Rm of Whitemouth

Whitemouth
RIVER VALLEY

Public Water System

Annual Report

2023

Name of the Public Water System: **Whitemouth Rural Pipeline**

Name of the Legal Owner: **RM of Whitemouth**

Contact Person: **Colleen Johnson (COA)**

Phone: **(204) 348-2221**

Fax: **(204) 348-2576**

Email: **cao@rmwhitemouth.com**

Website: **www.rmwhitemouth.com**

Name of Operators: **Glen Campbell, Sr. Utility Operator – Water Treatment 2, Water Distribution 1, Waste Water Small System**

Matthew Pommer, Operator in Training - Water Treatment OIT, Water Distribution OIT

Phone during business hours: **(204) 348-2574 or (204) 348-2221**

Date prepared: March 21/24
Prepared By: Glen Campbell

Table of Contents

Introduction:

The 2023 Public Water System Annual Report summarizes the ability of the RM of Whitemouth to produce and provide safe potable water to our constituents which meets provincial regulations.

1. Description of the Water System:

The RM of Whitemouth Public Water System provides potable drinking water to a population of approximately 1500 residents. Treated water from the water treatment plant met all health as stated in the *Guidelines for Canadian Drinking Water Quality* as well as provincial regulations. Aesthetic objectives in the *Guidelines for Canadian Drinking Water Quality* met all.

1.1 Water Supply Source

The RM of Whitemouth Water Treatment Plant draws its supply water from Natalie Lake of the Winnipeg River. The Winnipeg River has an abundant supply of high-quality water which is easily treated to meet all standards.

The Water Treatment Plant intake is approximately 12 feet below the surface of the river. The water is then pumped into the Water Treatment Plant situated in Seven Sisters Falls, Mb on Waterline Road.

1.2 Water Treatment Processes

The high quality of water which comes out of the Winnipeg River requires a minimal amount of treatment to meet all provincial requirements. Upon entering the water treatment plant and entering our Actiflo treatment system the raw water is injected with a product called Hydrex 3613 Polymere, which is a flocculating agent, and Aluminum Sulphate Solution, which is a further flocculating agent, and Actisand, which is fine silica sand. These processes are geared mainly towards treating the turbidity and colour of the raw water. The raw water comes out of the Winnipeg River with an average turbidity between 2-10 nephelometric turbidity units (NTU). The Actiflo processes drop this figure to on average between 0.4 -0.8 NTU. The water which has been treated through the Actiflo. After going through the filter, the treated water is at approximately 0.030-0.070 NTU. This number is approximately 11% of our

regulated limit. The legal requirement for our treated water is 0.3 NTU after these filters. The water is then stored in a 873,000 litre reservoir.

A result of the Actiflo/ Chemical processes is that the water pH drops to approximately 6.2-6.5. This water is then treated with Sodium Hydroxide 25% solution to raise the pH from 6.2-6.5 to a level of 7.6-7.8. This means that the treated water is very close to neutral which aids in controlling corrosion and deposits. The reservoir water is further treated with Sodium Hyprochlorite 12% as a disinfecting agent. Our distribution water must leave the water treatment plant with a minimum of 0.5mg per litre of free chlorine residual and have a minimum of 0.1 mg per litre in all areas of the distribution.

1.3 Water Treatment and Distribution Capacities

The RM of Whitemouth Water Treatment Plant operates at an incoming rate of 15 litres per second and runs for approximately 8 - 12 hours per day using two 20hp distribution duty pumps. We treat approximately 525,000 litres daily on average. Distribution system pressure is maintained at between 55-60psi using frequency drive pumps and a pressure relief system.

1.4 Distribution System

RM of Whitemouth's water distribution system is approximately 125 kilometres long and is comprised of approximately 50% PVC and 50% HDPE. Distribution piping varies in size from 8" to 2".

1.5 Number of Connections, and water user types

RM of Whitemouth has approximately 500 connections with a large different type of users from residential, commercial, and farms. From small users to large users. From year round to seasonal connections. In 2019 the RM of Whitemouth started selling water to the RM of Lac Du Bonnet Brookfield Utility / Awanipark in the LGD of Pinawa which added another 150 connections. For a total of 650 connections.

1.6 System Classification and Certification under the Water and Wastewater Facility Operators Regulation under the Environment Act.

