

# **RIVERDALE MUNICIPALITY PUBLIC WATER SYSTEM** **ANNUAL REPORT - 2019**

Riverdale Municipality strives to provide high quality drinking water in sufficient quantity to meet the needs of the public. It is our goal to do so in a safe, cost effective manner while remaining in compliance with the regulatory requirements governing the provision of drinking water.

The operation of our water system is regulated in part by the Drinking Water Safety Act (MR40/2007), which came into force on March 1, 2007. Section 32(1) of the regulation stipulates that water systems serving 1,000 or more persons must prepare an annual report to its water users. Therefore, the following report has been prepared for the Town of Rivers water consumers.

## **Where does our water come from?**

The Town of Rivers used water from four deep wells in the late 1940's but abandoned the wells when it bought the CNR dam on the Little Saskatchewan River south of town.

In 1991 the town began pumping water from Lake Wahtopah, abandoning the reservoir at the river. This change has improved water quality thus reducing the cost of the treatment process.

## **How does the water get to our tap?**

### **Source:**

- Two 23 horse submersible pumps pump the raw water from Lake Wahtopah to the water treatment plant through 2.5 kms of 250 mm C-900 PVC pipe.

### **Treatment:**

- The raw water enters a pre-filter/strainer in the treatment facility that limits the quantity of larger particles entering the Membrane Filtration Units (MFU) and reduces the frequency of backwash cycles required to clean the units.
- After the pre-filters, the water goes through the MFU's. The MFU's consist of two sets of eight ultrafiltration (UF) modules each.
- Each UF module has hundreds of hollow straws (membranes) that the water is forced through.
- The water enters the module where pressure is applied to force water through the membranes. Most of the water passes out of the module through the inside of the membranes, while particles larger than the pore size of the membrane are rejected.
- This process removes bacteria, viruses, colloids, parasites such as Giardia and Cryptosporidium, and similar sized particles from the water.
- From the UF modules, the water is placed in a reservoir used to supply the Membrane Treatment Units (MTU). This reservoir is now being chlorinated to reduce biofouling in the RO membranes. Biofouling is biological growth that inhibits the flow of water through the membranes. As the water is pumped to the MTU's, Sodium Bisulfite is added to dechlorinate the water as chlorine will damage the membranes.
- The MTU's consist of two sets of four reverse osmosis (RO) modules and two Nano-filtration (NF) modules.

- The water from the UF reservoir is pumped to the modules where pressure is applied to the membranes, forcing the water through the membranes, leaving behind the small amount of water that will not pass through due to the dissolved substances that are too large for the membrane pore size, (concentrate).
- The concentrate is stored in a waste chamber where it is neutralized before being pumped out to the Little Saskatchewan River.
- The pure water (permeate) passes through the RO/NF membranes, removing dissolved contaminants such as salts and organics.

### **Distribution:**

- The treated water is stored in a 1000m<sup>3</sup>/three chamber reservoir under the treatment facility.
- Chlorine is injected as the treated water enters the reservoir. This allows the chlorine adequate contact time to maintain the required residual.
- Treated water is pumped to the distribution system by 4-25 hp pumps which alternate between cycles and during low demand periods, a 7.5 hp “Jockey pump” is used.
- The distribution system pressure is currently set at 48 psi. (pounds per square inch).
- The distribution piping is comprised of 150mm Transite water main and ¾ inch to 2-inch service connections. There are currently a total of 536 services which are all metered.
- An on-site backup generator at the treatment facility is used to run the distribution pumps in the event of a power outage.

### **What chemicals are used in the treatment of our water?**

The clarity of surface water changes each season and is dependent on the weather (amount of precipitation, temperature, spring runoff, etc.). As the water changes, adjustments are made to the process to ensure the best possible finished water. The following is a list of the chemicals we currently use and a brief description of their function.

**Anti-Scalant** – Fed into the feed water of the MTU to control scaling of the membranes.

**Sodium Hydroxide** – Used for high PH cleanings on the UF’s and fed into the permeate water of the MTU for PH adjustment.

**Hydrochloric Acid** - Used for low PH cleanings on the UF’s and caustic neutralization.

**Sodium Hypochlorite** – Used in the UF membrane cleaning process. Also, an adequate amount of chlorine is added before the water enters the storage reservoir to provide a disinfectant residual throughout the distribution piping.

**Corrosion Inhibitor** – A liquid inhibitor formulated to control corrosion in our distribution lines.

**Sodium Bisulphite-** Injected into the MTU feed lines to dechlorinate the feed water and to dechlorinate CIP (clean in place) and CEB (chemically enhanced backwash) water in the UF’s.

### **Is our water tested? What for? When?**

Water tests are taken on a routine basis to ensure that the water is safe and to monitor how well the treatment process is working. We test the water at the water treatment facility every day. We also test the water in the distribution system, as well as the raw water regularly. It is a regulatory requirement that all water test results associated with water safety be submitted to the provincial Office of Drinking Water for review.

**Disinfectant Testing:** On line chlorine analyzers in the treatment process continuously monitor the level of chlorine in the treated water, in addition to manual chlorine tests done by the operator several times per day to ensure that the water leaving the water treatment plant has enough chlorine to ensure proper disinfection throughout the system. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

**Turbidity Testing:** Turbidity is defined as the cloudiness of a fluid caused by individual particles. Turbidity testing is a measurement of the clarity of water. We use turbidity to tell us how well our treatment process is working and to make adjustments to our chemical feed rates throughout the year as the water changes. Six on line turbidity analyzers continuously monitor the water as it goes through the treatment process, in addition to daily manual turbidity testing done by the operator.

**Bacterial Testing:** We test the raw water (untreated lake water), the treated water (leaving the water treatment plant) and the water in the distribution system at two locations every two weeks (bi-weekly) for the presences of Total Coliform and E. coli bacteria. If these bacteria are present in the water it is an indication that disease-causing organisms may be present. If the laboratory results are positive, we resample and test again. If the results are still positive, a boil water advisory may be issued to the town at which time the public would be notified by the various media.

**Trihalomethane (THM)/Haloacetic Acid (HAA) Testing:** Trihalomethanes (THMs) and Haloacetic Acid (HAA) are by-products of the water treatment process. They are formed when natural organic material, such as the decaying vegetation commonly found in lakes and reservoirs, reacts with chlorine used to treat the water. This reaction produces "disinfection by-products," the most common of which are THMs and HAA's. Sampling is done four times per year, every second year, and the standard is based on these tests.

**Chemical Testing:** We test the raw and treated water for 60 chemical parameters on an annual basis. Sampling was completed in November, 2019. Testing indicated that the treated water met all health and aesthetic guidelines. A copy of the chemical analysis report can be obtained from the Municipal office.

**Microcystin Testing:** During the summer months, we do visual inspections for algae near the raw water intake. If an algae bloom is present, we test for microcystin toxins every three days until the bloom has passed. In 2019, no microcystin was detected in the raw water.

