NTU 95% of the time | January to May | Upgrades to the SCADA reports were in progress during this time. Filter data was reviewed on a daily basis to ensure turbidity levels were within acceptable ranges at all times |