A Class 2 Water Treatment Facility

A Class 1 Water Distribution System

2. Disinfection System in Use.

The RM of Whitemouth uses Sodium Hypochlorite 12% as our disinfection method. Disinfection is the selective destruction or inactivation of potential disease-causing organisms in water. As per the *Drinking Water Safety Act* the RM of Whitemouth Public Water System must ensure that we maintain a free disinfectant residual of at least:

- 0.5 mg of free chlorine per litre of water is detectable at the point where water enters the distribution system, after a minimum contact time of 20 minutes

- O.1 mg of free chlorine per litre of water is detectable at all times at any point in the distribution network.

2.1 Type of Disinfection System Used

The RM of Whitemouth Water Treatment Plant disinfects using Sodium Hypochlorite 12% concentration. Chlorine is added to the system using 2 peristaltic pumps, one as primary one as backup should one fail or fault the other will automatically switch.

2.2 Need for Redundancy and Monitoring

The "Drinking Water and Safety Act" requires that disinfection is continuously maintained. To ensure this we use two separate chlorine pumps allowing for redundancy in the system itself where one side can be turned off and the disinfecting needs will be met by the remaining side and some spare parts which are more prone to fail or need replacing.

Disinfectant total and free residuals are checked and recorded daily at the water treatment plant and bi-weekly at points throughout the distribution system. Results are recorded on the appropriate monitoring forms and are sent to the regional Drinking Water Officer at the end of each month. SCADA system that records free chlorine levels on a continuous basis.

2.3 Disinfectant Residual Overall Performance and Results

For the year 2023 the RM of Whitemouth Public Water System has met 100% of the regulatory requirements for treated water and 100% for distributed water.

3. List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the *Guidelines for Canadian Drinking Water Quality,* developed by Health Canada. The parameters are health-based and they express the maximum acceptable concentrations for drinking water. Concentration values in excess of the standards constitute a possible health related issue and require corrective actions. The 2023 results for the RM of Whitemouth Public Water System are summarized in the following tables:

New to 2023 The Province of Manitoba with the Office of the Drinking Water has implemented a lead testing program for houses that were built prior to 1990

3.1 Disinfection Monitoring and Reporting

	Regulatory Requirement	Water System Performance
Free Chlorine Residual entering the Distribution System	≥0.5 mg/L	Meets requirements
Frequency of Testing	Daily	Meets requirements
Free Chlorine Residual in the Distribution System	≥0.1 mg/L	Meets requirements
Frequency of Testing	Bi-Weekly	Meets requirements
Report Submissions	Monthly	Meets requirements

3.2 Lead Testing Monitoring and Reporting

	Regulatory Requirement	Water System Performance
Number of Completed tests 20 per year	20	Meets Requirements
Number of samples Pass Below 0.005mg/l	20	Meets Requirements

3.3 Bacteriological Monitoring and Reporting

	Regulatory Requirement	Water System Performance
Number of Raw/Incoming Water Samples	Bi-weekly	Meets requirements
Number of Treated Water Samples	Bi-weekly	Meets requirements
Number of Distribution Water Samples	78	Meets requirements
Frequency of Testing	Bi-weekly	Meets requirements
Total Coliform (TC) Present in Water Samples	0 TC per 100mL	Meets requirements
E. Coli (EC) Present in Water Samples	0 EC per 100mL	Meets requirements

3.4 Turbidity Monitoring and Reporting

	Regulatory Requirement	Water System Performance
Chemically assisted, rapid gravity filtration process	≤0.3NTU in at Least 95% Of samples	Meets requirements
Standard	Never to exceed 1.0 NTU	Meets requirements
Frequency of Testing	Continuous	Meets requirements
Report Submissions	Monthly (An effective treatment barrier through monitoring / reporting)	Meets requirements

3.5 Disinfection By-products Monitoring and Reporting

	Regulatory Requirement	Water System Performance
Trihalomethane sampling requirements	Quarterly	Testing required every 2nd year completed 2023
Total Trihalomethane Standard	<0.1mg/L	Passed 0.0860 2023 results
Haoacetic Acid sampling requirements	Quarterly	Testing required every 2nd year completed 2023
Haloacetic Acid Standard	<0.08mg/L	Passed 0.0528 2023 results

4. Water System Alterations, Incidents and Corrective Actions

4.1 Water Breaks

Most waterline repairs were done while the waterline was still under minimal positive pressure to ensure no in line contamination. After repairs were completed, waterlines were flushed and checked to make sure that a satisfactory disinfectant residual was maintained prior to being put back into service. Most repairs were done in such a way as to minimize down time for users and as much advance notice given as possible. The RM of Whitemouth had 8 repairs in 2023.

