Consumer Confidence Report 2018

City of Great Falls, Public Drinking Water Supply

P. O. Box 5021, Great Falls, MT 59403 Phone (406) 727-1325

This report was prepared by the City of Great Falls Water Utility. Its purpose is to inform the public about the quality of our municipal drinking water. Please take a few minutes to review this document and feel free to call us with any questions.

The source of our water

The drinking water used by the residents of Great Falls, Malmstrom Air Force Base (MAFB), and Black Eagle comes from the Missouri River and is treated at our water treatment facility to make it safe to drink. The treatment facility is located just up gradient from the Missouri's confluence with the Sun River.

Water treatment and purification

Great Falls utilizes a conventional water treatment process, producing just over 4 billion gallons of drinking water in 2018. Our treatment process is monitored continuously, both electronically and by analyzing grab samples of treated water. Our personnel stay informed of new Federal and State drinking water regulations so that treatment and/or monitoring changes can be implemented in a timely and cost-effective manner.

Our treatment facility received violations for exceeding the Maximum Contaminant Level (MCL) for five regulated haloacetic acids (HAA5s) from April 1 through December 31, 2018. A summary of these results are located in Table 1 and are discussed in detail in the summary section of this report. The City is committed to the goal of providing its citizens with safe and dependable drinking water and continue to work with the Montana Department of Environmental Quality (MDEQ) on solutions to decrease these levels and bring our facility into full compliance standing.

What contaminants are present in our source water?

Rainwater flows across the surface of the land and/or percolates through the soil. Naturally occurring minerals dissolve and some of those, along with waste substances from other sources, are picked up and carried in the water. This water either becomes groundwater or makes its way to a stream, river, pond, lake, or reservoir.

Contaminants that may need removing from source water before it can be considered safe to drink include:

- **Microbial contaminants including viruses, bacteria, and protozoa**. These can originate from sewage treatment plants, leaky septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants such as salts and metals**. These can be naturally occurring or the result of urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and/or farming.
- **Pesticides and herbicides**. These may come from a variety of sources including agriculture, urban storm water runoff, and/or residential uses.
- **Organic chemical contaminants including synthetic and volatile organic chemicals**. These are by-products of industrial processes and petroleum production. They can also come from gas stations, urban storm water runoff, and/or septic systems.
- **Radioactive contaminants**. These can be naturally occurring, the result of oil and gas production, and/or the result mining activities.

The MDEQ completed the Great Falls source water delineation and assessment report. It defines a source water protection area for Great Falls (an area of surface water and land that contributes water to the Great Falls Public Water Supply). Additionally, it outlines potential contamination sources and addresses their potential for contributing contamination to our drinking water.

Do I need to take special precautions?

The Environmental Protection Agency (EPA) establishes regulations by setting allowable limits for contaminants in drinking water delivered by public water systems. The Food and Drug Administration (FDA) regulates contaminants in bottled water, affording equivalent protection to public health. Any drinking water may be reasonably expected to contain allowable amounts of some contaminants. It is important to remember that the presence of these contaminants does not necessarily mean the water will pose a specific health risk. Detailed information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791) or our local City-County Health Department (454-6950).

Some individuals may be more sensitive to certain contaminants than the general population. For example, immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, persons having HIV/AIDS (or other immune system disorders), some elderly, and infants may exhibit a higher risk of infection brought on by specific microbiological contaminants. These people should seek advice about their drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are also available from the Safe Drinking Water Hotline (1-800-426-4791).

How can I become involved?

You can learn more about your local water utility by attending any of the regularly scheduled City Commission meetings on the first and third Tuesdays of every month at 7:00 p.m. in the Commission Chambers at the Great Falls Civic Center. You may also arrange a tour of the local water treatment plant by calling 727-1325. Regulatory updates and other interesting information can be found by visiting the American Water Works Association web site at http://www.awwa.org.

