THE CITY OF LUDINGTON

400 S. Harrison Street • Ludington, MI 49431 • 231.845.6237

2019 Drinking Water Quality Report

Drinking Water

Water is a necessity for every home and the City of Ludington is dedicated to providing quality water to all residents and customers.

Every year, a drinking water quality report for the City of Ludington water supply system is provided to federal and state regulatory agencies. A similar report is prepared for all water customers. The City of Ludington is once again pleased to share that the drinking water meets all federal and state requirements. Details are included in this report.

If you have any questions about this report or your water quality, please contact Jamie Hockemeyer Water Treatment Plant Superintendent at (231) 843-8830. If you want to learn more about the operation of City government, please attend any of the regularly scheduled City Council meetings which are held at 6:30 p.m. on the second and fourth Monday of every month in the Council Chamber at City Hall.

The City of Ludington routinely monitors for contaminants in drinking water according to Federal and State laws and sampling directives. The 2019 Water Quality Results Table found on page 4 show the results of monitoring during the period of January 1 - December 31, 2019. Drinking water, including bottled water, may be reasonably expected to contain at least small amounts of contaminants. The presence of contaminants does not necessarily indicate the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the US EPA Safe Drinking Water Hotline at 1-800-426-4791 or State of Michigan Environmental Assistance Center at 1-800-662-9278.

Source Water

The sources of drinking water (both tap 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 and can take on minerals and, in some cases, radioactive material, as well as substances resulting from the presence of animals or from human activity. Source water for the City of Ludington and customers supplied in the City of Scottville, Pere Marquette Township and Amber Township is drawn in through two different intake structures in Lake Michigan and treated at the City of Ludington Water Treatment Plant located on Lakeshore Drive. The primary intake is a below lake bottom style infiltration bed covering about an acre in size. The secondary intake is a wood crib cover construction used to supplement the primary intake for added capacity.

The State performed an assessment of the city's source water in 2003 to determine the susceptibility or the relative potential of contamination. The susceptibility rating is on a six-tier scale from "very-low" to "very-high" based primarily on geologic sensitivity, water chemistry, and contamination sources. The susceptibility of the intakes to potential contamination is moderate. An effort has been made to protect our source water by creating, implementing, and updating a Surface Water Intake Protection Plan (SWIPP).

Individuals with Special Health Needs

For those individuals with special health issues and concerns, the following information contains EPA water use guidelines which may be applicable. Some people may be more vulnerable to contaminants in drinking water than others. Immuno-compromised persons include those undergoing chemotherapy, those who have had an organ transplant, people with HIV/AIDS or other immune system disorders, the elderly, and infants. These individuals should seek advice about drinking water from their health care provider.

US EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

Possible Contaminants Present in Source Water

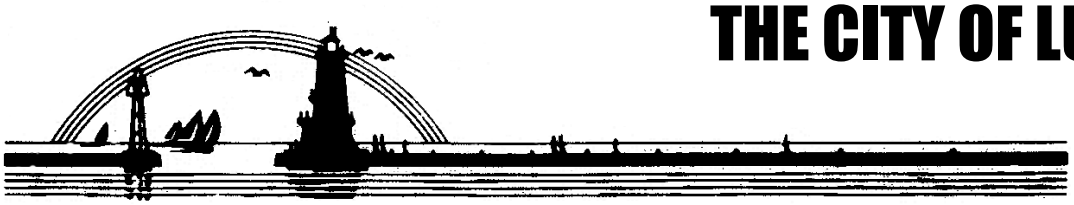
Microbial contaminants such as viruses, protozoa, and bacteria may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife. Inorganic contaminants such as salts and metals, can be naturally-occurring or result from urban storm water run-off, industrial, or domestic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

In order to ensure tap water is safe to drink, the US EPA prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Water Treatment and Distribution

The City of Ludington operates an 8.0 million gallon per day capacity conventional treatment facility which is staffed by a team of 8 licensed operators. This facility uses coagulation, flocculation, sedimentation, and filtration treatment processes to provide high quality aesthetically pleasing drinking water for the community. Approximately 1,060,500,000 gallons were produced in 2019.

The distribution system is comprised of elevated storage tanks, ground storage reservoirs, miles of watermain ranging from 4 inch to 20 inch in diameter, watermain valves, curbstop valves, hydrants, and service line connections. This system provides reliable and abundant water for consumption and fire-fighting capabilities for the community.



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Glossary of Terms and Abbreviations

Non-Detect (ND): the constituent is not present.

NA: Not applicable.

Parts per million (ppm) or Milligrams per liter (mg/L): A measure of the concentration of a contaminant in water. One part per million is equivalent to one minute in two years, or one inch in sixteen miles.