### ***What are the results of the tests?***

The following list summarizes all the treated water test results for 2019:

**Table 1. Treated Water Test Results and Standards**

<b>Testing Parameter</b>	<b>Standard</b>	<b>Frequency</b>	<b>Test Results</b>
Bacterial	0-TC*, 0-EC*	Bi-weekly	100% Compliance
Chlorine (leaving reservoir)	0.5mg/L	Continuous	98% Compliance
Chlorine (in town)	0.1mg/L	Bi-weekly	100% Compliance
Turbidity	<0.1 NTU	Continuous	25% Compliance
THM (Trihalomethanes)	0.1mg/L	Quarterly	0.0038 mg/L

HAA (Haloacetic Acids) 0.08mg/L Quarterly <0.0054 mg/L

*\*TC (total coliforms), \*EC (Escherichia coli), \*NTU (nephelometric units)*

Standards listed in the table above have been developed by Health Canada as the Guidelines for Canadian Drinking Water Quality. The Province of Manitoba has adopted these health-based standards to ensure the safety of water consumers. The standards provide the maximum value allowed for each parameter and results recorded above these values require corrective action.

## **How do we alert Public Utilities Staff to water emergencies?**

The new Water Treatment Plant utilizes a SCADA program. SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA generally refers to an industrial computer system that monitors and controls all the processes in the plant and through an alarm system alert Utilities Staff to any emergencies that might affect the town's water supply. There is an operator on call 24 hours a day, 7 days a week. The operator is available via cell phone at all times.

## **Were there any emergencies, regulatory compliance issues or other operational issues to report in 2019?**

**There were no water emergencies in 2019. Regulatory Compliance issues were:**

- Failure to meet disinfection requirements – there were 6 days in 2019 where the minimum free chlorine residual of 0.5 mg/L was not met leaving the water treatment plant. Hand tests done daily by the operators all met the water quality standards. The computer records an online sample 288 times per day, if an air bubble is trapped under the sensor, or the sensor is dirty it may record a lower than normal reading. More frequent sensor cleaning has resulted in no false readings going forward.
- Failure to meet bacteriological requirements – there were 3 bacteriological sample sets that were not submitted in 2019. Instead of bi-weekly, the operator submitted samples bi-monthly. This has been rectified.
- Failure to meet turbidity requirements – due to an instrumentation problem, the water did not meet the online turbidity standard from January to September in 2019. The online turbidity meter has been replaced and is now meeting the standard. Hand tests done daily by the operators all met the water quality standards.

## **Future system expansion or expenses expected?**

Currently we are conducting a Rural Water Study to serve the outlying municipality with potable water. The new UF blend line is in place and awaiting approval from DWO.

## **Who can we call with questions or concerns regarding our drinking water?**

For general questions during regular business hours, call the Riverdale Municipality Office from 9:00 am to 5:00 pm at 204-328-5300 or the Water Treatment Plant operator at 204-328-7480.

**For after hour's emergencies, the operator-on-call is Jeff Worth @ 204-573-7840 or Mike Beaulé @ 204-573-7841.**

**Attached is a list of all chemical water quality standards that apply to the water system, and a summary of analysis results for each parameter before and after treatment.**



Riverdale Municipality - Water Treatment  
Plant  
ATTN: Jeff Worth  
Rivers - PWS  
Box 520  
Rivers MB R0K 1X0

Date Received: 05-NOV-19  
Report Date: 19-NOV-19 15:04 (MT)  
Version: FINAL

Client Phone: 204-328-7480

## Certificate of Analysis

Lab Work Order #: L2377383  
Project P.O. #: NOT SUBMITTED  
Job Reference: RIVERS - PWS 181.00  
C of C Numbers:  
Legal Site Desc: 16843

Hua Wo  
Chemistry Laboratory Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721  
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# ANALYTICAL REPORT

## Physical Tests (WATER)

		ALS ID		L2377383-1	L2377383-2
		Sampled Date		04-NOV-19	04-NOV-19
		Sampled Time		08:30	09:00
		Sample ID		RIVERS 1 - RAW	RIVERS 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Colour, True	CU	15	-	11.9	<5.0
Conductivity	umhos/cm	-	-	739	53.8
Hardness (as CaCO3)	mg/L	-	-	336 <sup>HTC</sup>	10.6 <sup>HTC</sup>
Langelier Index (4 C)	No Unit	-	-	0.58	-2.4
Langelier Index (60 C)	No Unit	-	-	1.3	-1.6
pH	pH units	7.00-10.5	-	8.24	7.65
Total Dissolved Solids	mg/L	500	-	508	29
Transmittance, UV (254 nm)	%T/cm	-	-	59.0	96.8
Turbidity	NTU	-	-	1.27	<0.10

### Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

## Anions and Nutrients (WATER)

		ALS ID		L2377383-1	L2377383-2
		Sampled Date		04-NOV-19	04-NOV-19
		Sampled Time		08:30	09:00
		Sample ID		RIVERS 1 - RAW	RIVERS 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Alkalinity, Total (as CaCO3)	mg/L	-	-	195	15.5
Ammonia, Total (as N)	mg/L	-	-	0.238	<0.010
Bicarbonate (HCO3)	mg/L	-	-	237	18.9
Bromide (Br)	mg/L	-	-	0.050	<0.010
Carbonate (CO3)	mg/L	-	-	<0.60	<0.60
Chloride (Cl)	mg/L	250	-	11.7	2.07
Fluoride (F)	mg/L	-	1.5	0.139	<0.020
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	0.199	0.0362
Nitrite (as N)	mg/L	-	1	0.0238	<0.0010
Sulfate (SO4)	mg/L	500	-	207	7.27

### Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

#1: GCDWQ - Aesthetic Objective/Other Value

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

## Organic / Inorganic Carbon (WATER)

		ALS ID		L2377383-1	L2377383-2
		Sampled Date		04-NOV-19	04-NOV-19
		Sampled Time		08:30	09:00
		Sample ID		RIVERS 1 - RAW	RIVERS 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Dissolved Organic Carbon	mg/L	-	-	9.20	0.51
Total Organic Carbon	mg/L	-	-	8.87	<0.50

### Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

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#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

Analytical result for this parameter exceeds Guide Limit listed on this report.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

