

Drinking Water Quality and Compliance

City of Saskatoon – for Year 2010

Annual Notice to Consumers

Introduction

Saskatchewan Environment requires that at least once each year waterworks owners provide notification to consumers of the quality of water produced and supplied as well as information on the performance of the waterworks in submitting samples as 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 the above year time period. Readers should refer to Saskatchewan Environment's "Municipal Drinking Water Quality Monitoring Guidelines, November, 2002, 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. If consumers need more information on the nature and significance of specific water tests, for example, "what is the significance of selenium in a water supply", more detailed information is available from: <http://www.hc-sc.gc.ca/hecs-sesc/water/dwgsup.htm>.

Water Quality Standards - Bacteriological Quality

Parameter	Limit	Regular Samples Required	Regular Samples Tested	# Positive Regular Tested (%)
Total Coliform	0 cfu's/100mL	988	2442	0.04 %
Background Bacteria*	<200 cfu's/100mL	988*	2410	0 %

cfu's – colony forming units or organisms "<" -- less than

*Regarded in this report as non-Coliform bacteria when membrane filtration method used.

The owner/operator is responsible to ensure that one hundred percent of all bacteriological samples are submitted as required. Generally, analysis is performed on a single sample for all parameters mentioned above. All waterworks are required to submit samples for bacteriological water quality. The frequency of monitoring depends on the population served by the waterworks.

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

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	0.88 - 2.20 (as total)	988	2442	100 %

A minimum of 0.1 milligrams per litre (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. A proper chlorine submission is defined as a bacteriological sample submission form with both the free and total chlorine residual fields filled out. An adequate chlorine level is a result that indicates that the chlorine level is above the regulated minimums. A waterworks is required to submit chlorine residual test results on every bacteriological sample they submit.

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

Parameter	Limit (mg/L)	Sensor Test Level Range (mg/L)	# Tests Required	# Tests Performed	# Tests Not Meeting Requirements
Total Chlorine Residual	> 0.5	0 – 5	Continuous	Continuous	0

">" – greater than

A minimum of 0.5 milligrams per liter (mg/L) as 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. Data for this table is from operator findings and online continuous monitoring from our Control System.

Turbidity – (on site)

Staff at the City of Saskatoon Water Treatment Plant continuously monitor the turbidity of all filters and outgoing water into the distribution system. Turbidity caused by minor pipe disturbances in treated water is not included. Monitoring is also conducted on discrete samples, taken daily, at the Water Treatment Plant mini laboratory.

Parameter	Limit (NTU)	Range Capable of Being Tested (NTU)	Maximum Turbidity (NTU)	# Tests Not Meeting Requirements	# Tests Performed	# Tests Required
Turbidity – Plant	1.0	< 0.1 to 1.99	<1.0	0	Continuous	Continuous

NTU – Nephelometric Turbidity Unit

"<" – less than

Turbidity is a measure of water treatment efficiency. Turbidity measures the "clarity" of the drinking water and is generally reported in Nephelometric Turbidity Units (NTU). All waterworks are required to monitor turbidity at the Water Treatment Plant. The frequency of measurement varies from daily for small systems to continuous for larger waterworks.

Chemical – General

Note: Duplicates analyzed, one value reported per duplicate.

Parameter	Aesthetic Objectives (mg/L)	Sample Results (mg/L)	# Samples Required	# Samples Submitted
Alkalinity	500	79	4	8
Aluminum 1)	0.2	0.054	2	8
Bicarbonate	None	87	4	8
Calcium	None	23	4	8
Carbonate	None	5	4	8
Chloride	250	13	4	8
Conductivity ($\mu\text{S}/\text{cm}$)	None	339	4	8
Copper	1	0.0009	2	8
Hardness	800	131	4	8
Iron	0.3	0.0046	2	8
Magnesium	200	18	4	8
Manganese	0.05	0.0009	2	8
pH	6.5 – 9.0	8.48	4	8
Sodium	300	26	4	8
Sulfate	500	97	4	8
Total Dissolved Solids	1500	273	4	8
Zinc	5	0.0005	2	8

Note: 1) operational guideline

Chemical – Health Category

Note: Duplicates analyzed, one value reported per duplicate

All waterworks serving 5000 persons or more are required to submit water samples for Saskatchewan Environment's "Chemical Health" based on population size. The "Chemical Health" category includes analysis for arsenic, barium, boron, cadmium, chromium, fluoride, lead, nitrate, selenium and uranium.

