JUNE 2021

MICHIGAN STATE UNIVERSITY

WATER QUALITY ANNUAL REPORT

INFRASTRUCTURE PLANNING & FACILITIES

ipf.msu.edu

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We are pleased to report that Michigan State University's (MSU) drinking water meets or surpasses all federal and state regulatory requirements. We have a highly qualified staff of water utility professionals who understand the importance of the water quality for our community.

OUR COMMITMENT TO SAFE WATER

MSU is committed to providing our campus community with safe and reliable water.

To ensure that tap water is safe to drink, US EPA regulations limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) establishes limits for contaminants in bottled water, which provide the same protection for public health.

US EPA and MI EGLE require MSU to test our water on a regular basis to ensure its safety. MSU meets all monitoring and reporting requirements for both state and federal regulations.

In the wake of the water crisis experienced in Flint, it is understandable that the MSU community is concerned about its water quality. Infrastructure Planning and Facilities has a highly qualified staff of water utility professionals who understand the importance of the water quality for our community. We are dedicated to providing the highest quality drinking water and continue to meet or exceed all state and federal regulatory requirements.

There is no detectable lead in MSU drinking water when it enters the distribution system. Water supplied to MSU comes from a consistent source of groundwater, drawn from wells located deep within the Saginaw sandstone aquifer. If small amounts of lead are present in existing plumbing materials and water is allowed to set for several hours, lead may enter into drinking water since it is naturally corrosive.

To prevent this, MSU employs a comprehensive corrosion protection regimen, consisting of the use of phosphate additives. MSU has been testing for lead and other contaminants since 1992. Point of use water test results consistently show lead levels below the action level of 15 parts per billion (ppb).

Testing for PFAS and PCFs

We regularly test source water for PFAS (per- and poly-fluoroalkyl substances, also known as PFCs).

There is *no detectable* PFAS in MSU source water.

While campus water is safe to drink and tested regularly, naturally occurring minerals in the groundwater that supplies MSU's water system sometimes result in complaints about its aesthetic qualities.

WATER TREATMENT PLANT

To address those concerns, Michigan State University began construction in 2018 on a $21 million water treatment plant and water tower that removes iron and other minerals from campus water to improve its taste and appearance.

Construction of the treatment plant and 2-million-gallon water tower was completed in 2019 and the plant and tower were placed into service in August 2020.

Due to the size of MSU's water distribution system—74 miles of water mains—it may be one to two years before the full effect of the treatment plant on water quality is apparent to campus customers. To help speed up the process of removing the rust sediment that causes complaints, IPF crews have performed additional system flushes.

The new water tower eliminates the need for four high-service water distribution pumps and enhances reliability by providing gravity-produced pressurized water. The treated water will also reduce sediment accumulation in the campus water distribution system and building water softeners.

Sources of drinking water

MSU's water system uses 16 groundwater wells, each with pumping capacities ranging from 400 to 850 gallons per minute. Source water is closely monitored to ensure a high level of quality.

WHERE DOES MSU WATER COME FROM?

The water source for most of Michigan State University's East Lansing campus is groundwater drawn from the Saginaw aquifer. These underground water-bearing formations are continually replenished with water through the normal hydrologic cycle.

In Michigan and the Great Lakes Basin, we are fortunate to have an abundant supply of fresh water as compared with other areas of the world. The Great Lakes Basin contains 20 percent of the world's fresh water.

MSU's water system uses 16 groundwater wells, each with pumping capacities ranging from 400 to 850 gallons per minute. MSU closely monitors the source water and the treated drinking water to ensure a high level of quality and safety is maintained. Once treated, the water is distributed to campus through a network of water mains, consisting of about 74 miles of pipes that range from 6 to 16 inches in diameter.