# ANALYTICAL REPORT

## Total Metals (WATER)

		ALS ID		L2377383-1	L2377383-2	L2377383-3
		Sampled Date		04-NOV-19	04-NOV-19	04-NOV-19
		Sampled Time		08:30	09:00	08:30
		Sample ID		RIVERS 1 - RAW	RIVERS 2 - TREATED	RIVERS 3 - DISTRIBUTION
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Aluminum (Al)-Total	mg/L	0.1	-	0.0148	<0.0030	0.191
Antimony (Sb)-Total	mg/L	-	0.006	0.00010	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	-	0.01	0.00204	0.00019	0.00028
Barium (Ba)-Total	mg/L	-	1	0.0489	0.00174	0.00202
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.173	0.100	0.100
Cadmium (Cd)-Total	mg/L	-	0.005	0.0000186	0.0000085	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	60.8	1.98	2.27
Cesium (Cs)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Total	mg/L	-	0.05	0.00039	0.00013	0.00013
Cobalt (Co)-Total	mg/L	-	-	0.00018	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00929	0.00135	0.00786
Iron (Fe)-Total	mg/L	0.3	-	0.045	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.00109	<0.000050	0.000211
Lithium (Li)-Total	mg/L	-	-	0.0805	0.0053	0.0053
Magnesium (Mg)-Total	mg/L	-	-	44.7	1.38	1.34
Manganese (Mn)-Total	mg/L	0.02	0.12	0.0610	0.00169	0.00174
Molybdenum (Mo)-Total	mg/L	-	-	0.00263	0.000080	0.000075
Nickel (Ni)-Total	mg/L	-	-	0.00145	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.072	0.300	0.314
Potassium (K)-Total	mg/L	-	-	7.77	0.440	0.459
Rubidium (Rb)-Total	mg/L	-	-	0.00203	<0.00020	<0.00020
Selenium (Se)-Total	mg/L	-	0.05	0.000195	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	-	-	10.6	0.54	0.71
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	47.6	7.24	7.37
Strontium (Sr)-Total	mg/L	-	7	0.294	0.00952	0.0102
Sulfur (S)-Total	mg/L	-	-			2.39
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	0.00023	0.00014

### Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)

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#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

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\* Please refer to the Reference Information section for an explanation of any qualifiers noted.



# ANALYTICAL REPORT

## Total Metals (WATER)

		ALS ID		L2377383-1	L2377383-2	L2377383-3
		Sampled Date		04-NOV-19	04-NOV-19	04-NOV-19
		Sampled Time		08:30	09:00	08:30
		Sample ID		<b>RIVERS 1 - RAW</b>	<b>RIVERS 2 - TREATED</b>	<b>RIVERS 3 - DISTRIBUTION</b>
Analyte	Unit	Guide Limit #1	Guide Limit #2			
Titanium (Ti)-Total	mg/L	-	-	0.00044	<0.00030	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00254	0.000072	0.000070
Vanadium (V)-Total	mg/L	-	-	0.00095	0.00050	<0.00050
Zinc (Zn)-Total	mg/L	5	-	0.0158	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020

**Federal Guidelines for Canadian Drinking Water Quality (MAR, 2019)**

**#1: GCDWQ - Aesthetic Objective/Other Value**

**#2: GCDWQ - Maximum Acceptable Concentrations (MACs)**

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.

Analytical result for this parameter exceeds Guide Limit listed on this report.

\* Please refer to the Reference Information section for an explanation of any qualifiers noted.

## Reference Information

## Qualifiers for Individual Parameters Listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
<b>ALK-CO3CO3-CALC-WP</b>	Water	Alkalinity, Carbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by carbonate is calculated and reported as mg CO <sub>3</sub> 2-/L.			
<b>ALK-HCO3HCO3-CALC-WP</b>	Water	Alkalinity, Bicarbonate	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by bicarbonate is calculated and reported as mg HCO <sub>3</sub> -/L.			
<b>ALK-OHOH-CALC-WP</b>	Water	Alkalinity, Hydroxide	CALCULATION
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. The fraction of alkalinity contributed by hydroxide is calculated and reported as mg OH-/L.			
<b>ALK-TITR-WP</b>	Water	Alkalinity, Total (as CaCO <sub>3</sub> )	APHA 2320B
The Alkalinity of water is a measure of its acid neutralizing capacity. Alkalinity is imparted by bicarbonate, carbonate and hydroxide components of water. Total alkalinity is determined by titration with a strong standard mineral acid to the successive HCO <sub>3</sub> - and H <sub>2</sub> CO <sub>3</sub> endpoints indicated electrometrically.			
<b>BR-L-IC-N-WP</b>	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)-LR
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>C-DOC-HTC-WP</b>	Water	Dissolved Organic Carbon by Combustion	APHA 5310 B-WP
Filtered (0.45 um) sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO <sub>2</sub> which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
<b>C-TOC-HTC-WP</b>	Water	Total Organic Carbon by Combustion	APHA 5310 B-WP
Sample is acidified and purged to remove inorganic carbon, then injected into a heated reaction chamber where organic carbon is oxidized to CO <sub>2</sub> which is then transported in the carrier gas stream and measured via a non-dispersive infrared analyzer.			
<b>CL-L-IC-N-WP</b>	Water	Chloride in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>COLOUR-TRUE-WP</b>	Water	Colour, True	APHA 2120C
True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method (450 - 465 nm) after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
<b>EC-SCREEN-WP</b>	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other test eg. IC, TDS, TSS, etc			
<b>EC-WP</b>	Water	Conductivity	APHA 2510B
Conductivity of an aqueous solution refers to its ability to carry an electric current. Conductance of a solution is measured between two spatially fixed and chemically inert electrodes.			
<b>ETL-LANGELIER-4-WP</b>	Water	Langelier Index 4C	Calculated
<b>ETL-LANGELIER-60-WP</b>	Water	Langelier Index 60C	Calculated
<b>F-IC-N-WP</b>	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
<b>HARDNESS-CALC-WP</b>	Water	Hardness Calculated	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
<b>IONBALANCE-CALC-WP</b>	Water	Ion Balance Calculation	APHA 1030E

## Reference Information

## Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
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Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance (as % difference) cannot be calculated accurately for waters with very low electrical conductivity (EC), and is reported as "Low EC" where EC < 100 uS/cm (umhos/cm). Ion Balance is calculated as:

$$\text{Ion Balance (\%)} = [\text{Cation Sum} - \text{Anion Sum}] / [\text{Cation Sum} + \text{Anion Sum}]$$

**MET-T-CCMS-WP**      Water      Total Metals in Water by CRC ICPMS      EPA 200.2/6020B (mod.)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

**NH3-COL-WP**      Water      Ammonia by colour      APHA 4500 NH3 F

Ammonia in water samples forms indophenol when reacted with hypochlorite and phenol. The intensity is amplified by the addition of sodium nitroprusside and measured colourmetrically.

**NO2-L-IC-N-WP**      Water      Nitrite in Water by IC (Low Level)      EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**NO3-L-IC-N-WP**      Water      Nitrate in Water by IC (Low Level)      EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**PH-WP**      Water      pH      APHA 4500H

The pH of a sample is the determination of the activity of the hydrogen ions by potentiometric measurement using a standard hydrogen electrode and a reference electrode.

**SO4-IC-N-WP**      Water      Sulfate in Water by IC      EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

**TDS-WP**      Water      Total Dissolved Solids (TDS)      APHA 2540 SOLIDS C,E

A well-mixed sample is filtered through a glass fiber filter paper. The filtrate is then evaporated to dryness in a pre-weighed vial and dried at 180 – 2C. The increase in vial weight represents the total dissolved solids.

**TURBIDITY-WP**      Water      Turbidity      APHA 2130B (modified)

Turbidity in aqueous matrices is determined by the nephelometric method.

**UV-%TRANS-WP**      Water      UV Transmittance (Calculated)      APHA 5910B

Test method is adapted from APHA Method 5910B. A sample is filtered through a 0.45 um polyethersulfone (PES) filter and its UV Absorbance is measured in a quartz cell at 254 nm. UV Transmittance is calculated from the UV Absorbance result and reported as UV Transmittance per cm. The analysis is carried out without pH adjustment.

