File: 430-2

Drinking Water Quality and Compliance

City of Saskatoon – for Year 2018

Annual Notice to Consumers

1.0 Introduction

The Water Security Agency (WSA) requires waterworks owners to provide notification at least once each year to consumers on the quality of water produced and supplied. The information is to include the performance of the waterworks, as documented by water sampling required by a Minister's Order or Permit to Operate a Waterworks. The following is a summary of the City of Saskatoon's water quality and sample submission compliance records for 2018.

Readers should refer to the WSA's *Municipal Drinking Water Quality Monitoring Guidelines, March 2016, EPB 202* for more information on minimum sample submission requirements. Permit requirements for a specific waterworks may require more sampling than outlined in the department's monitoring guidelines. Detailed information on the nature and significance of specific water tests is available at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php.

2.0 Water Quality Standards – Bacteriological Quality

Bacteriological determination has been a standard monitoring tool for many years, particularly using total coliform bacteria as an indicator of the potential presence of pathogens. Bacteriological water quality monitoring is required for systems supplying water for human consumptive use or hygienic use. Sampling locations are intended to be at representative locations in the distribution system. Samples include reservoir samples and those obtained during routine distribution sampling.

Table 1: Bacteriological Sampling

Parameter	Limit	Regular Samples Required	Regular Samples Tested	# Positive Regular Tested (%)
Total Coliform	0 cfu/100mL	1,248	2,802	0 %
Background Bacteria*	<200 cfu/100mL	1,248	2,802	0 %

cfu – colony forming units or organisms
"<" -- less than
**Regarded in this report as non-Coliform bacteria when membrane filtration method used.*

3.0 Water Disinfection – Chlorine Residual in Distribution System for Test Results Analyzed with Bacteriological Samples

A minimum of 0.1 mg/L free chlorine residual **OR** 0.5 mg/L total chlorine residual is required at all times throughout the distribution system unless otherwise approved. The City of Saskatoon employs chloramination, therefore total chlorine residual samples are collected from the distribution system at the same time and frequency as bacteriological water quality samples.

Table 2: Chlorine Residual Sampling in Distribution

Parameter	Minimum Limit (mg/L)	Total Chlorine Residual Range (mg/L)	# Tests Required	# Tests Performed	% Adequate Chlorine (% Passed)
Chlorine Residual	0.1 mg/L free or 0.5 mg/L total	0.73 – 2.54	1,248	2,802	100 %

4.0 Water Disinfection – Total Chlorine Residual for Water Entering the Distribution System – From Water Treatment Plant Records

A minimum of 0.5 mg/L total chlorine residual is required for water entering the distribution system, as indicated in the City of Saskatoon's Permit to Operate. Tests for free and total chlorine are performed on a daily basis by the waterworks operators and are recorded in operation records. Continuous online monitoring is also done for this parameter and is compared to discrete data on a daily, weekly, and as required basis to ensure accuracy. Data presented in Table 3 is from online continuous monitoring and discrete daily testing conducted by the Accredited Water Treatment Plant (WTP) Water Lab.

Table 3: Total Chlorine Residual Sampling Entering Distribution

Parameter	Limit (mg/L)	Chlorine Residual (mg/L)		# Tests Required	# Tests Performed	# Tests Not Meeting Requirements
Total Chlorine Residual as measured by online monitors	> 0.5	Sensor Test Level Range 0 – 5		Continuous	Continuous	N/A
Total Chlorine Residual Lab measured	> 0.5	MIN	1.65	52	365	0
		MAX	2.70			
		AVG	**1.99**			

">" – greater than

5.0 Turbidity – (on site)

Turbidity is an important water quality parameter due to effects on bacteriological quality and treatment performance. Depending on the composition of the turbidity, interference with chlorination can range from negligible to severe. Staff at the City of Saskatoon WTP continuously monitor the turbidity of all filters and outgoing water into the distribution system. Monitoring is also conducted on discrete samples taken daily by the WTP Water Lab.

