

January, 2022 Update
Subject: PFOA and PFOS Investigation

The Marinette Water Utility has committed to continued sampling, once per quarter, of the public drinking water treatment system to gather more data involving the location and quantity of PFAS compounds throughout the drinking water treatment system. The locations of sampling are the Bay of Green Bay water to be treated, raw drinking water after powder activated carbon addition, and finished drinking water being distributed to the public. Samples from the public drinking water system have been taken on November 20, 2017, December 4, 2018, January 3, 2019, April 15, 2019, July 1, 2019, October 8, 2019, February 12, 2020, May 13, 2020, September 30, 2020, December 30, 2020, March 30, 2021, June 17, 2021, September 30, 2021, and December 9, 2021 by Marinette Water and Wastewater Utility staff. Results are listed in the table below for the November 20, 2017, December 4, 2018, January 3, 2019, April 15, 2019, July 1, 2019, October 8, 2019, February 12, 2020, May 13, 2020, September 30, 2020, December 30, 2020, March 30, 2021, June 17, 2021, September 30, 2021, and December 9, 2021 samples.

In 2016 the EPA announced the release of health advisory levels for the PFAS compounds PFOA and PFOS in **DRINKING WATER**. The health advisory level set forth by the EPA identified the concentration of PFOA and PFOS in drinking water at or below which adverse health effects are not anticipated to occur over a lifetime of exposure. The Health advisory level is 70 parts per trillion for PFOA and PFOS. Health advisory levels are non-regulatory and reflect the EPA's assessment of the best available peer reviewed science.

Through conversations with the Wisconsin DNR and the City of Marinette Water and Wastewater staff, it has been decided to include ALL detected PFAS compounds in the drinking water being distributed to the public. Results in the table below have been updated to show all PFAS compounds detected in the drinking water samples collected and analyzed.

Drinking Water Analysis:
(Bolded results indicate water distributed for human consumption)

Sample Location	Sample Date	PFOA (ppt) LOD=1.2 LOQ=3.9	PFOS (ppt) LOD=1.7 LOQ=5.3	PFHxA (ppt) LOD=1.3 LOQ=4.0	PFHpA (ppt) LOD=0.80 LOQ=2.6
Raw Drinking Water at Drinking Water Plant	11-20-2017	[2.11]	[1.87]	[2.04]	[1.04]
Finished Water at Drinking Water Plant	11-20-2017	[1.79]	Non Detectable	[2.34]	[1.03]
High School	11-20-2017	[1.81]	Non-Detectable	[3.13]	[1.05]
Hydrant Next to New REC Center	11-20-2017	[1.75]	Non Detectable	4.11	[1.07]
Raw Drinking Water from the Bay of Green Bay	12-4-2018	[3.54]	5.94	[1.8]	[1.09]
Raw Drinking Water After Carbon Addition	12-4-2018	[2.69]	[3.14]	[1.78]	[1.01]
Finished Drinking Water	12-4-2018	[2.08]	[1.95]	[1.66]	[1.14]

at Drinking Water Plant					
Raw Drinking Water from the Bay of Green Bay	1-3-2019	[1.87]	Non-Detectable	[1.61]	[0.89]
Raw Drinking Water After Carbon Addition	1-3-2019	[2.06]	[1.95]	[1.67]	[0.82]
Finished Drinking Water at Drinking Water Plant	1-3-2019	[2.10]	Non-Detectable	Non-Detectable	[0.86]
Raw Drinking Water from the Bay of Green Bay	4-15-2019	[1.93]	[1.96]	[1.36]	[0.99]
Raw Drinking Water After Carbon Addition	4-15-2019	[1.3]	[2.03]	[1.34]	[1.01]
Finished Drinking Water at Drinking Water Plant	4-15-2019	[1.68]	Non-Detectable	Non-Detectable	[0.86]
Raw Drinking Water from the Bay of Green Bay	7-1-2019	[1.77]	[2.06]	[1.64]	[0.93]
Raw Drinking Water After Carbon Addition	7-1-2019	[1.48]	[1.72]	[1.81]	[0.97]
Finished Drinking Water at Drinking Water Plant	7-1-2019	[1.73]	Non-Detectable	[1.98]	[1.12]