\*\*ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody Numbers:

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

## Reference Information

### GLOSSARY OF REPORT TERMS

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*

*Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.*



## Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>ALK-TITR-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4901790</b>							
<b>WG3213017-5</b>	<b>DUP</b>	<b>L2377298-2</b>						
Alkalinity, Total (as CaCO3)		428	435		mg/L	1.5	20	06-NOV-19
<b>WG3213017-4</b>	<b>LCS</b>							
Alkalinity, Total (as CaCO3)			97.7		%		85-115	06-NOV-19
<b>WG3213017-1</b>	<b>MB</b>							
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	06-NOV-19
<b>BR-L-IC-N-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4902138</b>							
<b>WG3211892-3</b>	<b>DUP</b>	<b>L2377383-1</b>						
Bromide (Br)		0.050	0.051		mg/L	1.0	20	06-NOV-19
<b>WG3211892-10</b>	<b>LCS</b>							
Bromide (Br)			98.4		%		85-115	06-NOV-19
<b>WG3211892-2</b>	<b>LCS</b>							
Bromide (Br)			97.1		%		85-115	06-NOV-19
<b>WG3211892-1</b>	<b>MB</b>							
Bromide (Br)			<0.010		mg/L		0.01	06-NOV-19
<b>WG3211892-9</b>	<b>MB</b>							
Bromide (Br)			<0.010		mg/L		0.01	06-NOV-19
<b>WG3211892-4</b>	<b>MS</b>	<b>L2377383-1</b>						
Bromide (Br)			90.2		%		75-125	06-NOV-19
<b>C-DOC-HTC-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4901949</b>							
<b>WG3213071-7</b>	<b>DUP</b>	<b>L2377230-1</b>						
Dissolved Organic Carbon		2.08	2.20		mg/L	5.6	20	06-NOV-19
<b>WG3213071-6</b>	<b>LCS</b>							
Dissolved Organic Carbon			93.8		%		80-120	06-NOV-19
<b>WG3213071-5</b>	<b>MB</b>							
Dissolved Organic Carbon			<0.50		mg/L		0.5	06-NOV-19
<b>WG3213071-8</b>	<b>MS</b>	<b>L2377230-1</b>						
Dissolved Organic Carbon			101.7		%		70-130	06-NOV-19
<b>C-TOC-HTC-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4901907</b>							
<b>WG3213096-7</b>	<b>DUP</b>	<b>L2377383-1</b>						
Total Organic Carbon		8.87	8.82		mg/L	0.6	20	06-NOV-19
<b>WG3213096-6</b>	<b>LCS</b>							
Total Organic Carbon			93.8		%		80-120	06-NOV-19
<b>WG3213096-5</b>	<b>MB</b>							



### Quality Control Report

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Client: Riverdale Municipality - Water Treatment Plant  
Rivers - PWS Box 520  
Rivers MB R0K 1X0

Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>C-TOC-HTC-WP</b>								
	Water							
Batch	R4901907							
WG3213096-5	MB							
Total Organic Carbon			<0.50		mg/L		0.5	06-NOV-19
WG3213096-8	MS	L2377383-2						
Total Organic Carbon			95.1		%		70-130	06-NOV-19
<b>CL-L-IC-N-WP</b>								
	Water							
Batch	R4902138							
WG3211892-3	DUP	L2377383-1						
Chloride (Cl)		11.7	11.7		mg/L	0.2	20	06-NOV-19
WG3211892-10	LCS							
Chloride (Cl)			101.8		%		90-110	06-NOV-19
WG3211892-2	LCS							
Chloride (Cl)			100.5		%		90-110	06-NOV-19
WG3211892-1	MB							
Chloride (Cl)			<0.10		mg/L		0.1	06-NOV-19
WG3211892-9	MB							
Chloride (Cl)			<0.10		mg/L		0.1	06-NOV-19
WG3211892-4	MS	L2377383-1						
Chloride (Cl)			108.0		%		75-125	06-NOV-19
<b>COLOUR-TRUE-WP</b>								
	Water							
Batch	R4900586							
WG3212118-3	DUP	L2375990-1						
Colour, True		149	151		CU	1.3	20	05-NOV-19
WG3212118-2	LCS							
Colour, True			92.8		%		85-115	05-NOV-19
WG3212118-1	MB							
Colour, True			<5.0		CU		5	05-NOV-19
<b>EC-WP</b>								
	Water							
Batch	R4901790							
WG3213017-5	DUP	L2377298-2						
Conductivity		2280	2280		umhos/cm	0.0	10	06-NOV-19
WG3213017-3	LCS							
Conductivity			95.8		%		90-110	06-NOV-19
WG3213017-1	MB							
Conductivity			<1.0		umhos/cm		1	06-NOV-19
<b>F-IC-N-WP</b>								
	Water							



## Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>F-IC-N-WP</b>		<b>Water</b>						
<b>Batch</b>	<b>R4902138</b>							
<b>WG3211892-11</b>	<b>DUP</b>	<b>L2376875-2</b>						
Fluoride (F)		0.217	0.216		mg/L	0.5	20	06-NOV-19
<b>WG3211892-3</b>	<b>DUP</b>	<b>L2377383-1</b>						
Fluoride (F)		0.139	0.136		mg/L	1.8	20	06-NOV-19
<b>WG3211892-10</b>	<b>LCS</b>							
Fluoride (F)			103.8		%		90-110	06-NOV-19
<b>WG3211892-2</b>	<b>LCS</b>							
Fluoride (F)			100.1		%		90-110	06-NOV-19
<b>WG3211892-1</b>	<b>MB</b>							
Fluoride (F)			<0.020		mg/L		0.02	06-NOV-19
<b>WG3211892-9</b>	<b>MB</b>							
Fluoride (F)			<0.020		mg/L		0.02	06-NOV-19
<b>WG3211892-12</b>	<b>MS</b>	<b>L2376875-2</b>						
Fluoride (F)			99.6		%		75-125	06-NOV-19
<b>WG3211892-4</b>	<b>MS</b>	<b>L2377383-1</b>						
Fluoride (F)			103.9		%		75-125	06-NOV-19
<b>MET-T-CCMS-WP</b>		<b>Water</b>						
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-4</b>	<b>DUP</b>	<b>WG3213129-3</b>						
Aluminum (Al)-Total		0.0148	0.0143		mg/L	3.2	20	08-NOV-19
Antimony (Sb)-Total		0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-NOV-19
Arsenic (As)-Total		0.00204	0.00197		mg/L	3.3	20	08-NOV-19
Barium (Ba)-Total		0.0489	0.0499		mg/L	2.0	20	08-NOV-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-NOV-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	08-NOV-19
Boron (B)-Total		0.173	0.169		mg/L	2.3	20	08-NOV-19
Cadmium (Cd)-Total		0.0000186	0.0000153		mg/L	20	20	08-NOV-19
Calcium (Ca)-Total		60.8	60.4		mg/L	0.7	20	08-NOV-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	08-NOV-19
Chromium (Cr)-Total		0.00039	0.00034		mg/L	13	20	08-NOV-19
Cobalt (Co)-Total		0.00018	0.00019		mg/L	4.2	20	08-NOV-19
Copper (Cu)-Total		0.00929	0.00912		mg/L	1.9	20	08-NOV-19
Iron (Fe)-Total		0.045	0.045		mg/L	0.3	20	08-NOV-19
Lead (Pb)-Total		0.00109	0.00104		mg/L	4.7	20	08-NOV-19
Lithium (Li)-Total		0.0805	0.0765		mg/L	5.0	20	08-NOV-19
Magnesium (Mg)-Total		44.7	44.7		mg/L	0.1	20	08-NOV-19



## Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-4</b>	<b>DUP</b>	<b>WG3213129-3</b>						
Manganese (Mn)-Total		0.0610	0.0613		mg/L	0.5	20	08-NOV-19
Molybdenum (Mo)-Total		0.00263	0.00262		mg/L	0.4	20	08-NOV-19
Nickel (Ni)-Total		0.00145	0.00144		mg/L	0.5	20	08-NOV-19
Potassium (K)-Total		7.77	7.96		mg/L	2.4	20	08-NOV-19
Phosphorus (P)-Total		0.072	0.059		mg/L	19	20	08-NOV-19
Rubidium (Rb)-Total		0.00203	0.00210		mg/L	3.2	20	08-NOV-19
Selenium (Se)-Total		0.000195	0.000185		mg/L	5.4	20	08-NOV-19
Silicon (Si)-Total		10.6	10.7		mg/L	0.9	20	08-NOV-19
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	08-NOV-19
Sodium (Na)-Total		47.6	47.6		mg/L	0.1	20	08-NOV-19
Strontium (Sr)-Total		0.294	0.302		mg/L	2.8	20	08-NOV-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	08-NOV-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	08-NOV-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-NOV-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-NOV-19
Titanium (Ti)-Total		0.00044	0.00044		mg/L	0.7	20	08-NOV-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	08-NOV-19
Uranium (U)-Total		0.00254	0.00239		mg/L	5.7	20	08-NOV-19
Vanadium (V)-Total		0.00095	0.00091		mg/L	3.9	20	08-NOV-19
Zinc (Zn)-Total		0.0158	0.0158		mg/L	0.4	20	08-NOV-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	08-NOV-19
<b>WG3213129-2</b>	<b>LCS</b>							
Aluminum (Al)-Total			104.4		%		80-120	08-NOV-19
Antimony (Sb)-Total			108.3		%		80-120	08-NOV-19
Arsenic (As)-Total			101.5		%		80-120	08-NOV-19
Barium (Ba)-Total			100.6		%		80-120	08-NOV-19
Beryllium (Be)-Total			104.1		%		80-120	08-NOV-19
Bismuth (Bi)-Total			101.1		%		80-120	08-NOV-19
Boron (B)-Total			101.8		%		80-120	08-NOV-19
Cadmium (Cd)-Total			99.6		%		80-120	08-NOV-19
Calcium (Ca)-Total			105.4		%		80-120	08-NOV-19
Cesium (Cs)-Total			103.6		%		80-120	08-NOV-19
Chromium (Cr)-Total			103.6		%		80-120	08-NOV-19





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Client: Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-2</b>	<b>LCS</b>							
Cobalt (Co)-Total			100.6		%		80-120	08-NOV-19
Copper (Cu)-Total			100.5		%		80-120	08-NOV-19
Iron (Fe)-Total			91.5		%		80-120	08-NOV-19
Lead (Pb)-Total			101.6		%		80-120	08-NOV-19
Lithium (Li)-Total			103.3		%		80-120	08-NOV-19
Magnesium (Mg)-Total			112.3		%		80-120	08-NOV-19
Manganese (Mn)-Total			100.1		%		80-120	08-NOV-19
Molybdenum (Mo)-Total			103.4		%		80-120	08-NOV-19
Nickel (Ni)-Total			99.5		%		80-120	08-NOV-19
Potassium (K)-Total			89.7		%		80-120	08-NOV-19
Phosphorus (P)-Total			104.5		%		80-120	08-NOV-19
Rubidium (Rb)-Total			101.9		%		80-120	08-NOV-19
Selenium (Se)-Total			103.2		%		80-120	08-NOV-19
Silicon (Si)-Total			105.7		%		80-120	08-NOV-19
Silver (Ag)-Total			101.9		%		80-120	08-NOV-19
Sodium (Na)-Total			99.7		%		80-120	08-NOV-19
Strontium (Sr)-Total			102.8		%		80-120	08-NOV-19
Tellurium (Te)-Total			101.4		%		80-120	08-NOV-19
Thallium (Tl)-Total			102.8		%		80-120	08-NOV-19
Thorium (Th)-Total			93.8		%		80-120	08-NOV-19
Tin (Sn)-Total			104.2		%		80-120	08-NOV-19
Titanium (Ti)-Total			97.0		%		80-120	08-NOV-19
Tungsten (W)-Total			103.2		%		80-120	08-NOV-19
Uranium (U)-Total			102.1		%		80-120	08-NOV-19
Vanadium (V)-Total			101.8		%		80-120	08-NOV-19
Zinc (Zn)-Total			100.9		%		80-120	08-NOV-19
Zirconium (Zr)-Total			98.8		%		80-120	08-NOV-19
<b>WG3213129-1</b>	<b>MB</b>							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	08-NOV-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	08-NOV-19



## Quality Control Report

Workorder: L2377383

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-1</b>	<b>MB</b>							
Boron (B)-Total			<0.010		mg/L		0.01	08-NOV-19
Cadmium (Cd)-Total			<0.000050		mg/L		0.000005	08-NOV-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	08-NOV-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	08-NOV-19
Chromium (Cr)-Total			0.00010	B	mg/L		0.0001	08-NOV-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	08-NOV-19
Iron (Fe)-Total			<0.010		mg/L		0.01	08-NOV-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	08-NOV-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	08-NOV-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	08-NOV-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	08-NOV-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	08-NOV-19
Potassium (K)-Total			<0.050		mg/L		0.05	08-NOV-19
Phosphorus (P)-Total			<0.030		mg/L		0.03	08-NOV-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	08-NOV-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	08-NOV-19
Silicon (Si)-Total			<0.10		mg/L		0.1	08-NOV-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	08-NOV-19
Sodium (Na)-Total			<0.050		mg/L		0.05	08-NOV-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	08-NOV-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	08-NOV-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	08-NOV-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	08-NOV-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	08-NOV-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	08-NOV-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	08-NOV-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	08-NOV-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	08-NOV-19
<b>WG3213129-5</b>	<b>MS</b>	<b>WG3213129-3</b>						
Aluminum (Al)-Total			100.1		%		70-130	08-NOV-19