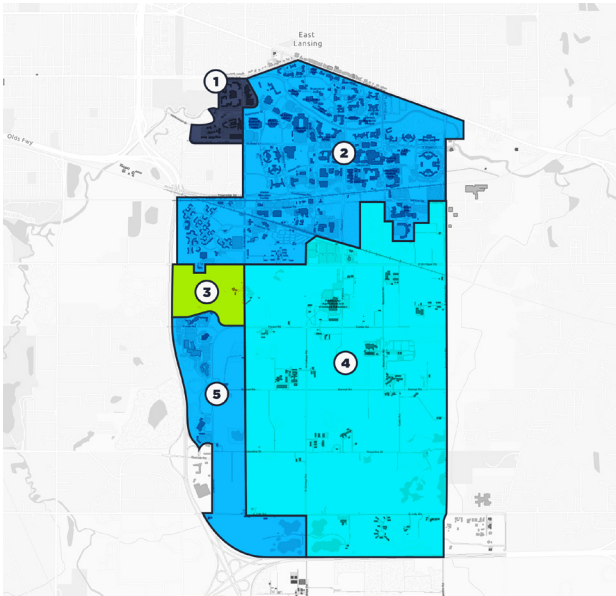
1855 Place, Jack Breslin Student Events Center, Brody Neighborhood, University Village and the Kellogg Hotel & Conference Center are supplied water by the East Lansing-Meridian Water and Sewer Authority.

For more information, refer to East Lansing-Meridian Water and Sewer Authority water quality report online:

https://www.cityofeastlansing.com/600/Annual-Water-Quality-Report

Facilities along the southwest border of campus at Forest and Collins roads, including the Henry Center for Executive Development, are supplied by the Lansing Board of Water and Light. For more information, refer to the Lansing Board of Water and Light water quality report online:

https://www.lbwl.com/WaterQualityReport



MSU East Lansing Water Distribution Systems

[1]City of East Lansing Distribution System

[2]Campus Distribution System

[3]Forest Akers West

[4]Wells Distribution System

[5]Board of Water and Light Distribution System

JAN 1 - DEC 31, 2020

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

CONSTITUENT/UNITS OF MEASUREMENTS	MCL/AL	MCLG	AMOUNT IN MSU WATER	YEAR[1]	LIKELY SOURCES
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 0 Violation: None	2020	Naturally present in the environment
Inorganic					
Copper (ppm)[3] Round 1	AL= 1.3	1.3	0.8 Range: 0-1.1 No samples exceeded the Action Level[4]	June 1 -Sept 30, 2020	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)[3] Round 1	AL=15	0	5 Range: 0-17 Five samples exceeded the Action Level[4]	June 1 -Sept 30, 2020	Lead service lines, corrosion of household plumbing fittings and fixtures; erosion of natural deposits
Copper (ppm)[3] Round 2	AL= 1.3	1.3	1 Range: 0-1.53 Three samples exceeded the Action Level[4]	July 1 -Dec 31, 2020	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)[3] Round 2	AL=15	0	2 Range: 0-15 No sample exceeded the Action Level[4]	July 1 -Dec 31, 2020	Lead service lines, corrosion of household plumbing fittings and fixtures; erosion of natural deposits
Number of Lead Services	N/A	N/A	0 Lead Service Leads		N/A
Fluoride (Tap) (ppm)	4	4	0.69 Range: 0.37-0.88	2020	Naturally occurring hydrofluorosilicic acid. Numbers shown avg over 2019. Current recommended level at 0.7 per EPA and EGLE dosage goal
Barium (ppm)	2	2	0.14 Range: 0.12-0.2	2020	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Inorganic					
Chlorine (ppm)[5]	4	4	Highest RAA: 1.59 Range: 0.2-2.18	2020	Water additive used to control microbes
Disinfectants By-Products					
Stage 2 Total Trihalomethanes (THMs) (ppb)	80	N/A	LRAA: 16.8 Range: 11.0-24.4	2020	By-product of disinfection
Stage 2 Total Halogcetic Acid (HAA5) (ppb)	60	N/A	LRAA: 12.1 Range: 8.0-19.0	2020	By-product of disinfection
Radionuclides					
Gross Alpha (pCi/L)	15	0	0.99	2020	Erosion of natural deposits
Radium (pCi/L)	5	0	2.46	2020	Erosion of natural deposits
Unregulated Substance[2]					
Sodium (ppm)	N/A	N/A	12	2020	Erosion of natural deposits and runoff

[1]Water quality regulations allow the monitoring of some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.

[2]Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

[3]MSU currently tests lead and copper twice per year as required by MI EGLE.

