



Kale Black, Sr. Drinking Water Officer  
Office of Drinking Water, Manitoba Sustainable Development  
309 - 25 Tupper Street North  
Portage La Prairie, MB R1N 3K1

December 22, 2020

**RE: CORRECTIVE ACTION REPORT FOR WINNIPEG PUBLIC WATER SYSTEM, 252.00**

**Incident No:** CAR-23-2020-WTP

**Reported to ODW:** November 24, 2020, 17:54

**Reported by:** Mike Szmon, Water Treatment Systems Engineer

**Approved by:** Mike Szmon, Water Treatment Systems Engineer

**Incident Date:** November 24, 2020

**Incident Location:** Winnipeg 2-Treated (WTP)

**Incident Type:** Chemicals not certified safe for potable water use introduced to potable water supply, PWS-09-412-01 Clause 2.4

**Description of Incident and Corrective Actions:**

At approximately 14:45 on November 24, 2020, a day shift Water Treatment Operator working in the Bulk Chemical Building at the Water Treatment Plant (WTP) noticed discoloration and odour from the domestic hot water he was using to clean in the area. At the same time, the domestic hot water system was being used to flush the sodium hydroxide dosing lines to the injection point at the chlorine contact chamber in the treated water system, as part of a routine maintenance program. Upon noting the issue, the operator stopped the flushing of the sodium hydroxide lines and isolated the domestic water system. Maintenance staff were dispatched to investigate and determined that propylene glycol and corrosion inhibitors had leaked from a heat exchanger into the domestic hot water system. The heat exchanger was immediately isolated from the domestic hot water system and Laboratory staff were dispatched to test the City's water system for morpholine, a compound noted on the Safety Data Sheets for the corrosion inhibitors, and propylene glycol.

Flushing of the sodium hydroxide lines occurred over the 4-day period of November 20-24, 2020. During this time, an estimated 2,200 litres of propylene glycol and four litres corrosion inhibitor products entered approximately 755 million litres of water that were produced at the WTP. Because the propylene glycol and corrosion inhibitor additives were diluted in the water produced by the WTP, they posed a low risk to



the safety of the water supply. Propylene glycol and morpholine were not detected in any of the samples collected from the WTP, Pumping Stations, or from the distribution system.

On November 25, a follow-up inspection of the heat exchanger was conducted with the equipment supplier. The inspection revealed a hole in one of the failsafe double-walled plates in the heat exchanger, which was caused by a piece of metal slag from the welding process at the factory. The walls of the plates were fused together at the hole, which allowed the glycol and corrosion inhibitors to leak into the hot water system instead of spilling out, as designed. The heat exchanger plates had been replaced on November 20, 2020 as part of a preventative maintenance work order and the heat exchanger was pressure tested before being returned to service; no issues were found. At some point after returning the heat exchanger to service on November 20, the metal slag dislodged, opening the hole that caused the glycol to enter the domestic hot water system.

The heat exchanger plates have since been inspected, replaced, pressure tested and the heat exchanger returned to service. The domestic hot water system in the Bulk Chemical Building at the WTP has also been flushed to remove any residual propylene glycol.

**Test Results:** See attached

**Reference No:** Job No. 609

**EMERGENCY REPORTING IS REQUIRED WHERE A POTENTIAL HEALTH RISK IS INVOLVED. FOLLOW THE INSTRUCTIONS OF YOUR DRINKING WATER OFFICER IN SITUATIONS REQUIRING IMMEDIATE REPORTING**

N:\Environmental Standards\Analytical Services\Government Agencies\Office of Drinking Water\Corrective Action Reports



Report To :

**Mr. Michael Szmon**

Water Services Division  
57082 PR 207  
Springfield MB R0E 0K0

Report Date : November 27, 2020

Phone : 204-986-2108

Email : mszmon@winnipeg.ca

## Certificate of Analysis Job No. 609

Date Authorised : November 27, 2020

Total Number of Pages : 16

This report is issued under the authority of :

**Brock Bradford**

Analytical Services Branch Head

This report shall not be reproduced except in full without the written approval of the laboratory.