Questions & Answers

Q: How often is our drinking water tested?

A: The type and frequency of testing required is based on the water's source and the number of people served. Great Falls is classified as a medium-sized (between 50,000 and 100,000 served) surface water (Missouri River) community public water supply. As such, Great Falls is required to continually monitor the levels of some drinking water constituents (e.g. disinfectant residual). Other constituents, such as radionuclides, are required to be tested only once every several years. The data presented in the tables contained in this report are the results from the most recent testing completed in accordance with the applicable regulations.

Q: Why does the water coming out of my tap have a milky appearance sometimes but then clears up?

A: The water coming into your home may contain air held in solution by the pressure of the water system. As the water leaves the tap, the pressure rapidly decreases causing millions of tiny air bubbles to be suspended in the water, thereby producing the milky appearance. The water then clears from the bottom of the container to the top portion, as the air bubbles rise and return to the atmosphere.

Q: **How hard is Great Falls water?**

A: Great Falls water is classified as moderately hard, ranging from 127 to 167 milligrams per liter as calcium carbonate or 7.4 to 9.8 grains per gallon. Some households install water softeners as a matter of personal preference but softening is generally not necessary.

Some Facts about Water

Of the 326 million cubic miles of water on earth, approximately 97% is seawater, 2% is frozen, and 1% is suitable for drinking water. This amounts to each person on our planet having enough fresh water to fill a cube 130 feet on a side; however, the water is not evenly distributed and is in constant demand. One gallon of water weighs about 8⅓ pounds. Average total water use (both indoor and outdoor) for a typical single-family home is about 100 gallons per person per day. You can fill an 8-ounce glass with drinking water 15,000 times for the same cost as a six-pack of soda. You can survive about a month without food, but only 5 to 7 days without water.

Water Analysis Data

Data tables on the following pages contain terms and abbreviations with which you may be unfamiliar. In order to help you better understand this data we offer the following definitions and explanations:

parts per million (ppm) or milligrams per Liter (mg/L) - one part per million is approximately equivalent to one minute in two years or equal to one penny in $10,000.

parts per billion (ppb) or micrograms per Liter (μg/L) - one part per billion is approximately equivalent to one minute in 2,000 years or equal to one penny in $10,000,000.

picocuries per Liter (pCi/L) - a measure of radioactivity per volume of water.

millirems per year (mrem/yr) - a measure of radiation exposure. In the United States, the average person is exposed to an effective dose equivalent of approximately 360 mrem (whole body exposure) per year from all sources.

Nephelometric Turbidity Unit (NTU) - a measure of the clarity of water. Water having turbidity in excess of 5 NTU would appear noticeably cloudy to the average person.

Maximum Contaminant Level Goal - the "Goal" (MCLG) is the level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Contaminant Level - the "Maximum Allowed" (MCL) is the highest allowable level of a contaminant in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Residual Disinfection Level Goal or MRDLG - the level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Maximum Residual Disinfection Level or MRDL - the highest level of a disinfectant allowed in drinking water. There is convincing evidence that the addition of a disinfectant is necessary for control of microbial contaminants.

Action Level (AL) - the concentration of a contaminant which, if exceeded, triggers additional treatment(s) or other requirements which a water system must follow.

Treatment Technique (TT) - a required process intended to reduce the level of a contaminant in drinking water.

Variances and Exemptions – State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

The City of Great Falls routinely monitors for contaminants in drinking water according to Federal and State laws. The two (2) data summary tables included in this report, document the test results from monitoring during the period of January 1 through December 31, 2018. The State of Montana requires monitoring for some contaminants less than once per year because the concentrations of these contaminants do not change frequently; therefore, some of the following data parameters, though representative, are more than one year old. The tables are presented as follows:

Table I. **Regulated Contaminants – Detected**
Table II. **Unregulated Contaminants – Detected**

Additional report copies are available free of charge from the Great Falls Water Treatment Plant. An electronic copy can be located at https://greatfallsmt.net/ccr2018.