[4]90th Percentile testing results were at or below the MCL level in accordance with regulations.

[5]Chlorine does not have an associated MCL or MCLG. It is limited by a MRDLG which is defined on page 10. The levels shown are the MRDLG limit.

Additional parameters

While not mandatory for State of Michigan reporting, we've compiled additional campus water quality parameters of interest for researchers, faculty, staff and students.

Campus

PARAMETER	MSU WATER RESULTS	
	AVG. LEVEL DETECTED	RANGE
Chloride (ppm)	26.2	16-33
Hardness (calcium carbonate)[1] (ppm)	591	288-592
Iron (ppm)	0.7	0.3-1.4
Nitrate as N (ppm)	ND	ND
Nitrite as N (ppm)	ND	ND
Sodium (ppm)	14	6-34
Sulfate (ppm)	90	16-180

[1]May differ at tap due to residence time

Unregulated Contaminant Monitoring Rule 4 (UCMR4)[2]

CONTAMINANT	AVG.	RANGE	MRL
Bromochloroacetic Acid (ppt)	1.58	1.40-1.70	0.30
Bromodichloroacetic Acid (ppt)	1.43	1.30-1.50	0.50
Chlorodibromoacetic Acid (ppt)	0.33	0.31-0.35	0.30
Dichloroacetic Acid (ppt)	4.00	3.60-4.30	0.20
Trichloroacetic Acid (ppt)	4.30	3.80-4.60	0.50

[2]Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

JAN 1 - DEC 31, 2020

This table shows test results for substances that were found in MSU's drinking water. Results are not shown for substances that were tested for but not detected at or above the Maximum Contaminant Level (MCL).

CONSTITUENT/UNITS OF MEASUREMENTS	MCL	MCLG	AMOUNT IN MSU WATER	YEAR[1]	LIKELY SOURCES
Biological Constituents					
Total Coliform (% Positive Samples)	N/A	N/A	Number Detected: 0 Violation: None	2020	
Inorganic					
Copper (ppm)[3]	AL= 1.3	1.3	0.1 Range: 0-0.1 No samples exceeded the Action Level[4]	2020	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)[3]	AL=15	0	0 Range: ND-0 One sample exceeded the Action Level[4]	2020	Lead service lines, corrosion of household plumbing fittings and fixtures; erosion of natural deposits
Number of Lead Services	N/A	N/A	0 Lead Service Leads	2020	N/A
Fluoride (Natural) (ppm)	4	4	0.2 Range: 0.13-0.35	2020	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Nickel (ppm)	0.1	0.1	0.01 Range: 0-0.01	2020	Erosion of natural deposits
Barium (ppm)	2	2	0.14 Range: 0.01-0.2	2020	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Arsenic (ppb)	10	10	2.3 Range: 0-9.0	2020	Erosion of natural deposits; discharge from wood treatment; discharge from glass production[5]
Isopropylbenzene (ppm)[8]	None	None	0.0007 Range: 0-0.0007	2018	Runoff from petroleum products, paint, and rust preventatives
Radionuclides					
Gross Alpha (pCi/L)	15	0	8.24 Range: 3.0-9.4	2020	Erosion of natural deposits[7]
Radium (pCi/L)	5	0	4.39 Range: 2.9-5.5	2020	Erosion of natural deposits[6]
Unregulated Substance[2]					
Sodium (ppm)	N/A	N/A	12.31 Range: 6.5-35	2020	Erosion of natural deposits and runoff

[1]Water quality regulations allow us to monitor some substances less often than once a year because their concentrations are not expected to vary significantly from year to year.

[2]Unregulated substances are those for which the EPA has not established drinking water standards. The purpose of monitoring these substances is to assist the EPA in determining the occurrence of unregulated substances in drinking water and whether future regulation is warranted.

[3]MSU currently tests lead and copper twice per year as required by MI EGLE.

[4]90th Percentile testing results were at or below the MCL level in accordance with regulations.

[5]While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

[6]Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

[7]Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

[8]Test results post 2018 have reported Non-Detect.

IMPORTANT WATER QUALITY NOTICES

Vulnerability of sub-populations - Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline (800-426-4791) or at www.epa.gov/safewater.