Table 4: Turbidity Sampling

Parameter	Limit (NTU)	Sample Turbidity (NTU)		# Tests Required	# Tests Performed	# Tests Not Meeting Requirements
Turbidity as measured by online monitors	< 0.3 (95% of time) 1.0 (Never to exceed)	Sensor Test Level Range 0 -2		Continuous	Continuous	N/A
Turbidity Lab measured	1.0	MIN	0.06	52	365	0
		MAX	0.20			
		AVG	0.09			

NTU – Nephelometric Turbidity Unit
"<" – less than
">" – greater than

6.0 Fluoride – On and Off-site Monitoring

Fluoride is monitored on-site at the WTP and off-site at select representative routine sampling locations in the distribution system, including reservoirs. Fluoride is often added to drinking water for the prevention of tooth decay. Fluoride is added to a dosage of 0.7 mg/L residual Fluoride as per the Permit to Operate and is based on the Health Canada Guideline for Fluoride addition. The table below shows data from the Accredited WTP Water Lab. Continuous monitoring is also performed on-site at the WTP.

Table 5: Fluoride Sampling

Sampling Location	Fluoride Limit (mg/L)	Sample Result (average) (mg/L)	# Samples Required	# Samples Submitted
Water Treatment Plant	1.5	0.67	Daily	365
Acadia Reservoir	1.5	0.68	52 from all sites combined	53
42nd Street Reservoir	1.5	0.67		52
Distribution System	1.5	0.67		307

7.0 Chemical – General (Major Ions)

The composition and concentration of general chemicals identify the water's chemical composition. This will vary among supply sources. Samples are collected from treated water at the WTP and submitted on a quarterly basis (January, April, July, and October).

Table 6: Chemical Sampling - General (Major Ions)

Parameter	Aesthetic Objectives (mg/L)	Sample Results (mg/L)	# Samples Required (1 per 3 months)	# Samples Submitted
Alkalinity	500	128	4	8
Bicarbonate	None	150	4	8
Calcium	None	43	4	8
Carbonate	None	<3.5	4	8
Chloride	250	15	4	8
Conductivity (µS/cm)	None	475	4	8
Hardness (as $CaCO_3$)	800	183	4	8
Magnesium	200	18	4	8
Nitrate (as NO_3)	45.0*	1.1	4	8
pH	7.0 to 10.5	8.2	4	8
Sodium	200	26	4	8
Sulphate	500	87	4	8
Total Dissolved Solids	500	275	4	8

Note: * MAC value – *Maximum Acceptable Concentration*
"<" – less than

***Objectives apply to certain characteristics of or substances found in water for human consumptive or hygienic use. The presence of these substances will affect the acceptance of water by consumers and/or interfere with the practice of supplying good quality water. Compliance with drinking water aesthetic objectives is not mandatory as these objectives are in the range where they do not constitute a health hazard. The aesthetic objectives for several parameters (including hardness as $CaCO_3$, magnesium, sodium and total dissolved solids) consider regional differences in drinking water sources and quality.*

8.0 Chemical – Health and Toxicity

Substances within the Chemical Health category may be naturally occurring in drinking water sources or may be the result of human activities. These substances may represent a long-term health risk if the Maximum Acceptable Concentration (MAC) or Interim Maximum Acceptable Concentration (IMAC) is exceeded.

Samples for chemical health analysis are collected from treated water leaving the WTP and are submitted on a quarterly basis (January, April, July, and October).

Table 7: Chemical Sampling - Health and Toxicity

Parameter	Limit MAC (mg/L)	Limit IMAC (mg/L)	Sample Results (mg/L)	# Samples Exceeding Limits	# Samples Required (1 per 6 months)	# Samples Submitted
Aluminum		0.1*	0.014	0	2	8
Antimony		0.006	<0.00060	0	2	8
Arsenic		0.010	<0.00029	0	2	8
Barium	1.0		0.054	0	2	8
Boron	5.0		0.028	0	2	8
Cadmium	0.005		<0.000020	0	2	8
Chromium	0.050		<0.0010	0	2	8