If you have any questions about this report or your water utility, please contact Wayne Lovelis (Plant Manager) or Nate Shumate (Water Quality Specialist) at (406) 727-1325.

Table I. Regulated Contaminants – Detected

Contaminant	Likely Source	MCL	MCLG	Date Sampled	Level Detected	Violation Yes or No
Arsenic	Erosion of natural deposits; runoff from orchards; and glass/electronics production wastes.	0.01 ppm	0 ppm	1/24/18	0.004 ppm	No
Fluoride	Erosion of natural deposits; discharge from fertilizer and aluminum factories.	4 ppm	4 ppm	1/24/18	0.9 ppm	No
Nitrate plus Nitrite as Nitrogen	Runoff from fertilizer use; leaching from septic tanks; sewage; and erosion of natural deposits.	10 ppm	10 ppm	1/24/18	0.18 ppm	No
Lead *Note: In samples collected on 1/24/18, no lead was detected in the treated water as it left the water treatment plant.*	Corrosion of household plumbing systems and erosion of natural deposits.	AL = 15 ppb 90th percentile level must be less than 15 ppb	0 ppb	6/16 to 9/16	5 ppb@ 90th percentile (see below)	No
Copper *Note: In samples collected on 1/24/18, no copper was detected in the treated water as it left the water treatment plant.*	Corrosion of household plumbing systems; erosion of natural deposits; and, leaching from wood preservatives.	AL = 1.3 ppm 90th percentile level must be less than 1.3 ppm	1.3 ppm	6/16 to 9/16	0.625 ppm @ 90th percentile one site exceeded 1.3 ppm	No

DISINFECTANTS

Contaminant	Likely Source	MRDL	MRDLG	Sampled	Level Detected	Violation Yes or No
Chlorine	water additive used to control microbes	4 ppm	4 ppm	continuously	0.01 to 2.20 ppm	No
Chloramines†	water additive used to control microbes	4 ppm	4 ppm	continuously	0.01 to 2.20 ppm	No

† The primary disinfectant used in Great Falls is free chlorine. Through the addition of ammonia, monochloramines are formed just before the water exits the treatment plant. Monochloramines do not dissipate as readily as free chlorine and thus helps maintain acceptable residual disinfection levels at the far reaches of the distribution system.

Contaminant	Likely Source of Contamination	MCL	MCLG	Date Sampled	Level Detected	Violation Yes or No
Turbidity Turbidity is a measure of the cloudiness of the water. It is monitored because it is a good indicator of the effectiveness of the water filtration system.	Soil runoff	TT = 1 NTU maximum; TT < 0.15 NTU 95% of the time	0	Throughout the year every 4 hours manually; every 15 minutes electronically	0.200 NTU on 10/1/18 <0.15 NTU 99% of time	No No

RADIONUCLIDES

Beta/Photon Emitters	decay of natural and man-made deposits	4 mrem/yr	0 mrem/yr	2/23/99	2.7 (± 2.7) pCi/l gross beta	No
Gross Alpha	erosion of natural deposits	15 pCi/L	0 pCi/L	7/1/14	4.1	No
Radium 226 + Radium 228	erosion of natural deposits	5 pCi/L	0 pCi/L	7/1/14	0.5	No
Uranium	erosion of natural deposits	0.03 ppm	0 ppm	7/1/14	0.001	No

SYNTHETIC ORGANIC CONTAMINANTS (SOCs - Including Pesticides and Herbicides)

Contaminant	Likely Source of Contamination	MCL	MCLG	Date Sampled	Level Detected	Violation Yes or No
Hexachlorocyclopentadiene	discharge from chemical factories	50 ppb	50 ppb	9/25/18	0.10 ppb	No

LEAD AND COPPER RULE SAMPLING SUMMARY (triennial samples)

Note:
Each sample collected for lead analysis was also analyzed for copper. In this report the sites are separately numbered 1-32 based on ascending levels of lead or copper; that is, the site having the highest level of lead did not necessarily display the highest level of copper.