4.2 Water Hook-Ups

During 2023 the RM had 5 new water hookups.

4.3 Other Incidents or Corrective Actions

During 2023 the RM of Whitemouth Public Water System had no incidents or corrective actions required

5. Drinking Water Safety Orders on Water System and Corrective Actions Taken

During 2023, there were no Drinking Water Safety Orders issued for the RM of Whitemouth Public Water System.

6. Boil Water Advisories Issued on Water System and Corrective Actions Taken

During 2023 the RM of Whitemouth Public Water System did have 4 Boil Water Advisories. One in January, May, November, and December. All due to depressurization of distribution water lines.

7. Warnings Issued or Charges Laid on Water System in Accordance with The Drinking Water Safety Act

During 2023 the RM of Whitemouth Public Water System did not have any warnings or charges.

8. **Major Unexpected Expenses Incurred in 2023**

   In 2023 we had a raw water intake pump fail and was replace in the wet well at the water treatment plant.

9. **Anticipated Future Major Cost Items, System Expansion and/or Increased or Decreased Production**

   Continue to add new hydrants through out the RM. We also added 3 new fire hydrants through out the RM in 2023. We started to add curb stops for residents that do not have in 2023. We will continue to add so many per year to ensure that all residents have working curb stops in the future.

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2332335**	Page	: 1 of 6
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Amrith Kumar	Account Manager	: Sheriza Rajack-Ahamed
Address	: Box 4000, #4 Highway 502 Lac du Bonnet MB Canada R0E 1A0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 345 1415	Telephone	: +1 204 255 9720
Project	: WHITEMOUTH - PWS - 249.25	Date Samples Received	: 12-Dec-2023 14:30
PO	: ----	Date Analysis Commenced	: 13-Dec-2023
C-O-C number	: ----	Issue Date	: 18-Dec-2023 15:01
Sampler	: ----		
Site	: Whitemouth - PWS 249.25 Op ID: 7238		
Quote number	: WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional Information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Christopher Chow		Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Metals, Winnipeg, Manitoba

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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. Guidelines 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.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: Water

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	RM OF WHITEMOUTH RURAL PIPELINE 3 - DIST. MID POINT	----	----	----	----
				Sampling date/time	12-Dec-2023 10:00	12-Dec-2023 09:45	12-Dec-2023 09:10	----	----	----	----
				Sub-Matrix	Water	Water	Water	----	----	----	----
					WP2332335-001	WP2332335-002	WP2332335-003	--------	-------	--------	--------
Physical Tests											
Absorbance, UV (@ 254nm)	----	E404/WP	AU/cm		0.264	0.0530	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/WP	mg/L		43.4	36.9	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/WP	mg/L		Not Detected	Not Detected	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/WP	mg/L		Not Detected	Not Detected	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WP	mg/L		43.8	37.1	----	----	----	----	----
Colour, true	----	E329/WP	CU		20.9	Not Detected	----	----	----	----	----
Conductivity	----	E100/WP	µS/cm		105	173	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	mg/L		50.8	49.6	----	----	----	----	----
Langelier Index (@ 4°C)	----	EC105A/WP	-		-1.09	-1.26	----	----	----	----	----
Langelier Index (@ 60°C)	----	EC105A/WP	-		-0.316	-0.479	----	----	----	----	----
pH	----	E108/WP	pH units		7.70	7.64	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162-L/WP	mg/L		51.7	81.0	----	----	----	----	----
Turbidity	----	E121/WP	NTU		1.57	<0.10	----	----	----	----	----
pH, saturation (@ 4°C)	----	EC105A/WP	pH units		8.79	8.90	----	----	----	----	----
Transmittance, UV (@ 254nm)	----	E404/WP	% T/cm		54.4	88.5	----	----	----	----	----
pH, saturation (@ 60°C)	----	EC105A/WP	pH units		8.02	8.12	----	----	----	----	----
Anions and Nutrients											
Bromide	24959-67-9	E235.Br-L/WP	mg/L		Not Detected	Not Detected	----	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/WP	mg/L		1.95	5.01	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WP	mg/L		0.047	0.023	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/WP	mg/L		0.0626	0.0556	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/WP	mg/L		Not Detected	Not Detected	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP	mg/L		2.90	33.1	----	----	----	----	----
Organic / Inorganic Carbon											