Sample Location	Sample Date	PFOA (ppt) LOD=1.6 LOQ=5.3	PFOS (ppt) LOD=2.7 LOQ=9.1	PFHxA (ppt) LOD=1.3 LOQ=4.3	PFHpA (ppt) LOD=0.57 LOQ=1.9
Raw Drinking Water from the Bay of Green Bay	10-8-2019	[2.44]	Non-Detectable	[1.87]	[1.02]
Raw Drinking Water After Carbon Addition	10-8-2019	[1.94]	Non-Detectable	[1.48]	[0.96]
Finished Drinking Water at Drinking Water Plant	10-8-2019	[1.93]	Non-Detectable	[1.56]	[1.19]

LOD= Limit of Detection: As low as the instrument can detect.

LOQ= Limit of Quantitation: As low as the instrument can detect with 100% certainty.

ppt = parts per trillion or nanograms per liter (ng/L)

Non-Detectable = Substance was not found above laboratory limit of detection

[] = Substance was found between laboratory limit of detection and limit of quantification

Note: Not included in this report are the results for 8 other PFAS compounds that we had analyzed that have not been detected in ANY drinking water sample taken. These results for the 8 other compounds

were included in the test method run at the contracted laboratory in conjunction with the PFOA and PFOS and can be obtained upon request.

Sample Location	Sample Date	PFOA (ppt) LOD=0.66 LOQ=2.2	PFOS (ppt) LOD=0.28 LOQ=0.87	PFHxA (ppt) LOD=0.54 LOQ=1.8	PFHpA (ppt) LOD=0.27 LOQ=0.89	PFNA (ppt) LOD=0.37 LOQ=1.2	PFHxS (ppt) LOD=0.28 LOQ=0.93
Raw Drinking Water from the Bay of Green Bay	2-12-2020	[1.75]	1.52	[1.25]	1.03	[0.38]	[0.626]
Raw Drinking Water After Carbon Addition	2-12-2020	[1.67]	1.57	[1.27]	[0.864]	Non-Detectable	[0.49]
Finished Drinking Water at Drinking Water Plant	2-12-2020	[1.51]	[0.862]	[1.34]	[0.849]	Non-Detectable	[0.516]

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As shown by the table above, some compounds previously not-detected are now detected and quantified in this table due to lower LOD and LOQ values. This happens due to test method development and refinement at the contracted laboratory and is normal for emerging contaminants.

Sample Location	Sample Date	PFOA (ppt) LOD=0.31 LOQ=1.0	PFOS (ppt) LOD=0.45 LOQ=1.5	PFHxA (ppt) LOD=0.41 LOQ=1.4	PFHpA (ppt) LOD=0.34 LOQ=1.1	PFNA (ppt) LOD=0.45 LOQ=1.5	PFHxS (ppt) LOD=0.53 LOQ=1.8
Raw Drinking Water from the Bay of Green Bay	5-13-2020	1.97	1.84	1.63	1.17	Non-Detectable	[0.68]
Raw Drinking Water After Carbon Addition	5-13-2020	1.90	1.79	1.71	1.15	Non-Detectable	[0.59]
Finished Drinking	5-13-2020	1.57	[1.26]	[1.22]	[0.94]	Non-Detectable	[0.60]

Water at Drinking Water Plant							
Raw Drinking Water from the Bay of Green Bay	9-30-2020	1.88	1.94	[1.34]	1.29	Non-Detectable	[0.69]
Raw Drinking Water After Carbon Addition	9-30-2020	2.14	1.86	[1.24]	1.25	Non-Detectable	[0.72]
Finished Drinking Water at Drinking Water Plant	9-30-2020	1.86	[0.77]	[1.21]	1.10	Non-Detectable	[0.70]

