Drinking Water Quality and Compliance
SaskWater Gravelbourg Water Supply System
2016 Notification to Consumers

The Water Security Agency (WSA) 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 Permit to Operate a waterworks. The following is a summary of the SaskWater Gravelbourg Water Supply System water quality and sample submission compliance record for the January 1, 2016 to December 31, 2016 time period. This report was completed on March 20, 2017. Readers should refer to the WSA's Municipal Drinking Water Quality Monitoring Guidelines, October 2012, EPB 202 for more information on minimum sample submission requirements and types of samples. Permit requirements for a specific waterworks may require more sampling than outlined in the Agency's monitoring guidelines. If consumers need to know more about drinking water in Saskatchewan, more detailed information is available from: **http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/index-eng.php**.

BACTERIOLOGICAL QUALITY

Parameter	Limit	Regular Samples Required	Required Samples Submitted	# of Positive Regular Samples Submitted
Total Coliform	0 Organisms/100 mL	52	54	0
E. Coli	0 Organisms/100 mL	52	54	0
Background Bacteria	Less than 200/100 mL	52	54	0

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. Additional sampling was done for informational purposes only.

WATER DISINFECTION

Chlorine Residual for Water Entering Distribution System – From Test Results Submitted with Bacteriological Samples

Parameter	Minimum Limit (either/or)	Range (mg/L)	# Tests Required	# Tests Submitted	# Adequate Chlorine
Free Chlorine	0.1 mg/L	0.45 – 3.00	52	54	54
Total Chlorine	0.5 mg/L	0.88 – 3.50	52	54	

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. Adequate chlorine 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.

Free Chlorine Residual for Water Entering Distribution System

Parameter	Limit (mg/L)	Range (mg/L)	# Tests Required	# Tests Performed	% Adequate Chlorine
Free Chlorine	At least 0.1	0.32 – 5.20	732	774	100

Minimum 0.1 milligrams per litre (mg/L) free chlorine residual is required for water entering a distribution system. Residuals are monitored continuously and tests normally performed daily by waterworks operators and are to be recorded in operation records.

TURBIDITY

Turbidity for Water Entering Distribution System – From Test Results Submitted with Bacteriological Samples

Parameter	Limit (NTU)	Range (NTU)	# Tests Required	# Tests Performed	# Exceeding Limit
Turbidity	No standard	0.07 – 2.68	52	54	0

Turbidity for Water Leaving the Nanofiltration Unit

Parameter	Limit (NTU)	Range (NTU)	95th Percentile (NTU)	# Tests Required	# Tests Performed	# Exceeding Limit
Turbidity (Membrane Filtration)	<0.1 – 95% of time and; never >0.3	0.004 – 0.090	0.018	Continuous	Continuous	0

Turbidity is monitored continuously and tests normally performed on a daily basis by waterworks operators and are recorded in operation records.

Turbidity for Water Entering the Distribution System

Parameter	Limit (NTU)	Range (NTU)	95th Percentile (NTU)	# Tests Required	# Tests Performed	# Exceeding Limit
Turbidity	No Standard	0.04 – 2.78	0.18	732	736	0

Turbidity is a measure of water treatment efficiency. Turbidity measures the “clarity” of the drinking water and is reported in Nephelometric Turbidity Units (NTU). All waterworks are required to monitor turbidity at the water treatment plant. The turbidity is done daily with bench testing instrument, as well as continuously with an on-line analyzer.

CONDUCTIVITY

For Water Leaving the Nanofiltration Unit

Parameter	Limit	Range	# Tests Required	# Tests Submitted	# Exceeding Objective
Conductivity (µs/cm)	No Standard	27.3 – 390.9	Continuous	Continuous	0

Conductivity is monitored continuously and tests normally performed on a daily basis by waterworks operators and are recorded in operation records.

pH

For Water Entering the Distribution System

Parameter	Objective	Range	# Tests Required	# Tests Submitted	# Exceeding Objective
pH	6.5 – 9.0	6.51 – 9.52	366	366	8

CHEMICAL – GENERAL

Gravelbourg Water Supply System is required to submit water samples for the WSA's General Chemical category once per three months every second year. 2016 is a required sampling year. The last sample for General Chemical analysis was taken on October 25, 2016. Sample results indicated that the provincial drinking water quality standards were not exceeded.

Parameter	MAC	AO *	Sample Results	# of Samples Required	# of Samples Submitted
Total Alkalinity (mg/L)		500	25.7	4	4
Bicarbonate (mg/L)	No Objective		22	4	4
Calcium (mg/L)	No Objective		<1	4	4
Carbonate (mg/L)	No Objective		0	4	4
Chloride (mg/L)		250	6.6	4	4
Fluoride (mg/L)	1.5		<0.05	4	4
Total Hardness (mg/L)		800	7	4	4
Hydroxide (mg/L)	No Objective		3	4	4
Magnesium (mg/L)		200	<1	4	4
Nitrate (mg/L)	45		0.9	4	4
pH (pH units)		6.5 - 9.0	7.53	4	4
Potassium (mg/L)	No Objective		<1	4	4
Sodium (mg/L)		300	17	4	4
Specific Conductivity (µs/cm)	No Objective		94	4	4
Sulphate (mg/L)		500	7.7	4	4
Total Dissolved Solids (mg/L)		1500	60	4	4

MAC – Maximum Acceptable Concentration AO – Aesthetic Objective

CHEMICAL – HEALTH

Gravelbourg Water Treatment Plant is required to submit water samples for the WSA's Chemical Health category once every 2 years. 2016 is a required sampling year. The last sample for Chemical Health analysis was submitted on July 26, 2016. Sample results indicated that the provincial drinking water quality standards were not exceeded.

Parameter	MAC (mg/L)	IMAC (mg/L)	AO* (mg/L)	Sample Results (mg/L)	# of Samples Required	# of Samples Submitted
Aluminum	No Objective			0.0047	1	2
Arsenic	0.010			0.00017	1	2
Barium	1.0			0.0015	1	2
Boron		5.0		0.35	1	2
Cadmium	0.005			<0.00056	1	2
Chromium	0.05			<0.00019	1	2
Copper			1.0	0.0060	1	2
Iron			0.3	<0.1	1	4
Lead	0.01			0.0001	1	2
Manganese			0.05	<0.01	1	4
Selenium	0.01			<0.00113	1	2
Uranium	0.02			<0.00011	1	2
Zinc			5	0.0068	1	2

MAC – Maximum Acceptable Concentrations AO – Aesthetic Objective
IMAC – Interim Maximum Acceptable Concentrations

*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 hazards. 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.

CHEMICAL – TRIHALOMETHANES (THM)

Trihalomethanes are formed when chlorine reacts with organic matter in water. The four THM compounds are: chloroform, dibromochloromethane, bromodichloromethane (BCDM) and bromoform. The sum of the concentrations of these four components is referred to as Total Trihalomethanes. The limit for THM is a long term objective based on an annual average of seasonal samples.

Parameter	Limit (mg/L)	Average (mg/L)	# Samples Required	# Samples Submitted
Trihalomethane	0.1 mg/L	0.036	4	4

CHEMICAL – HALOACETIC ACIDS (HAAs)

Haloacetic acids are formed when chlorine reacts with organic matter in water. The five regulated haloacetic acids are: monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. The sum of the concentrations of these five components is referred to as HAA5. The limit for HAAs is a long term objective based on an annual average of quarterly samples.

Parameter	Limit (mg/L)	Average (mg/L)	# Samples Required	# Samples Submitted
Haloacetic Acids 5	0.080	0.006	4	4

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

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