Parts per billion (ppb) or Micrograms per liter (µg/L): A measure of the concentration of a contaminant in water. One part per billion is equivalent to one minute in 2,000 years, or one inch in sixteen thousand miles.

Parts per trillion (ppt) or Nanogram per liter (ng/L): A measure of the concentration of a contaminant in water. One part per trillion is equivalent to one drop of water in 20 Olympic-size swimming pools.

Nephelometric Turbidity Unit (NTU): Turbidity is a measure of the clarity of the water. We monitor turbidity because it is a good indicator of the effectiveness of our filtration system. Turbidity in excess of 5.0 NTU is just noticeable to the average person.

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Treatment Technique (TT): A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Maximum Contaminant Level (MCL): 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 treatment technology.

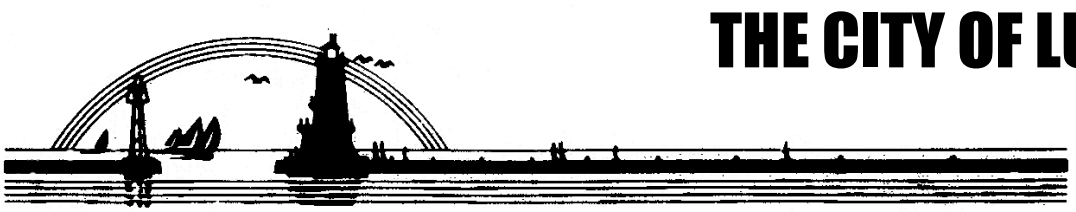
Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): 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.

Maximum Residual Disinfectant Level Goal (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.

Running Annual Average (RAA): The average of analytical results for samples obtained during the calendar year.

Locational Running Annual Average (LRAA): The average of analytical results for samples obtained at a particular monitoring location during the previous four calendar quarters.



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2019 WATER QUALITY RESULTS TABLE

Regulated Monitoring at the Treatment Plant

Substance	Units	Range Detected	Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Barium	ppm	0.02	0.02	2	2	No	2019	Erosion of natural deposits
Fluoride	ppm	0.65 - 0.78	0.72	4	4	No	2019	Water additive which promotes strong teeth
Turbidity[1]	ntu	0.03 - 0.12	0.04	TT=1	NA	No	2019	Soil runoff, suspended matter in lake water
Total Organic Carbon[2]	ppm	1.30 - 1.90	1.66	TT	NA	No	2019	Naturally present in the environment
Nitrate	ppm	ND	ND	10	10	No	2019	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Gross Alpha	pCi/L	1.93	1.93	15	0	No	2018	Erosion of natural deposits
Combined Radium 226/228	pCi/L	0.74	0.74	5	0	No	2018	Erosion of natural deposits
Total Xylenes	ppm	ND	ND	10	10	No	2019	Leaks and spills from gasoline and petroleum storage tanks

Regulated Monitoring in the Distribution System

Substance	Units	Range Detected	Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Haloacetic Acids [3]	ppb	13.0 - 28.0	21.0	60	0	No	2019	Formed when chlorine is added to water with naturally occurring organic material
Total Trihalomethane [3]	ppb	20.1 - 48.3	35.4	80	0	No	2019	
Free Chlorine Residual [4]	ppm	1.27 - 1.50	1.35	**MRDL**=4	**MRDLG**=4	No	2019	Used to disinfect drinking water

Regulated Monitoring at Customer's Tap

Substance	Units	Range Detected	Action Level (AL)	90th Percentile	MCLG	Number of Samples Above (AL)	Year Sampled	Possible Sources of Contaminate
Lead	ppb	ND	15.0	0.0	0	0	2017	Corrosion of household plumbing system
Copper	ppm	ND - 0.038	1.3	0.028	1.3	0	2017	Corrosion of household plumbing system

Unregulated Monitoring

Substance	Units	Range Detected	Level Detected	MCL	MCLG	Violations	Year Sampled	Possible Sources of Contaminate
Sodium	ppm	9.0	9.0	NA	NA	No	2019	Erosion of natural deposits
PFAS	ppt	ND	ND	NA	NA	No	2019	Fire supression foam; household products

Footnotes:

1. Turbidity is a measurement of water clarity. We monitor turbidity because it is a good indicator of our filtration process. The turbidity measurements must be less than or equal to 0.3 ntu in 95% of all samples taken each month and shall never exceed 1 ntu at any time.

2. The level detected shown for Total Organic Carbon (TOC) is the running annual average calculated quarterly.

3. The level detected shown for Total Trihalomethanes (TTHM) and Haloacetic Acids (HAA5) is the running annual average calculated quarterly.