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Raw Drinking Water from the Bay of Green Bay	12-30-2020	[1.55]	1.37	[1.33]	[0.84]	Non-Detectable	[0.48]
Raw Drinking Water After Carbon Addition	12-30-2020	[1.52]	1.24	[1.42]	[0.88]	Non-Detectable	[0.47]
Finished Drinking Water at Drinking	12-30-2020	[1.42]	[0.78]	1.89	1.05	Non-Detectable	[0.46]

Water Plant							
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Sample Location	Sample Date	PFOA (ppt) LOD=0.66 LOQ=2.2	PFOS (ppt) LOD=0.70 LOQ=2.30	PFHxA (ppt) LOD=1.10 LOQ=3.60	PFHpA (ppt) LOD=0.74 LOQ=2.50	PFNA (ppt) LOD=0.87 LOQ=2.90	PFHxS (ppt) LOD=0.82 LOQ=2.70
Raw Drinking Water from the Bay of Green Bay	3-30-2021	[1.16]	[1.11]	Non-Detectable	[0.83]	Non-Detectable	Non-Detectable
Raw Drinking Water After Carbon Addition	3-30-2021	[1.07]	[1.02]	Non-Detectable	Non-Detectable	Non-Detectable	Non-Detectable
Finished Drinking Water at Drinking Water Plant	3-30-2021	[1.32]	[0.85]	Non-Detectable	[0.74]	Non-Detectable	Non-Detectable
Raw Drinking Water from the Bay of Green Bay	6-17-2021	[1.92]	[1.89]	Non-Detectable	[1.18]	Non-Detectable	[0.89]
Raw Drinking Water After Carbon Addition	6-17-2021	[2.00]	[1.76]	[1.41]	[1.08]	Non-Detectable	[0.87]
Finished Drinking Water at Drinking	6-17-2021	[1.96]	[1.32]	[1.25]	[1.27]	Non-Detectable	[0.91]

Water Plant							
Raw Drinking Water from the Bay of Green Bay	9-30-2021	[2.16]	[2.05]	[1.69]	[1.08]	Non-Detectable	Non-Detectable
Raw Drinking Water After Carbon Addition	9-30-2021	[2.04]	[1.94]	[1.85]	[1.17]	Non-Detectable	Non-Detectable
Finished Drinking Water at Drinking Water Plant	9-30-2021	[1.83]	[1.20]	[1.47]	[1.06]	Non-Detectable	Non-Detectable
Raw Drinking Water from the Bay of Green Bay	12-9-2021	[1.75]	[1.91]	[1.18]	[0.88]	Non-Detectable	Non-Detectable
Raw Drinking Water After Carbon Addition	12-9-2021	[1.73]	[1.91]	[1.17]	[0.92]	Non-Detectable	Non-Detectable
Finished Drinking Water at Drinking Water Plant	12-9-2021	[1.77]	[1.01]	[1.20]	[0.90]	Non-Detectable	Non-Detectable

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Wastewater Analysis:

Wastewater samples were taken in December of 2021 as part of an ongoing investigation of PFOA and PFOS compounds present in the Marinette Wastewater Collection and Treatment System. Sample results are detailed in the table below.

Through open dialogue with Industrial Users throughout the City of Marinette, Wastewater Utility Staff has been participating in ongoing PFAS source reduction through education and investigation from 2018 to present.

Treatment Plant Influent and Effluent Sampling

Sample Location	Sample Date	PFOA (ppt)	PFOS (ppt)
Wastewater Influent	11-20-2017	34.3	9.28
Wastewater Effluent	11-20-2017	38.2	42.8
Wastewater Influent	5-14-2018	43.5	25.4
Wastewater Effluent	5-14-2018	50.3	13.3
Wastewater Influent	10-30-2019	28	[3.8]
Wastewater Effluent	10-30-2019	37	5.4
Wastewater Influent	6-18-2020	28	8.4
Wastewater Effluent	6-18-2020	38	9.3
Wastewater Influent	12-15-2021	12	7.1
Wastewater Effluent	12-15-2021	15	4.7

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For more information regarding PFAS in the environment please visit <https://www.epa.gov/pfas>.