The results relate only to the sample(s) as received by the laboratory.

Additional information regarding the test methods used by Analytical Services Branch or contract laboratory is available upon request.

**Sample No. :** 351587  
**Sample Description :** WTP-Raw Water  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	4.1 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	8.09 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<1.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351588  
**Sample Description :** WTP-Clearwell-WT1  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	4.1 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.78 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351589  
**Sample Description :** WTP-DBPS Outlet, Branch 1  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	4.9 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.84 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351590  
**Sample Description :** WTP-DBPS Outlet, Branch 2  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	4.6 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.71 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351591  
**Sample Description :** MacLean Station Discharge  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	3.5 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.50 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS



**Sample No. :** 351592  
**Sample Description :** McPhillip's Station Discharge  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	4.1 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.45 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351593  
**Sample Description :** Hurst Station Discharge  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	3.0 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.48 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351594  
**Sample Description :** NE06\_Nairn Ave. & Stapleton St.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	5.5 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.39 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351595  
**Sample Description :** NW04\_Redwood Ave. & McGregor St.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	10.8 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.45 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351596  
**Sample Description :** SE02\_Elizabeth Rd. & Archibald St.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	13.0 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.50 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351597  
**Sample Description :** SW04\_Corydon Ave. & Renfrew St.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	6.2 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.34 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351598  
**Sample Description :** SW07\_Kenaston Blvd. & Scurfield Blvd.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	8.1 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.56 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351599  
**Sample Description :** WC12\_McDermot Ave. & Ellen St.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	8.0 ± 2%	deg_C		11/24/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.58 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS



**Sample No. :** 351600  
**Sample Description :** Aqued. Branch 1 at McPhillip's Stn.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	3.4 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.39 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Sample No. :** 351601  
**Sample Description :** Aqued. Branch 2 at Hurst Stn.  
**Sample Date :** November 24, 2020  
**Sample Received :** November 24, 2020  
**Sample Plan :** Ad hoc sample

Test Parameters	Result	Units	Comments	Completed	Lab
<b>Temperature by Thermometer</b>					
Temperature, sample	3.1 ± 2%	deg_C		11/25/2020	COW_ASB
<b>pH in Laboratory by Electrometric Method</b>					
pH in water	7.38 ± 0.07 units	units		11/25/2020	COW_ASB
<b>Morpholine in Water by LC/MS-MS</b>					
Morpholine	<10.0000	ug/L		11/27/2020	ALS
<b>Alcohols and Glycols in Water</b>					
Diethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Ethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Propylene Glycol in water	<5.00	mg/L		11/27/2020	ALS
Triethylene Glycol in water	<5.00	mg/L		11/27/2020	ALS

**Reference Information**

The Analytical Services Branch is accredited by CALA in accordance with ISO 17025 standards for specific tests.

**Accredited Test Methods Used :**

**Test Method**

pH in Laboratory by Electrometric Method

**Reference Method**

Modified from SM 4500 H+B (Electrometric Method)

**Additional Test Methods Used :**

**Test Method**

Temperature by Thermometer

**Reference Method**

Modified from SM 2550 B. Laboratory and Field Methods (Temperature)

**Laboratories :**

ALS : ALS Canada Ltd (ALS Environmental), 1329 Niakwa Road, Winnipeg, MB R2J 3T4

COW\_ASB : City of Winnipeg Main Laboratory at NEWPCC, 2230 Main Street, Winnipeg, MB R2V 4T8

**Additional Comments :**

- 1) A quality control report can be provided upon request. These reports may contain quality control results from other samples not included in this test report.
- 2) Analytical Services Branch test methods may incorporate modifications from specified reference methods to improve performance.
- 3) For subcontracted testing, the certificate of analysis can be provided upon request.
- 4) Opinions and/or interpretations expressed in this report are outside the scope of this laboratory's accreditation.

----- **END OF REPORT** -----