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Client: Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-5 MS</b>		<b>WG3213129-3</b>						
Antimony (Sb)-Total			108.1		%		70-130	08-NOV-19
Arsenic (As)-Total			102.6		%		70-130	08-NOV-19
Barium (Ba)-Total			N/A	MS-B	%		-	08-NOV-19
Beryllium (Be)-Total			104.2		%		70-130	08-NOV-19
Bismuth (Bi)-Total			95.3		%		70-130	08-NOV-19
Boron (B)-Total			N/A	MS-B	%		-	08-NOV-19
Cadmium (Cd)-Total			103.2		%		70-130	08-NOV-19
Calcium (Ca)-Total			N/A	MS-B	%		-	08-NOV-19
Cesium (Cs)-Total			107.5		%		70-130	08-NOV-19
Chromium (Cr)-Total			100.5		%		70-130	08-NOV-19
Cobalt (Co)-Total			98.7		%		70-130	08-NOV-19
Copper (Cu)-Total			97.4		%		70-130	08-NOV-19
Iron (Fe)-Total			98.3		%		70-130	08-NOV-19
Lead (Pb)-Total			98.7		%		70-130	08-NOV-19
Lithium (Li)-Total			98.1		%		70-130	08-NOV-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	08-NOV-19
Manganese (Mn)-Total			N/A	MS-B	%		-	08-NOV-19
Molybdenum (Mo)-Total			118.2		%		70-130	08-NOV-19
Nickel (Ni)-Total			97.9		%		70-130	08-NOV-19
Potassium (K)-Total			N/A	MS-B	%		-	08-NOV-19
Phosphorus (P)-Total			103.8		%		70-130	08-NOV-19
Rubidium (Rb)-Total			99.5		%		70-130	08-NOV-19
Selenium (Se)-Total			108.2		%		70-130	08-NOV-19
Silicon (Si)-Total			N/A	MS-B	%		-	08-NOV-19
Silver (Ag)-Total			105.3		%		70-130	08-NOV-19
Sodium (Na)-Total			N/A	MS-B	%		-	08-NOV-19
Strontium (Sr)-Total			N/A	MS-B	%		-	08-NOV-19
Tellurium (Te)-Total			107.3		%		70-130	08-NOV-19
Thallium (Tl)-Total			99.5		%		70-130	08-NOV-19
Thorium (Th)-Total			100.2		%		70-130	08-NOV-19
Tin (Sn)-Total			105.3		%		70-130	08-NOV-19
Titanium (Ti)-Total			105.3		%		70-130	08-NOV-19
Tungsten (W)-Total			105.2		%		70-130	08-NOV-19



## Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904793</b>							
<b>WG3213129-5 MS</b>		<b>WG3213129-3</b>						
Uranium (U)-Total			101.6		%		70-130	08-NOV-19
Vanadium (V)-Total			102.6		%		70-130	08-NOV-19
Zinc (Zn)-Total			96.6		%		70-130	08-NOV-19
Zirconium (Zr)-Total			110.1		%		70-130	08-NOV-19
<b>Batch</b>	<b>R4906529</b>							
<b>WG3214211-4 DUP</b>		<b>WG3214211-3</b>						
Aluminum (Al)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	12-NOV-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-NOV-19
Barium (Ba)-Total		0.00462	0.00456		mg/L	1.3	20	12-NOV-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-NOV-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-NOV-19
Boron (B)-Total		0.472	0.481		mg/L	1.9	20	12-NOV-19
Cadmium (Cd)-Total		0.0000117	0.0000123		mg/L	5.2	20	12-NOV-19
Calcium (Ca)-Total		175	178		mg/L	1.4	20	12-NOV-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-NOV-19
Cobalt (Co)-Total		0.00017	0.00018		mg/L	4.9	20	12-NOV-19
Copper (Cu)-Total		0.0208	0.0211		mg/L	1.5	20	12-NOV-19
Iron (Fe)-Total		0.055	0.057		mg/L	3.6	20	12-NOV-19
Lead (Pb)-Total		0.000223	0.000229		mg/L	3.0	20	12-NOV-19
Lithium (Li)-Total		0.125	0.128		mg/L	2.4	20	12-NOV-19
Magnesium (Mg)-Total		74.5	75.6		mg/L	1.6	20	12-NOV-19
Manganese (Mn)-Total		0.701	0.697		mg/L	0.5	20	12-NOV-19
Molybdenum (Mo)-Total		0.00556	0.00567		mg/L	1.9	20	12-NOV-19
Nickel (Ni)-Total		0.00109	0.00113		mg/L	4.0	20	12-NOV-19
Potassium (K)-Total		14.9	15.2		mg/L	2.0	20	12-NOV-19
Phosphorus (P)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	12-NOV-19
Rubidium (Rb)-Total		0.00424	0.00423		mg/L	0.2	20	12-NOV-19
Selenium (Se)-Total		0.000149	0.000085	J	mg/L	0.000064	0.0001	12-NOV-19
Silicon (Si)-Total		13.4	13.5		mg/L	0.9	20	12-NOV-19
Silver (Ag)-Total		0.000013	0.000015		mg/L	13	20	12-NOV-19
Sodium (Na)-Total		181	185		mg/L	2.2	20	12-NOV-19
Sulfur (S)-Total		231	233		mg/L	0.8	20	12-NOV-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-NOV-19



## Quality Control Report

Workorder: L2377383

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4906529</b>							
<b>WG3214211-4</b>	<b>DUP</b>	<b>WG3214211-3</b>						
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-NOV-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-NOV-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-NOV-19
Titanium (Ti)-Total		0.00049	<0.00030	RPD-NA	mg/L	N/A	20	12-NOV-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-NOV-19
Uranium (U)-Total		0.000183	0.000187		mg/L	2.2	20	12-NOV-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-NOV-19
Zinc (Zn)-Total		0.0126	0.0130		mg/L	3.1	20	12-NOV-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-NOV-19
<b>WG3214211-2</b>	<b>LCS</b>							
Aluminum (Al)-Total			102.2		%		80-120	12-NOV-19
Antimony (Sb)-Total			105.8		%		80-120	12-NOV-19
Barium (Ba)-Total			103.0		%		80-120	12-NOV-19
Beryllium (Be)-Total			102.0		%		80-120	12-NOV-19
Bismuth (Bi)-Total			104.6		%		80-120	12-NOV-19
Boron (B)-Total			105.1		%		80-120	12-NOV-19
Cadmium (Cd)-Total			104.4		%		80-120	12-NOV-19
Calcium (Ca)-Total			102.6		%		80-120	12-NOV-19
Cesium (Cs)-Total			100.1		%		80-120	12-NOV-19
Cobalt (Co)-Total			103.2		%		80-120	12-NOV-19
Copper (Cu)-Total			103.2		%		80-120	12-NOV-19
Iron (Fe)-Total			91.1		%		80-120	12-NOV-19
Lead (Pb)-Total			103.4		%		80-120	12-NOV-19
Lithium (Li)-Total			103.2		%		80-120	12-NOV-19
Magnesium (Mg)-Total			113.7		%		80-120	12-NOV-19
Manganese (Mn)-Total			103.2		%		80-120	12-NOV-19
Molybdenum (Mo)-Total			102.5		%		80-120	12-NOV-19
Nickel (Ni)-Total			101.7		%		80-120	12-NOV-19
Potassium (K)-Total			96.8		%		80-120	12-NOV-19
Phosphorus (P)-Total			103.8		%		80-120	12-NOV-19
Rubidium (Rb)-Total			102.9		%		80-120	12-NOV-19
Selenium (Se)-Total			102.7		%		80-120	12-NOV-19
Silicon (Si)-Total			105.1		%		80-120	12-NOV-19