Site Ranking	Copper results in ascending order in ppm	Lead results in ascending order in ppb
1	0.013	0
2	0.026	0
3	0.027	0
4	0.035	0
5	0.041	0
6	0.052	0
7	0.053	0
8	0.057	0
9	0.062	0
10	0.072	0
11	0.087	0
12	0.089	0
13	0.097	0
14	0.101	0
15	0.106	1
16	0.147	1
17	0.157	1
18	0.158	1
19	0.195	1
20	0.198	1
21	0.209	1
22	0.232	1
23	0.262	2
24	0.284	2
25	0.295	3
26	0.314	3
27	0.523	3
28	0.613	5
29	0.636	5
30	0.740	6
31	1.020	8
32	1.740	8
90th Percentile	**0.625 ppm**	**5 ppb**

Table I. Regulated Contaminants – Detected (continued)

The 1994 Federal Lead & Copper Rule mandates a household testing program for these substances. Under the provisions of the Lead & Copper Rule, high-risk sites include, but are not limited to single-family residences served by a lead service line, having interior lead piping or having lead-soldered copper pipe installed after 1982, but prior to Montana's ban on lead solder (December 31, 1987). According to the Rule, 90% of the samples from high-risk homes must have lead levels less than 15 ppb and copper levels less than 1.3 ppm. Samples were collected from water that had remained within the building's interior plumbing for a period of at least six hours. Lead and copper levels below the MCL indicate water that was not corrosive to lead or copper plumbing.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and residential plumbing. The City of Great Falls is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead

Table I. Regulated Contaminants – Detected (Continued)

Disinfection By-Products (DBPs)

Contaminant	Likely Source of Contamination	MCL	Date Sampled	Level Detected	Violation
TTHMs (total trihalomethanes)	by-product of drinking water disinfection	80 ppb loc. avg.‡	quarterly	see table below	No
HAA5s (five haloacetic acids)	by-product of drinking water disinfection	60 ppb loc. avg.‡	quarterly	see table below	Yes

TTHM Summary	**Site #1**	**Site #2**	**Site #3**	**Site #4**	**Site #5**	**Site #6**	**Site #7**	**Site #8**
1st Quarter 2018	49 ppb	50 ppb	50 ppb	52 ppb	43 ppb	43 ppb	54 ppb	54 ppb
2nd Quarter 2018	53 ppb	67 ppb	66 ppb	63 ppb	58 ppb	54 ppb	68 ppb	68 ppb
3rd Quarter 2018	83 ppb	99 ppb	81 ppb	89 ppb	104 ppb	79 ppb	97 ppb	91 ppb
4th Quarter 2018	54 ppb	49 ppb	0.37 ppb	60 ppb	46 ppb	45 ppb	54 ppb	60 ppb
‡locational average	59.8 ppb	66.3 ppb	49.3 ppb	66.0 ppb	62.8 ppb	55.3 ppb	68.3 ppb	68.3 ppb

highest locational average for 2018 = 68.3 ppb **locational average range = 49.3 to 68.3 ppb**

Some people who drink water containing trihalomethanes in excess of the MCL *over many years* (emphasis given), may experience problems with their liver, kidneys, and/or central nervous systems. Some may also may have an increased risk of getting cancer.