Contaminants and their presence in water - Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791) or at www.epa.gov/safewater.

Sources of drinking water - The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells.

As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife
- Inorganic Contaminants, such as salts and metals, which can be naturally occurring or result from urban storm runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and Herbicides, which may come from a variety of sources such as farming, storm water runoff, residential or business.
- Organic Chemical Contaminants, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff and septic systems.
- Radioactive Contaminants, which can be naturally-occurring, or may be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems.

The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water which must provide the same protection for public health

Lead and copper in drinking water - 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 home plumbing. Michigan State University 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 have a lead service line, galvanized previously connected to lead, or unknown but likely to be lead, it is recommended that you run your water for at least 5 minutes to flush water from both your home plumbing and the lead service line. 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 EPA's Safe Drinking Water Hotline at 1-800-426-4791 or at http://www.epa.gov/safewater/lead.

Infants and children who drink water containing lead could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink water over many years could develop kidney problems or high blood pressure.

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

Common abbreviations

AL (Action Level) – The concentration of a contaminant which, if exceeded, requires a water system to initiate a treatment process or other action.

ALG (Action Level Goal) – The level of a contaminant in drinking water below which there is no known or expected risk to health. ALGs allow for a margin of safety.

AVG (Average) – Regulatory compliance with some MCLs are based on running annual average of monthly samples.

LRAA (Location Running Annual Average) – The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

MCL (Maximum Contaminant Level) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available technology.

MCLG (Maximum Contaminant Level Goal) – 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.

MRL (Minimum Reporting Level) - The smallest measured cincentration of a substance that can be reliably measured and reorted by a laboratory using a given analytical method.

MRDL (Maximum Residual Disinfectant Level) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Common abbreviations

MRDLG (Maximum Residual Disinfectant Level Goals) - The level of 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.

ND (Non-Detect) - Below analytical method detection limit.

NTU (Nephelometric Turbidity Units) - Unit of measurement for water clarity.

pCi/L (picocuries per liter or nanograms per liter ng/L) - A measure of radioactivity.

ppb (parts per billion or micrograms per liter mcg/L) - One ounce in 7,350,000,000 gallons of water.

ppm (parts per million or milligrams per liter mg/L) - One ounce in 7,350 gallons of water

ppt (parts per trillion or nanograms per liter ng/L) - One ounce in 7,350,000,000,000 gallons of water.

RAA (Running Annual Average) - A continuous averaging of four quarters of sampling.

SDWA (Safe Drinking Water Act) - A set of federally mandated regulations that ensures the quality and safety of water provided by public water systems.

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

> - An abbreviation meaning "more than."

< - An abbreviation meaning "less than."

We are required to monitor Michigan State University's drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not our drinking water meets health standards.

NOTICE OF ERROR

During the period from Jan. 1, 2020 to Sept. 30, 2020, we did not monitor for the Gross Alpha contaminant from Well 26 and missed taking a sample from our entry point within this required sampling period.

This violation does not pose a threat to MSU's water supply quality.

This is not an emergency and does not require boiling water or using an alternative source of water. To correct the situation, MSU took an additional sample of drinking water to test for Gross Alpha contaminants. The water supply has been certified to fully comply with the public notification regulations in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

This table lists the contaminant we did not properly test for, how often we are supposed to sample for this contaminant, how many samples we are supposed to take, how many samples we took, when samples should have been taken, and the date we collected follow-up samples.

CONTAMINANT	REQUIRED SAMPLING FREQUENCY	NUMBER OF SAMPLES TAKEN	WHEN ALL SAMPLES SHOULD HAVE BEEN TAKEN	WHEN ADDITIONAL SAMPLES WERE TAKEN
Gross Alpha	1 sample every 3 years	0	January 1, 2020 - September 30, 2020	October 16, 2020

For more information, please contact the MSU Water Operator in Charge:

Thomas Silsby
517-884-7110
silsbyth@msu.edu

What is a Gross Alpha test?

Performed to measure overall radioactivity in drinking water, the Gross Alpha test identifies naturally occurring radioactive elements which emit alpha particles as they decay. Alpha radiation naturally exists in the soil, in the air, and also in water.

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