Analytical Results Evaluation

Matrix: Water

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	RM OF WHITEMOUTH RURAL PIPELINE 3 - DIST. MID POINT	----	----	----	----
				Sampling date/time	12-Dec-2023 10:00	12-Dec-2023 09:45	12-Dec-2023 09:10	----	----	----	----
				Sub-Matrix	Water	Water	Water	----	----	----	----
					WP2332335-001	WP2332335-002	WP2332335-003	--------	--------	--------	--------
Organic / Inorganic Carbon											
Carbon, dissolved organic [DOC]	----	E358-L/WP	mg/L		10.8	5.26	----	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/WP	mg/L		11.4	5.06	----	----	----	----	----
Ion Balance											
Anion sum	----	EC101A/WP	meq/L		1.00	1.58	----	----	----	----	----
Cation sum (total)	----	EC101A/WP	meq/L		1.17	1.69	----	----	----	----	----
Ion balance (cations/anions)	----	EC101A/WP	%		117	107	----	----	----	----	----
Ion balance (APHA)	----	EC101A/WP	%		7.83	3.36	----	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WP	µg/L		74.1	44.6	41.2	----	----	----	----
Antimony, total	7440-36-0	E420/WP	µg/L		<0.10	<0.10	<0.10	----	----	----	----
Arsenic, total	7440-38-2	E420/WP	µg/L		1.01	0.38	0.34	----	----	----	----
Barium, total	7440-39-3	E420/WP	µg/L		9.56	8.78	8.63	----	----	----	----
Beryllium, total	7440-41-7	E420/WP	µg/L		<0.020	<0.020	<0.020	----	----	----	----
Bismuth, total	7440-69-9	E420/WP	µg/L		<0.050	<0.050	<0.050	----	----	----	----
Boron, total	7440-42-8	E420/WP	µg/L		<10	<10	<10	----	----	----	----
Cadmium, total	7440-43-9	E420/WP	µg/L		<0.0050	<0.0050	<0.0050	----	----	----	----
Calcium, total	7440-70-2	E420/WP	µg/L		13500	13200	12700	----	----	----	----
Cesium, total	7440-46-2	E420/WP	µg/L		0.011	<0.010	<0.010	----	----	----	----
Chromium, total	7440-47-3	E420/WP	µg/L		<0.50	<0.50	<0.50	----	----	----	----
Cobalt, total	7440-48-4	E420/WP	µg/L		<0.10	<0.10	<0.10	----	----	----	----
Copper, total	7440-50-8	E420/WP	µg/L		1.15	<0.50	<0.50	----	----	----	----
Iron, total	7439-89-6	E420/WP	µg/L		73	<10	31	----	----	----	----
Lead, total	7439-92-1	E420/WP	µg/L		<0.050	<0.050	<0.050	----	----	----	----
Lithium, total	7439-93-2	E420/WP	µg/L		1.6	1.5	1.3	----	----	----	----
Magnesium, total	7439-95-4	E420/WP	µg/L		4160	4050	4020	----	----	----	----