HAA5 Summary	**Site #1**	**Site #2**	**Site #3**	**Site #4**	**Site #5**	**Site #6**	**Site #7**	**Site #8**
1st Quarter 2018	55 ppb	54 ppb	49 ppb	52 ppb	48 ppb	49 ppb	53 ppb	47 ppb
2nd Quarter 2018	73 ppb	85 ppb	61 ppb	67 ppb	74 ppb	67 ppb	81 ppb	77 ppb
3rd Quarter 2018	93 ppb	85 ppb	90 ppb	88 ppb	95 ppb	93 ppb	109 ppb	105 ppb
4th Quarter 2018	69 ppb	58 ppb	17 ppb	37 ppb	61 ppb	60 ppb	56 ppb	42 ppb
‡locational average	72.5 ppb	70.5 ppb	54.3 ppb	61.0 ppb	69.5 ppb	67.3 ppb	74.8 ppb	67.8 ppb

highest locational average for 2018 = 74.8 ppb **locational average range = 54.3 to 74.8 ppb**

Some people who drink water containing haloacetic acids in excess of the MCL *over many years* (emphasis given), may have an increased risk of getting cancer.

Total Organic Carbon (TOC)

TOC provides a medium for the formation of DBPs, including both TTHMs and HAA5s. Reducing TOCs in our treatment process is important in reducing the formation potential of those by-products, both regulated and unregulated.

Date Sampled	River Water TOC	Treated Water TOC	% Removal Required (A)	% Removal Achieved (B)	Compliance Ratio (B/A)*
1/3/18	3.1 mg/L	2.2 mg/L	15.0	29.0	1.94
2/5/18	2.9 mg/L	2.3 mg/L	15.0	20.7	1.38
3/5/18	2.6 mg/L	2.1 mg/L	15.0	19.2	1.28
4/3/18	2.8 mg/L	2.3 mg/L	15.0	17.9	1.19
5/15/18	3.0 mg/L	2.1 mg/L	15.0	30.0	2.00
6/4/18	3.7 mg/L	2.5 mg/L	15.0	32.4	2.16
7/5/18	4.7 mg/L	3.1 mg/L	35.0	34.0	0.97
8/7/18	3.9 mg/L	2.8 mg/L	25.0	28.2	1.13
9/5/18	3.8 mg/L	2.9 mg/L	25.0	23.7	0.95
10/11/18	3.9 mg/L	3.0 mg/L	15.0	23.1	1.54
11/5/18	3.6 mg/L	2.7 mg/L	15.0	25.0	1.67
12/6/18	3.1 mg/L	2.4 mg/L	15.0	22.6	1.51

*Compliance is based in part upon the yearly average compliance ratio being equal to or > 1.0. In 2018, the average compliance ratio was 1.48.

Table II. Unregulated Contaminants – Detected				
Unregulated contaminant monitoring helps EPA to determine where certain contaminants occur and whether or not they need to be re-classified as regulated contaminants.				
Inorganic Contaminant		**Date Sampled**	**Level Detected (All results in mg/L)**	
Bicarbonate as HCO3		1/24/18	148	
Calcium		1/24/18	35	
Chloride		1/24/18	14	
Magnesium		1/24/18	10	
Potassium		1/24/18	3.0	
Silica		1/24/18	20.2	
Silicon		1/24/18	9.5	
Sodium		1/24/18	18	
Strontium		1/24/18	0.21	
Sulfate		1/24/18	29	
Radionuclides	**Date Sampled**	**Level Detected**	**Unit of Measurement**	**Significance**
Radon-222 *	1/09/95	47 (± 37)	pCi/l	see comments below
*About radon: There is currently no federal regulation for radon in drinking water. Radon is a radioactive gas that you can't see, taste or smell. It is found all over the U.S. Radon can move up through the ground and into a home through cracks and holes in the foundation. Radon can build up to high levels in all types of homes. Radon can also get into indoor air when released from tap water from showering, washing dishes, and other household activities. Compared to radon entering the home through soil, radon entering the home through tap water will in most cases be a small source of radon in indoor air. Radon is a known human carcinogen. Breathing air containing radon can lead to lung cancer. Drinking water that contains radon may also cause increased risk of stomach cancer. If you are concerned about radon in your home, test the air in your home. Testing is inexpensive and easy. Fix your home if the level of radon in your air is 4 picocuries per liter of air (4pCi/l) or higher. There are simple ways to fix a radon problem that aren't too costly. For additional information, call your state radon program or call EPA's Radon Hotline (1-800-SOS-RADON).				