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. All drinking water suppliers are required to monitor for substances in the "Chemical Health" category. The frequency of monitoring depends on the population served by the waterworks. Some waterworks add fluoride to drinking water to aid in the prevention of dental decay.

Samples for chemical health analysis, except for fluoride, were submitted on a quarterly basis (January, April, July, and October). Fluoride is tested daily at the Water Treatment Plant and weekly in the distribution system – required when fluoride is added to the water. Sample results indicated that the provincial drinking water quality standards were not exceeded.

Chemical – Health Category

Parameter	Limit MAC (mg/L)	Limit IMAC (mg/L)	Sample Results (mg/L)	# Samples Exceeding Limits	# Samples Required	# Samples Submitted
Arsenic		0.025	0.0002	0	2	8
Barium	1.0		0.020	0	2	8
Boron		5.0	0.03	0	2	8
Cadmium	0.005		<0.00001	0	2	8
Chromium	0.05		0.0007	0	2	8
Fluoride*	1.5		0.63	0	365	365
Fluoride[♦]	1.5		0.62	0	52	94
Lead	0.01		< 0.0001	0	2	8
Nitrate	45.0		0.94	0	4	8
Selenium	0.01		0.0004	0	2	8
Uranium	0.02		0.0010	0	2	8

* Fluoride leaving the Water Treatment Plant only ♦ Fluoride in distribution system / reservoirs.

MAC – Maximum Acceptable Concentration, IMAC – Interim Maximum Acceptable Concentration

Note: “<” values are considered to be below detection limits.

Chemical – Trihalomethanes and Haloacetic Acids

Parameter	Trihalomethanes Limit (mg/L)	Sample Result (average)	# Samples Required	# Samples Submitted
Trihalomethanes	0.1	0.031 mg/L	8	20
Haloacetic Acids	0.08	0.027 mg/L	4	20

Average is from water in distribution system. Two samples required every 3 months.

Trihalomethanes and haloacetic acids are generated during the water disinfection process by a by-product of reactions between chlorine and organic material. Trihalomethanes and haloacetic acids are generally found only in drinking water obtained from surface water supplies. Trihalomethanes and haloacetic acids are to be monitored on a quarterly basis and the Interim Maximum Acceptable Concentration is expressed as an average of 4 quarterly samples. Only water suppliers whose water is derived from surface water or groundwater under the influence of surface water are required to monitor trihalomethanes and haloacetic acids.

Chemical – Pesticides

All waterworks serving 5000 persons or more are required to submit water samples for Saskatchewan Environment's "Pesticides" category. The frequency of sample submission depends on the number of persons supplied by the waterworks. The "Pesticides" category includes analysis for atrazine, bromoxynil, carbofuran, chlorpyrifos, dicamba, 2,4-D, diclofop-methyl, dimethoate, malathion, pentachlorophenol, picloram, and trifluralin.

Samples for pesticide analysis were submitted, and sample results indicated that the provincial drinking water quality standards were not exceeded.

Parameter	Limit MAC (mg/L)	Limit IMAC (mg/L)	Sample Results (mg/L)	# Samples Exceeding Limits	# Samples Required	# Samples Submitted
Atrazine		0.005	< 0.001	0	1	1
Bromoxynil		0.005	< 0.0005	0	1	1
Carbofuran	0.09		< 0.002	0	1	1
Chlorpyrifos	0.09		< 0.002	0	1	1
Dicamba	0.12		< 0.0005	0	1	1
2,4-D		0.1	< 0.0005	0	1	1
Diclofop-methyl	0.009		< 0.003	0	1	1
Dimethoate		0.02	< 0.001	0	1	1
Malathion	0.19		< 0.002	0	1	1
Pentachlorophenol	0.06		< 0.002	0	1	1
Picloram		0.19	< 0.001	0	1	1
Trifluralin		0.045	< 0.001	0	1	1

Note: "<" values are considered to be below detection limits.

Pesticides in drinking water may occur as a result of the use of these substances by humans. These substances may represent a long-term health risk if the Maximum Acceptable Concentration (MAC) or Interim Maximum Acceptable Concentration (IMAC) is exceeded. Mandatory sampling requirements depend on the population served by the waterworks.