## Quality Control Report

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Client: Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4906529</b>							
<b>WG3214211-2</b>	<b>LCS</b>							
Silver (Ag)-Total			100.9		%		80-120	12-NOV-19
Sodium (Na)-Total			106.4		%		80-120	12-NOV-19
Strontium (Sr)-Total			102.4		%		80-120	12-NOV-19
Sulfur (S)-Total			97.0		%		80-120	12-NOV-19
Tellurium (Te)-Total			99.5		%		80-120	12-NOV-19
Thallium (Tl)-Total			103.6		%		80-120	12-NOV-19
Thorium (Th)-Total			98.2		%		80-120	12-NOV-19
Tin (Sn)-Total			102.3		%		80-120	12-NOV-19
Titanium (Ti)-Total			94.2		%		80-120	12-NOV-19
Tungsten (W)-Total			103.1		%		80-120	12-NOV-19
Uranium (U)-Total			100.0		%		80-120	12-NOV-19
Vanadium (V)-Total			103.3		%		80-120	12-NOV-19
Zinc (Zn)-Total			101.3		%		80-120	12-NOV-19
Zirconium (Zr)-Total			96.7		%		80-120	12-NOV-19
<b>WG3214211-1</b>	<b>MB</b>							
Aluminum (Al)-Total			<0.0030		mg/L		0.003	12-NOV-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-NOV-19
Boron (B)-Total			<0.010		mg/L		0.01	12-NOV-19
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	12-NOV-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-NOV-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-NOV-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Copper (Cu)-Total			<0.00050		mg/L		0.0005	12-NOV-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-NOV-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-NOV-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-NOV-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-NOV-19
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-NOV-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-NOV-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-NOV-19



## Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

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**Client:** Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

**Contact:** Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>MET-T-CCMS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4906529</b>							
<b>WG3214211-1 MB</b>								
Phosphorus (P)-Total			<0.030		mg/L		0.03	12-NOV-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-NOV-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-NOV-19
Silver (Ag)-Total			<0.000010		mg/L		0.00001	12-NOV-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-NOV-19
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	12-NOV-19
Sulfur (S)-Total			0.80	B	mg/L		0.5	12-NOV-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-NOV-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-NOV-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-NOV-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-NOV-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-NOV-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-NOV-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-NOV-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-NOV-19
<b>WG3214211-5 MS</b>		<b>WG3214211-3</b>						
Aluminum (Al)-Total			96.0		%		70-130	12-NOV-19
Antimony (Sb)-Total			104.5		%		70-130	12-NOV-19
Barium (Ba)-Total			105.4		%		70-130	12-NOV-19
Beryllium (Be)-Total			95.5		%		70-130	12-NOV-19
Bismuth (Bi)-Total			92.0		%		70-130	12-NOV-19
Boron (B)-Total			N/A	MS-B	%		-	12-NOV-19
Cadmium (Cd)-Total			101.1		%		70-130	12-NOV-19
Calcium (Ca)-Total			N/A	MS-B	%		-	12-NOV-19
Cesium (Cs)-Total			98.0		%		70-130	12-NOV-19
Cobalt (Co)-Total			99.3		%		70-130	12-NOV-19
Copper (Cu)-Total			N/A	MS-B	%		-	12-NOV-19
Iron (Fe)-Total			97.9		%		70-130	12-NOV-19
Lead (Pb)-Total			92.9		%		70-130	12-NOV-19
Lithium (Li)-Total			N/A	MS-B	%		-	12-NOV-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	12-NOV-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-NOV-19







### Quality Control Report

Workorder: L2377383

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Client: Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
 Rivers MB R0K 1X0

Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>NO2-L-IC-N-WP</b>								
	Water							
Batch	R4902138							
<b>WG3211892-10</b>	<b>LCS</b>							
Nitrite (as N)			100.9		%		90-110	06-NOV-19
<b>WG3211892-2</b>	<b>LCS</b>							
Nitrite (as N)			100.7		%		90-110	06-NOV-19
<b>WG3211892-1</b>	<b>MB</b>							
Nitrite (as N)			<0.0010		mg/L		0.001	06-NOV-19
<b>WG3211892-9</b>	<b>MB</b>							
Nitrite (as N)			<0.0010		mg/L		0.001	06-NOV-19
<b>WG3211892-4</b>	<b>MS</b>	<b>L2377383-1</b>						
Nitrite (as N)			103.0		%		75-125	06-NOV-19
<b>NO3-L-IC-N-WP</b>								
	Water							
Batch	R4902138							
<b>WG3211892-3</b>	<b>DUP</b>	<b>L2377383-1</b>						
Nitrate (as N)		0.199	0.200		mg/L	0.5	20	06-NOV-19
<b>WG3211892-10</b>	<b>LCS</b>							
Nitrate (as N)			100.6		%		90-110	06-NOV-19
<b>WG3211892-2</b>	<b>LCS</b>							
Nitrate (as N)			100.3		%		90-110	06-NOV-19
<b>WG3211892-1</b>	<b>MB</b>							
Nitrate (as N)			<0.0050		mg/L		0.005	06-NOV-19
<b>WG3211892-9</b>	<b>MB</b>							
Nitrate (as N)			<0.0050		mg/L		0.005	06-NOV-19
<b>WG3211892-4</b>	<b>MS</b>	<b>L2377383-1</b>						
Nitrate (as N)			106.7		%		75-125	06-NOV-19
<b>PH-WP</b>								
	Water							
Batch	R4901790							
<b>WG3213017-5</b>	<b>DUP</b>	<b>L2377298-2</b>						
pH		7.82	7.82	J	pH units	0.00	0.2	06-NOV-19
<b>WG3213017-2</b>	<b>LCS</b>							
pH			7.36		pH units		7.3-7.5	06-NOV-19
<b>SO4-IC-N-WP</b>								
	Water							
Batch	R4902138							
<b>WG3211892-11</b>	<b>DUP</b>	<b>L2376875-2</b>						
Sulfate (SO4)		9.17	9.21		mg/L	0.4	20	06-NOV-19
<b>WG3211892-3</b>	<b>DUP</b>	<b>L2377383-1</b>						
Sulfate (SO4)		207	206		mg/L	0.5	20	06-NOV-19
<b>WG3211892-10</b>	<b>LCS</b>							



## Quality Control Report

Workorder: L2377383

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Client: Riverdale Municipality - Water Treatment Plant  
 Rivers - PWS Box 520  
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Contact: Jeff Worth