Important information on source water monitoring

During 2007, Great Falls collected monthly water samples directly from the Missouri River intake and had them analyzed for *Cryptosporidium*, a microbial pathogen found in surface water throughout the United States. Although the filtration portion of our water treatment process removes *Cryptosporidium,* it cannot guarantee 100% removal. Results from this monitoring indicated the presence of these organisms in our source water during the months of February, April, July, September, October and December.

A second round of monitoring our source water for *Cryptosporidium* and *Giardia* commenced in October of 2015 and ran throughout September of 2017. Laboratory results indicated that of the 24 months sampled, *Cryptosporidium* was only present in our source water in October 2015 and September and October of 2016. *Cryptosporidium* was not detected in any source water samples submitted for analysis in 2017.

Current test methods do not allow us to determine whether the detected organisms are dead or if they are capable of causing disease. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals consult their doctor regarding appropriate precautions to consider to avoid infection. *Cryptosporidium* must be ingested to cause disease and it may be spread through means other than drinking water.

The Long Term 2 (LT2) Enhanced Surface Water Treatment Rule requires an additional 1 log removal of *Cryptosporidium* from the source water. The City of Great Falls is currently in the process of making capital improvements by installing an Ultra Violet (UV) treatment system in order to consistently achieve this removal. In the meantime, we have consistently met the additional 1 log removal requirement through filtration and the City of Great Falls will strive to continue to meet the requirements of LT2.

It is important to note that the Total Organic Carbon (TOC) in our source water(s) was highly elevated during the third quarter of 2018, as can be seen on the TOC summary included as Table 1 of this report. This influx was likely due to contributing watersheds carrying TOCs and/or Natural Organic Matter (NOM) from the previous year's expansive fires, via a combination of precipitation and snowmelt/runoff events.

Important information on finished water monitoring

During 2018, Great Falls collected 70 routine distribution system samples per month. Each sample was tested for residual chlorine concentration; pH; turbidity; and, for the microbial contaminants of Total Coliform (TC) bacteria and Escherichia coli (E. coli). Every sample yielded results within acceptable limits and no sample resulted with any indication of any microbial contaminants.

Analysis of Great Falls drinking water resulted in violations for the exceedance of the established MCL for HAA5s in 2018 (Q2 through Q4). It is important to understand that MCLs are set very stringently. To put this into perspective, for a given regulated contaminant a person would have to drink 2 liters of water every day at the MCL for a lifetime for there to be a one-in-a-million chance of having a corresponding adverse health effect (i.e. cancer). Citizens of Great Falls were kept informed through news broadcasts, local radio talk shows, and by mailed or publicly posted notifications.

We observed the highest levels of HAA5s during the third quarter of 2018. This was likely due to very elevated levels of TOC/NOM present in our source water(s) at that time, which react with chlorine to form such contaminants.

We observed a significant reduction in HAA5s during the fourth quarter of 2018 when compared to third quarter results, likely due to the decrease in incoming TOC/NOM in our source water(s).

Summary

The City is committed to the goal of providing its citizens with safe and dependable drinking water and continue to work with the MDEQ on solutions to decrease HAA5 contaminant levels. Our new UV system is on schedule to be online in February 2019; and, will include a chlorine feeder, Liquid Ammonia Sulfate (LAS) feeder and UV reactors. The LAS system will enable us to control our chloramination process with more precision. This should ultimately limit the amount of chlorine available to react with source water(s) TOC/NOM, thus decreasing the initial formation potential of HAA5s.

Again, if you have any questions about this report or your water utility, please contact Wayne Lovelis (Plant Manager) or Nate Shumate (Water Quality Specialist) at (406) 727-1325.