Analytical Results Evaluation

Matrix: Water

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	RM OF WHITEMOUTH RURAL PIPELINE 3 - DIST. MID POINT	----	----	----	----
				Sampling date/time	12-Dec-2023 10:00	12-Dec-2023 09:45	12-Dec-2023 09:10	----	----	----	----
				Sub-Matrix	Water	Water	Water	----	----	----	----
					WP2332335-001	WP2332335-002	WP2332335-003	--------	--------	--------	--------
Total Metals											
Manganese, total	7439-96-5	E420/WP	µg/L		4.51	0.36	1.39	----	----	----	----
Molybdenum, total	7439-98-7	E420/WP	µg/L		0.178	0.186	0.175	----	----	----	----
Nickel, total	7440-02-0	E420/WP	µg/L		0.65	0.98	1.01	----	----	----	----
Phosphorus, total	7723-14-0	E420/WP	µg/L		<50	<50	<50	----	----	----	----
Potassium, total	7440-09-7	E420/WP	µg/L		938	907	894	----	----	----	----
Rubidium, total	7440-17-7	E420/WP	µg/L		1.54	1.45	1.28	----	----	----	----
Selenium, total	7782-49-2	E420/WP	µg/L		0.115	0.058	<0.050	----	----	----	----
Silicon, total	7440-21-3	E420/WP	µg/L		1840	1360	1320	----	----	----	----
Silver, total	7440-22-4	E420/WP	µg/L		<0.010	<0.010	<0.010	----	----	----	----
Sodium, total	7440-23-5	E420/WP	µg/L		2840	15400	15300	----	----	----	----
Strontium, total	7440-24-6	E420/WP	µg/L		26.3	26.7	25.5	----	----	----	----
Sulfur, total	7704-34-9	E420/WP	µg/L		1300	12600	12400	----	----	----	----
Tellurium, total	13494-80-9	E420/WP	µg/L		<0.20	<0.20	<0.20	----	----	----	----
Thallium, total	7440-28-0	E420/WP	µg/L		<0.010	<0.010	<0.010	----	----	----	----
Thorium, total	7440-29-1	E420/WP	µg/L		<0.10	<0.10	<0.10	----	----	----	----
Tin, total	7440-31-5	E420/WP	µg/L		<0.10	<0.10	<0.10	----	----	----	----
Titanium, total	7440-32-6	E420/WP	µg/L		2.10	<0.30	<0.30	----	----	----	----
Tungsten, total	7440-33-7	E420/WP	µg/L		<0.10	<0.10	<0.10	----	----	----	----
Uranium, total	7440-61-1	E420/WP	µg/L		0.083	<0.010	<0.010	----	----	----	----
Vanadium, total	7440-62-2	E420/WP	µg/L		0.83	0.53	0.51	----	----	----	----
Zinc, total	7440-66-6	E420/WP	µg/L		<3.0	<3.0	14.7	----	----	----	----
Zirconium, total	7440-67-7	E420/WP	µg/L		<0.20	<0.20	<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**WP2332335**	Page	: 1 of 11
Client	:**Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	:Amrith Kumar	Account Manager	: Sheriza Rajack-Ahamed
Address	:Box 4000, #4 Highway 502 Lac du Bonnet MB Canada R0E 1A0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:204 340 3423	Telephone	: +1 204 255 9720
Project	:WHITEMOUTH - PWS - 249.25	Date Samples Received	: 12-Dec-2023 14:30
PO	: ----	Issue Date	: 18-Dec-2023 15:00
C-O-C number	: ----		
Sampler	: ----		
Site	:Whitemouth - PWS 249.25 Op ID: 7238		
Quote number	:WTP Chemistry		
No. of samples received	:3		
No. of samples analysed	:3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: Water

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.Br-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.Br-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.Cl-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.Cl-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.F	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.F	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.NO3-L	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓

Matrix: Water

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.NO3-L	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.NO2-L	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.NO2-L	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E235.SO4	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E235.SO4	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E358-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E358-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E355-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E355-L	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E290	12-Dec-2023	13-Dec-2023	14 days	1 days	✓	13-Dec-2023	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E290	12-Dec-2023	13-Dec-2023	14 days	1 days	✓	13-Dec-2023	14 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E329	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E329	12-Dec-2023	13-Dec-2023	3 days	1 days	✓	13-Dec-2023	3 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E100	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E100	12-Dec-2023	13-Dec-2023	28 days	1 days	✓	13-Dec-2023	28 days	1 days	✓
Physical Tests : pH by Meter										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E108	12-Dec-2023	13-Dec-2023	0.25 hrs	26 hrs	× EHTR-FM	13-Dec-2023	0.25 hrs	26 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E108	12-Dec-2023	13-Dec-2023	0.25 hrs	26 hrs	× EHTR-FM	13-Dec-2023	0.25 hrs	26 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E162-L	12-Dec-2023	----	----	----		14-Dec-2023	7 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E162-L	12-Dec-2023	----	----	----		14-Dec-2023	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E121	12-Dec-2023	----	----	----		13-Dec-2023	3 days	1 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E121	12-Dec-2023	----	----	----		13-Dec-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E404	12-Dec-2023	----	----	----		13-Dec-2023	3 days	1 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E404	12-Dec-2023	----	----	----		13-Dec-2023	3 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	E420	12-Dec-2023	14-Dec-2023	180 days	2 days	✓	14-Dec-2023	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RM OF WHITEMOUTH RURAL PIPELINE 2 - TREATED	E420	12-Dec-2023	14-Dec-2023	180 days	2 days	✓	14-Dec-2023	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RM OF WHITEMOUTH RURAL PIPELINE 3 - DIST. MID POINT	E420	12-Dec-2023	14-Dec-2023	180 days	2 days	✓	14-Dec-2023	180 days	2 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification;* ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1275162	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1276376	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1276377	1	5	20.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1275491	1	20	5.0	5.0	✓
Conductivity in Water	E100	1275161	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1275079	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1276375	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1276378	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1276379	1	7	14.2	5.0	✓
pH by Meter	E108	1275160	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1276373	1	6	16.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1275636	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1276356	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1274628	1	14	7.1	5.0	✓
Turbidity by Nephelometry	E121	1275285	1	9	11.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1275328	1	6	16.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1275162	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1276376	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1276377	1	5	20.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1275491	1	20	5.0	5.0	✓
Conductivity in Water	E100	1275161	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1275079	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1276375	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1276378	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1276379	1	7	14.2	5.0	✓
pH by Meter	E108	1275160	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1276373	1	6	16.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1275636	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1276356	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1274628	1	14	7.1	5.0	✓
Turbidity by Nephelometry	E121	1275285	1	9	11.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1275328	1	6	16.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1275162	1	7	14.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Bromide in Water by IC (Low Level)	E235.Br-L	1276376	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1276377	1	5	20.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1275491	1	20	5.0	5.0	✓
Conductivity in Water	E100	1275161	1	14	7.1	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1275079	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1276375	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1276378	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1276379	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1276373	1	6	16.6	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1275636	1	10	10.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1276356	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1274628	1	14	7.1	5.0	✓
Turbidity by Nephelometry	E121	1275285	1	9	11.1	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1275328	1	6	16.6	5.0	✓
Matrix Spikes (MS)							
Bromide in Water by IC (Low Level)	E235.Br-L	1276376	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1276377	1	5	20.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1275079	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1276375	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1276378	1	7	14.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1276379	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1276373	1	6	16.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1276356	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1274628	1	14	7.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Winnipeg	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Winnipeg	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Winnipeg	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry (Low Level)	E162-L ALS Environmental - Winnipeg	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC (Low Level)	E235.Cl-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Winnipeg	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Winnipeg	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
UV Absorbance and Transmittance by Spectrometry	E404 ALS Environmental - Winnipeg	Water	APHA 5910 B (mod)	UV Absorbance is determined by first filtering a sample through a 0.45 micron filter, followed by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Winnipeg	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Winnipeg	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Ion Balance using Total Metals	EC101A ALS Environmental - Winnipeg	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Winnipeg	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Winnipeg	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon

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QUALITY CONTROL REPORT

Work Order	:**WP2332335**	**Page**	: 1 of 13
Client	:Manitoba Conservation & Climate	**Laboratory**	:ALS Environmental - Winnipeg
Contact	:Amrith Kumar	**Account Manager**	:Sheriza Rajack-Ahamed
Address	:249.25 - Whitemouth - PWS Box 248 Whitemouth MB Canada R0E 2G0	**Address**	:1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	:	**Telephone**	:+1 204 255 9720
Project	:WHITEMOUTH - PWS - 249.25	**Date Samples Received**	:12-Dec-2023 14:30
PO	:----	**Date Analysis Commenced**	:13-Dec-2023
C-O-C number	:----	**Issue Date**	:18-Dec-2023 15:00
Sampler	:---- 204 340 3423		
Site	:Whitemouth - PWS 249.25 Op ID: 7238		
Quote number	:WTP Chemistry		
No. of samples received	:3		
No. of samples analysed	:3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Christopher Chow		Winnipeg Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Winnipeg Inorganics, Winnipeg, Manitoba
Rhovee Guevarra		Winnipeg Metals, Winnipeg, Manitoba

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include 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 predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1275160)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	pH	----	E108	0.10	pH units	7.70	7.72	0.259%	4%	----
Physical Tests (QC Lot: 1275161)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Conductivity	----	E100	2.0	µS/cm	105	105	0.00%	10%	----
Physical Tests (QC Lot: 1275162)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	43.8	43.3	1.15%	20%	----
Physical Tests (QC Lot: 1275285)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Turbidity	----	E121	0.10	NTU	1.57	1.63	3.75%	15%	----
Physical Tests (QC Lot: 1275328)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.264	0.266	0.755%	20%	----
Physical Tests (QC Lot: 1275491)											
WP2332133-001	Anonymous	Colour, true	----	E329	5.0	CU	<5.0	<5.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1275636)											
WP2332166-001	Anonymous	Solids, total dissolved [TDS]	----	E162-L	15.0	mg/L	3810	3690	3.12%	20%	----
Anions and Nutrients (QC Lot: 1276373)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.90	2.91	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1276375)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.047	0.046	0.0009	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1276376)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1276377)											