4. The level detected shown for Free Chlorine Residual was calculated using a running annual average.

No MCL Violations

As shown in the 2019 Water Quality Results Table there are no MCL violations and the City of Ludington's drinking water meets or exceeds all Federal and State requirements. More information about contaminants and potential health effects can be obtained by calling the US EPA Safe Drinking Water Hotline at 1-800-426-4791 or State of Michigan Environmental Assistance Center at 1-800-662-9278.

MCLs are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink two (2) liters of water every day, which is approximately eight (8) - 8 ounce glasses of water, at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Lead

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. The City of Ludington is responsible for providing high quality drinking water, but cannot control the variety of materials used in household plumbing components.

Lead in drinking water is rarely the sole cause of lead poisoning, but it can add to a person's total lead exposure. All potential sources of lead in the household should be identified and removed, replaced or reduced. When water has been sitting for several hours the potential for lead exposure can be minimized by flushing the tap for 30 seconds to two minutes before using water for drinking or cooking. If you have a service line that is lead, 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 there is a concern about lead in the water, testing may be an option.

Information on lead in drinking water, testing methods, and steps to take to minimize exposure are available from the Safe Drinking Water Hotline or at http://www. epa.gov/safewater/lead. Lead and Copper sampling takes place tri-annually per regulatory requirements of the US EPA Lead and Copper Rule (LCR). Sampling was last performed in 2017 and will take place again in 2020.

Distribution System Material Inventory

The City of Ludington is currently working with residents to identify and replace lead service lines per the EGLE Revised Lead and Copper Rule. At this point in time, we currently have 4,445 services lines in the distribution system and 1,761 of those have been identified as meeting the lead service line criteria. City staff are continuously working to determine the material of the remaining 1,578 unknown service lines.

Fluoride

Fluoridation is performed at the Water Treatment Plant for dental health purposes. The Center for Disease Control (CDC) has the following advice for parents of infants; "The proper amount of fluoride from infancy through old age helps prevent and control tooth decay. Recent evidence suggests that mixing powdered or liquid infant formula concentrate with fluoridated water on a regular basis may increase the chance of a child developing the faint white markings of very

mild or mild enamel fluorosis. Parents should follow the advice of the formula manufacturer and their child's doctor for the type of water appropriate for the formula they are using. Parents and caregivers of infants fed primarily with formula from concentrate who are concerned about the effect that mixing their infant's formula with fluoridated water may have in developing enamel fluorosis can lessen this exposure by mixing formula with low fluoride water most or all of the time." http:// www.cdc.gov/fluoridation/safety/infant_formula.htm.

In 2015, the US Department of Health and Human Services determined 0.7 ppm (mg/L) of fluoride in water to be the optimal level.

The Cross Connection Control Program

The Cross Connection Control Program is designed to protect the city's water supply from any unwanted flow from residential, commercial, or industrial customers. A cross-connection is a link or potential link between potable (safe) water and any source containing water or other substances that are not safe for human consumption. The Utility Maintenance department oversees inspection and testing of devices used to prevent cross connections throughout the community as required by federal and state requirements.

PFAS

Per and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that include PFOA, PFOS, GenX, and many other chemicals. PFAS compounds have been manufactured and used in a variety of industries in the United States since the 1940s. Products that contain PFAS include: fire-fighting foams, stain repellents, nonstick cookware, waterproof clothing, food wrappers, and many other household products.

The State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) in collaboration with the Michigan PFAS Action Response Team (MPART) and contracted environmental engineering firm AECOM monitored all 1,114-community water supplies during the Statewide Testing Initiative in 2018 and 2019.

The US EPA has set a lifetime health advisory level (LHA) for PFOA and PFOS. The current LHA is 70 parts per trillion (ppt). The State of Michigan EGLE has drafted regulations to add maximum contaminant levels (MCL) for 7 specific PFAS compounds. Results from the Statewide Testing Initiative show non-detect levels of PFAS compounds in the City of Ludington's drinking water.

US EPA UCMR

The US EPA Unregulated Contaminant Monitoring Rule (UCMR) samples systems nationwide to collect data for contaminants which are suspected to be present in drinking water and do not currently have health-based standards set under the Safe Drinking Water Act (SDWA). 30 contaminates are monitored every 5 years.

The 30 contaminants monitored for during UCMR 4 (2018-2020) include: 10 cyanotoxins, 2 metals, 8 pesticides, 1 pesticide manufacturing byproduct, 3 brominated haloacetic acid groups, 3 alcohols, and 3 other semi-volatile chemicals.

The City of Ludington will be participating in UCMR 4 (4th monitoring period since the rule was implemented) in 2020.