Chemical – Cyanide and Mercury

Note: Duplicates analyzed, one value reported per duplicate.

Parameter	Limit MAC (mg/L)	Sample Results (mg/L)	# Samples Exceeding Limits	# Samples Required	# Samples Submitted
Cyanide	0.2	< 0.001	0	2	8
Mercury	0.001	< 0.00001	0	2	8

Note: "<" values are considered to be below detection limits.

Mercury enters water supplies naturally and as a result of human activities. Cyanide can enter source waters as a result of industrial effluent or spill events. These substances may represent a long-term health risk if the Maximum Acceptable Concentration (MAC) is exceeded. Mandatory sampling requirements depend on the population served by the waterworks.

Chemical – Synthetic Organic Chemicals

All waterworks serving 5000 persons or more are required to submit water samples for Saskatchewan Environment's "Synthetic Organic Chemicals" category. The frequency of sample submission depends on the number of persons supplied by the waterworks. The "Synthetic Organic Chemicals" category includes analysis for benzene, benzo(a)pyrene, carbon tetrachloride, 1,2-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethylene, dichloromethane, 2,4-dichlorophenol, monochlorobenzene, 2,3,4,6-tetrachlorophenol, trichloroethylene, 2,4,6-trichlorophenol, xylenes, toluenes, nitroacetic acid, ethylbenzene, and vinyl chloride. Samples for synthetic organic chemicals were submitted, and results indicated that the provincial drinking water quality standards were not exceeded.

Parameter	Limit MAC (mg/L)	Limit IMAC (mg/L)	Sample Results (mg/L)	# Samples Exceeding Limits	# Samples Required	# Samples Submitted
Benzene	0.005		< 0.0002	0	1	1
Benzo(a)pyrene	0.00001		< 0.00001	0	1	1
Carbon Tetrachloride	0.005		< 0.002	0	1	1
1,2 Dichlorobenzene	0.2		< 0.0005	0	1	1
1,4 Dichlorobenzene	0.005		< 0.0005	0	1	1
1,2 Dichloroethane		0.005	< 0.0005	0	1	1
1,1 Dichloroethylene	0.014		< 0.0005	0	1	1
Dichloromethane	0.05		< 0.0005	0	1	1
2,4 Dichlorophenol	0.9		< 0.001	0	1	1
Ethylbenzene	0.0024*		< 0.0002	0	1	1
Monochlorobenzene	0.08		< 0.0005	0	1	1
Nitrotri-acetic acid	0.4		< 0.1	0	1	1
2,3,4,6 Tetrachlorophenol	0.1		< 0.0005	0	1	1
Toluene	0.024*		< 0.0002	0	1	1
Trichloroethylene	0.05		< 0.0005	0	1	1
2,4,6 Trichlorophenol	0.005		< 0.001	0	1	1
Vinyl chloride	0.002		< 0.0005	0	1	1
Xylenes	0.3*		< 0.0002	0	1	1

* Aesthetic objective

♦ Canadian Council of Ministers of the Environment (CCME) - MAC (mg/L)

Note: "<" values are considered to be below detection limits.

Contamination of drinking water by synthetic organic chemicals only results from pollution events. Contamination of drinking water in excess of Maximum Acceptable Concentration (MAC) or Interim Maximum Acceptable Concentration (IMAC) may represent a health risk. Mandatory sampling requirements depend on the population served by the waterworks.

Radiological

Parameter	Limits (Becquerels/L)	Sample Results	# Samples Exceeding Limits	# Samples Required	# Samples Submitted
Gross alpha	0.1	<0.1	0	1	1
Gross beta	1.0	<0.08	0	1	1

Note: Becquerel – a unit to measure radioactivity.

Also “<” values are considered to be below detection limits.

Radiological constituents in drinking water may be the result of natural conditions or as a result of human activities. Gross alpha and gross beta are initial water quality screening tests used to determine the overall quality of drinking water for a larger set of specific radiological parameters. Further sampling may be required if gross alpha or beta exceedances are found. Sampling requirements depend on permit specific requirements.

Contact Information

More information on water quality and sample submission performance may be obtained from:

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