Sub-Matrix: Water

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1276377) - continued											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	1.95	1.96	0.521%	20%	----
Anions and Nutrients (QC Lot: 1276378)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0626	0.0632	1.02%	20%	----
Anions and Nutrients (QC Lot: 1276379)											
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1274628)											
WP2332223-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	14.5	14.8	2.12%	20%	----
Organic / Inorganic Carbon (QC Lot: 1275079)											
WP2332136-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	16.1	16.3	1.40%	20%	----
Total Metals (QC Lot: 1276356)											
WP2332243-003	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0960	0.0910	5.36%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00206	0.00210	1.91%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0565	0.0567	0.410%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	0.000029	0.000009	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.164	0.168	2.07%	20%	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000072	0.0000062	0.0000010	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	130	133	2.09%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000017	0.000015	0.000002	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00018	0.00017	0.000003	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00739	0.00735	0.603%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.361	0.356	1.37%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000060	0.000057	0.000003	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.105	0.105	0.507%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	55.7	54.7	1.88%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.148	0.144	2.94%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00134	0.00138	3.27%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00173	0.00178	0.00005	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	0.060	0.061	0.002	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1276356) - continued											
WP2332243-003	Anonymous	Potassium, total	7440-09-7	E420	0.050	mg/L	6.94	6.70	3.57%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00240	0.00233	2.84%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000206	0.000223	0.000017	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	15.2	15.1	0.858%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	79.4	76.8	3.31%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.471	0.469	3.71%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	70.9	69.0	2.81%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00291	0.00289	0.00002	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.00206	0.00206	0.0626%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00125	0.00114	0.00012	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00026	0.00024	0.00001	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1275161)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1275162)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1275285)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1275328)						
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1275491)						
Colour, true	----	E329	5	CU	<5.0	----
Physical Tests (QCLot: 1275636)						
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	<3.0	----
Anions and Nutrients (QCLot: 1276373)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1276375)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1276376)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1276377)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1276378)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1276379)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Organic / Inorganic Carbon (QCLot: 1274628)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1275079)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1276356)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1276356) - continued						
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1275160)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1275161)									
Conductivity	----	E100	1	µS/cm	1412 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1275162)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	100 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1275285)									
Turbidity	----	E121	0.1	NTU	200 NTU	96.0	85.0	115	----
Physical Tests (QCLot: 1275328)									
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	0.582 AU/cm	101	85.0	115	----
Physical Tests (QCLot: 1275491)									
Colour, true	----	E329	5	CU	250 CU	102	85.0	115	----
Physical Tests (QCLot: 1275636)									
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	1000 mg/L	95.8	85.0	115	----
Anions and Nutrients (QCLot: 1276373)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 1276375)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1276376)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 1276377)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 1276378)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1276379)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.9	90.0	110	----
Organic / Inorganic Carbon (QCLot: 1274628)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1275079)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	97.7	80.0	120	----

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 1276356)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	107	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	99.7	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	114	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	108	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	108	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	94.6	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	101	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	96.2	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	102	80.0	120	----

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1276356) - continued									
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	93.8	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND -- Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1276373)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1276375)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Fluoride	16984-48-8	E235.F	0.998 mg/L	1 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1276376)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Bromide	24959-67-9	E235.Br-L	0.484 mg/L	0.5 mg/L	96.7	75.0	125	----
Anions and Nutrients (QCLot: 1276377)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Chloride	16887-00-6	E235.Cl-L	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1276378)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Nitrate (as N)	14797-55-8	E235.NO3-L	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1276379)										
WP2332335-001	RM OF WHITEMOUTH RURAL PIPELINE 1 - RAW	Nitrite (as N)	14797-65-0	E235.NO2-L	0.502 mg/L	0.5 mg/L	100	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1274628)										
WP2332223-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1275079)										
WP2332136-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 1276356)										
WP2332243-003	Anonymous	Aluminum, total	7429-90-5	E420	0.208 mg/L	0.2 mg/L	104	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0211 mg/L	0.02 mg/L	105	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0453 mg/L	0.04 mg/L	113	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00899 mg/L	0.01 mg/L	89.9	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00391 mg/L	0.004 mg/L	97.7	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0104 mg/L	0.01 mg/L	104	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1276356) - continued										
WP2332243-003	Anonymous	Chromium, total	7440-47-3	E420	0.0424 mg/L	0.04 mg/L	106	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Copper, total	7440-50-8	E420	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		Iron, total	7439-89-6	E420	2.07 mg/L	2 mg/L	103	70.0	130	----
		Lead, total	7439-92-1	E420	0.0182 mg/L	0.02 mg/L	91.3	70.0	130	----
		Lithium, total	7439-93-2	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0218 mg/L	0.02 mg/L	109	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		Phosphorus, total	7723-14-0	E420	11.1 mg/L	10 mg/L	111	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0213 mg/L	0.02 mg/L	106	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0438 mg/L	0.04 mg/L	109	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	10 mg/L	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	20 mg/L	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00366 mg/L	0.004 mg/L	91.4	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		Tin, total	7440-31-5	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0441 mg/L	0.04 mg/L	110	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00399 mg/L	0.004 mg/L	99.6	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.111 mg/L	0.1 mg/L	111	70.0	130	----
		Zinc, total	7440-66-6	E420	0.358 mg/L	0.4 mg/L	89.6	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0434 mg/L	0.04 mg/L	109	70.0	130	----