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>SO4-IC-N-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4902138</b>							
<b>WG3211892-10</b>	<b>LCS</b>							
Sulfate (SO4)			102.6		%		90-110	06-NOV-19
<b>WG3211892-2</b>	<b>LCS</b>							
Sulfate (SO4)			102.0		%		90-110	06-NOV-19
<b>WG3211892-1</b>	<b>MB</b>							
Sulfate (SO4)			<0.30		mg/L		0.3	06-NOV-19
<b>WG3211892-9</b>	<b>MB</b>							
Sulfate (SO4)			<0.30		mg/L		0.3	06-NOV-19
<b>WG3211892-12</b>	<b>MS</b>	<b>L2376875-2</b>						
Sulfate (SO4)			108.1		%		75-125	06-NOV-19
<b>WG3211892-4</b>	<b>MS</b>	<b>L2377383-1</b>						
Sulfate (SO4)			N/A	MS-B	%		-	06-NOV-19
<b>TDS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4904965</b>							
<b>WG3213504-7</b>	<b>DUP</b>	<b>L2377248-1</b>						
Total Dissolved Solids		3100	3630		mg/L	16	20	08-NOV-19
<b>WG3213504-6</b>	<b>LCS</b>							
Total Dissolved Solids			87.8		%		85-115	08-NOV-19
<b>WG3213504-5</b>	<b>MB</b>							
Total Dissolved Solids			<4.0		mg/L		4	08-NOV-19
<b>TURBIDITY-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4901646</b>							
<b>WG3212230-3</b>	<b>DUP</b>	<b>L2377383-1</b>						
Turbidity		1.27	1.25		NTU	1.6	15	06-NOV-19
<b>WG3212230-2</b>	<b>LCS</b>							
Turbidity			104.5		%		85-115	06-NOV-19
<b>WG3212230-1</b>	<b>MB</b>							
Turbidity			<0.10		NTU		0.1	06-NOV-19
<b>UV-%TRANS-WP</b>								
	<b>Water</b>							
<b>Batch</b>	<b>R4900893</b>							
<b>WG3211216-3</b>	<b>DUP</b>	<b>L2376558-1</b>						
Transmittance, UV (254 nm)		43.7	43.5		%T/cm	0.5	20	05-NOV-19
<b>WG3211216-1</b>	<b>IRM</b>	<b>BLANK</b>						
Transmittance, UV (254 nm)			100.0		%		99.5-100.5	05-NOV-19
<b>WG3211216-2</b>	<b>LCS</b>							
Transmittance, UV (254 nm)			96.2		%		85-115	05-NOV-19

# Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

Client: Riverdale Municipality - Water Treatment Plant  
Rivers - PWS Box 520  
Rivers MB R0K 1X0  
Contact: Jeff Worth

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## Legend:

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Limit ALS Control Limit (Data Quality Objectives)  
DUP Duplicate  
RPD Relative Percent Difference  
N/A Not Available  
LCS Laboratory Control Sample  
SRM Standard Reference Material  
MS Matrix Spike  
MSD Matrix Spike Duplicate  
ADE Average Desorption Efficiency  
MB Method Blank  
IRM Internal Reference Material  
CRM Certified Reference Material  
CCV Continuing Calibration Verification  
CVS Calibration Verification Standard  
LCSD Laboratory Control Sample Duplicate

## Sample Parameter Qualifier Definitions:

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Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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# Quality Control Report

Workorder: L2377383

Report Date: 19-NOV-19

Client: Riverdale Municipality - Water Treatment Plant  
Rivers - PWS Box 520  
Rivers MB R0K 1X0  
Contact: Jeff Worth

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## Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
<b>Physical Tests</b>							
pH							
	1	04-NOV-19 08:30	06-NOV-19 12:00	0.25	52	hours	EHTR-FM
	2	04-NOV-19 09:00	06-NOV-19 12:00	0.25	51	hours	EHTR-FM

## Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.  
EHTR: Exceeded ALS recommended hold time prior to sample receipt.  
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
EHT: Exceeded ALS recommended hold time prior to analysis.  
Rec. HT: ALS recommended hold time (see units).

Notes\*:  
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.  
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2377383 were received on 05-NOV-19 12:35.

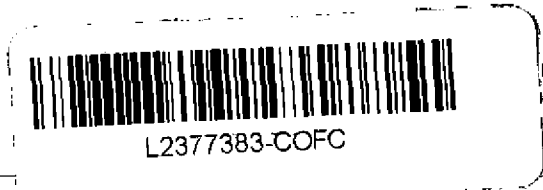
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Sustainable Development  
Office of Drinking Water  
1007 Century Street, Winnipeg, Manitoba,  
Canada R3H 0W4



Regular Service (default):	<input checked="" type="checkbox"/> Regular Service (is 5-7 Days):
Unless otherwise requested	<input checked="" type="checkbox"/> 1 Day, rush / priority
	<input checked="" type="checkbox"/> 2 Day, rush / priority
	<input checked="" type="checkbox"/> 3 Day, rush / priority

**Report to Operator (email PDF):**

Contact: Jeff Worth  
Address: Box 520, Rivers, MB R0K1X0  
Phone: (204) 328-7480  
Email: ap.riverdale@mymts.net

Contact: Kathryn Bridgeman  
Address: Box 520, Rivers, MB R0K1X0  
Phone: (204) 328-5250  
Email: cao.riverdale@mymts.net

**Email PDF copy to:**

DWO: Christine Gerardy  
DWO Address: 1129 Queen's Ave., Brandon, MB R7A1L9  
DWO Phone: (204) 570-1405  
DWO Email: Christine.Gerardy@gov.mb.ca  
Additional Email: Joern.Muenster@gov.mb.ca

**If an update in Owner or Operator contact information is required, please contact your Drinking Water Officer**

<b>Client / Project Information:</b>	Lab: ALS	Account:	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C
Operation Name:	RIVERS - PWS	Expected Sample Time:		<b>October-2019</b>	
Operation Code:	181.00				
Operation ID:	16843				
Sampled by:	JEFF WORTH				

**Please record Free & Total Chlorine residuals for Distribution By-product Sampling**  
**DO NOT COPY or RE-USE this form. Sample Number are unique to the Office of Drinking Water**  
**and provided by Drinking Water Officer.**

Sample Number	Station Number	Sample Identification	Free Chlorine (mg/L)	Total Chlorine (mg/L)	Sample Date dd-mmm-yyyy	Sample Time hh:mm	Sample Matrix	Sample Type	MB-CH-PWS-V2013	MB-MET-T-L-MS-WP	# of Containers
1910CG0001	MB05MFD041	Rivers 1 - Raw	—	—	04/11/2019	0830	6	1	X		4
1910CG0002	MB05MFD042	Rivers 2 - Treated	0.94	1.03	04/11/2019	0900	10	1	X		4
1910CG0003	MB05MFD043	Rivers 3 - Distribution	0.98	1.12	04/11/2019	0830	9	1		X	1

Failure to complete all portions of this form may delay analysis.  
Please fill in this form LEGIBLY.

Sample Matrix: 6-Raw Water, 9-Distributed Water, 10-Treated Water  
Sample Type: 1-Grab Sample

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.  
For ALL other testing, please use Laboratory specific forms.

Relinquished By: <i>J Worth</i>	Date & Time: NOV 4 2019, 9:00 AM	Validated By (lab use only):	Date & Time:
Received By: <i>AR</i>	Date & Time: NOV 5 19 635	Temperature: 73	Samples Received in Good Condition? Y/N