Manitoba

Environment, Climate and Parks
Office of Drinking Water
1007 Century Street, Winnipeg, Manitoba,
Canada R3H 0W4

Chain of Custody (COC)
Manitoba Drinking Water Systems

Regular Service (default):	X Regular Service (is 5-7 Days):
Unless otherwise requested	1 Day, rush / priority 2 Day, rush / priority 3 Day, rush / priority

Report to Operator (email PDF):
Contact: Glen Campbell
Address: Box 248, Whitemouth, MB R0E2G0
Phone: (204) 348-2574
Email: utility@rmwhitemouth.com

Report to Owner (email PDF):
Contact: Colleen Johnson
Address: Box 248, 49 Railway Avenue, Whitemouth, MB R
Phone: (204) 348-2221
Email: cao@rmwhitemouth.com

Email PDF copy to:
DWO: Amrith Kumar
DWO Address: #4 HWY 502, Lac du Bonnet, MB R0E1A0
DWO Phone: (204) 340-3423
DWO Email: Amrith.Kumar@gov.mb.ca
Additional Email: Joern.Muenster@gov.mb.ca; Melanie.Betsill@gov.mb.ca;

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

Client / Project Information:	Lab:	Account:	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C
Operation Name:	WHITEMOUTH - PWS				
Operation Code:	249.25		Expected Sample Time:	March-2023	
Operation ID:	7238				
Sampled by:	GLEN CAMPBELL				

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-CCMS	# of Containers
2303AK5001	MB05PHD041	RM of Whitemouth Rural Pipeline 1 - Raw	—	—	DEC 12/23	10:00	6	1	X		4
2303AK5002	MB05PHD042	RM of Whitemouth Rural Pipeline 2 - Treated	1.11	1.37	DEC 12/23	9:45	10	1	X		4
2303AK5003	MB05PHD043	RM of Whitemouth Rural Pipeline 3 - Distribution Mid Point	.86	1.10	DEC 12/23	9:10	9	1		X	1

Environmental Division
Winnipeg
Work Order Reference
WP2332335

Telephone : +1 204 255 8720

~~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-Treate
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:		Date & Time	DEC 12/23 @ 10:00	Validated By (lab use only):	Date & Time:
				Sample Condition (lab use only)	
Received By: (lab use only)		Date & Time: (lab use only)	DEC 12 2023 2:30	Temperature 14.3	Samples Received in Good Condition? Y / N

Sample Intake						
Client:	RM Whitemouth					
Cheque Enclosed with CoC		Yes	No			
Priority/Emergency Required (circle one)		Yes	No			
Time Sensitive Hold Time (circle one)		Yes	No			
Matrix (circle one)		Water	Soil/solid	Air	Biota	Other
# of Bottles received:						
Green/White	2 x 500	Yellow/Black				
Purple/White	2 x 100	Light blue/White				
Warm red/White	3 x 125	Orange/Black				
Dark Green/White		Dark Blue/White				
Grey/black	2 x 100	Black/white				
Other:						
Additional Comments:						

Login Check	Check yes if you have verified the following: Yes	N/A
Received date/time	✓	
Project/PO/LSD	✓	
Quote/Office match CoC	✓	
Sample IDs/Description	✓	
Sample Date/time	✓	
Sales Items as per CoC	✓	
Express Due Dates		✓
Client due date matches ALS Due date	✓	
Client recipient emails	✓	
Guidelines/thresholds added		✓
Billing/payment recorded		✓
~~Field data entered~~		✓
Sub-contracting Forms Printed		✓
SUBCO/Chromatograph added to client contacts for required analysis		✓
Are sub-samples required?		✓
Has a SIF been submitted for this WO?		✓
Has the SIF been resolved?		✓