Memphis Water Quality Report 2019

Memphis Light, Gas and Water is proud to present its 2019 Water Quality Report, which includes required information about the testing, monitoring and treatment of our drinking water.

What the Water Quality Report means

In 2019, as years before, Memphis water meets or exceeds all state and federal water quality regulations. This Water Quality Report guides you, the consumer, through required monitoring results and information on common contaminants that can be found in drinking water, including bottled water.

By Skylar Shotwell, St. Ann Catholic School

Origins of our water

Our water comes from an underground aquifer known as the Memphis Aquifer. If you've ever looked at the 34-storied 365-foot tall Clark Tower building in East Memphis, you'll get an idea of how deep our artesian wells are to reach this amazing, natural underground reservoir. The reservoir is located 350 to 1,100 feet below ground.

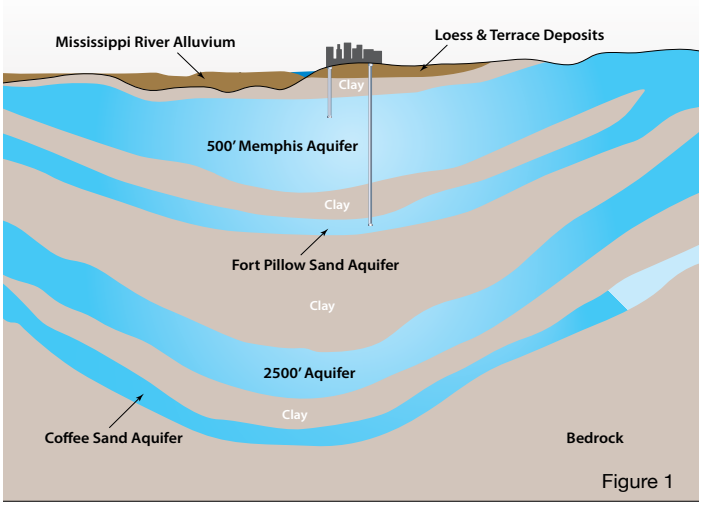


Figure 1

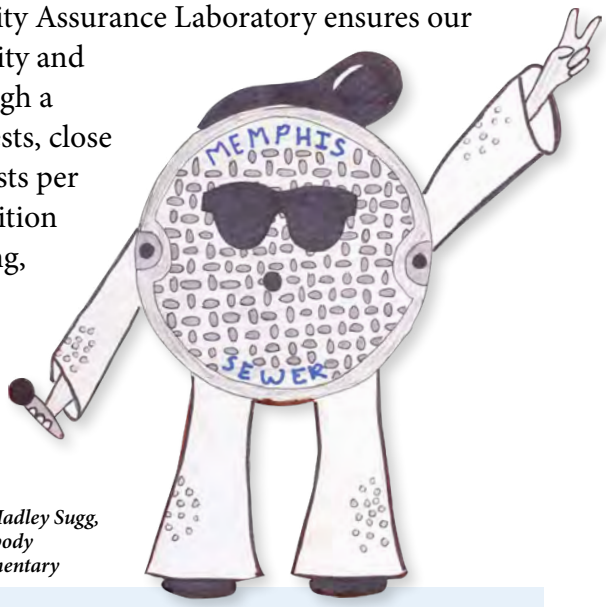
By looking at Figure 1, you'll see the aquifers are made up of layers of clay, sand and gravel. Those layers act as a natural filter removing many impurities from the water. Some experts believe the water we drink today began as raindrops over 2,000 years ago.

Why the report matters

Our water customers in Memphis and Shelby County depend on us having an excellent quality of water that is among the purest in the world.

What we do

After the water is collected and processed, MLGW's Water Quality Assurance Laboratory ensures our water's quality and safety through a battery of tests, close to 40,000 tests per year. In addition to our testing, MLGW is funding a five-year, $5 million



By Hadley Sugg, Peabody Elementary

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 pose a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791. *Sources: EPA and Tennessee Department of Environment and Conservation*

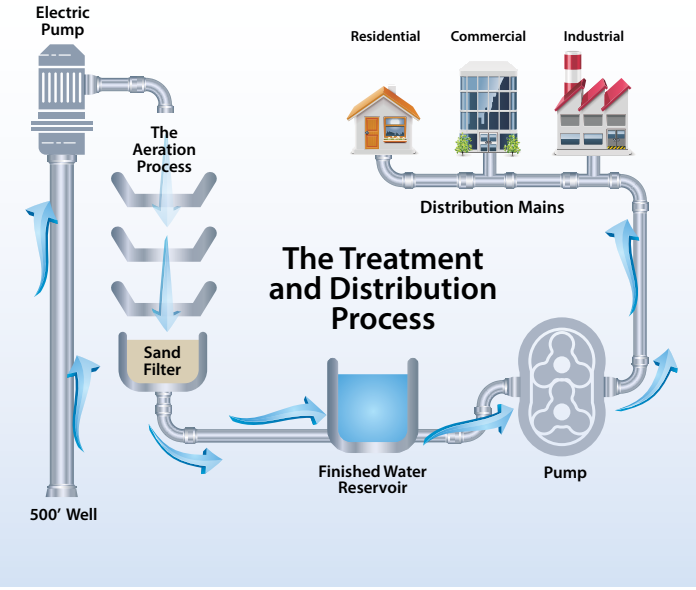
water study with the Center for Applied Earth Science and Engineering Research (CAESER).

The study is a part of the long-term relationship MLGW has enjoyed since 1992 when MLGW and the U of M formed the Ground Water Institute (now known as CAESER). CAESER's staff and students will search for breaches in the clay layer, map the aquifer and study how water use impacts any contamination found.

Other drinking water sources

In addition to underground aquifers where MLGW pumps our water from, drinking water sources (both tap and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over 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 human activity.

In order to ensure that tap water is safe to drink, the Food and Drug Administration and Tennessee



By Myles Jones, Whitehaven High School

Department of Environment and Conservation set regulations which limit the amount of certain contaminants in water provided by public water systems. The FDA regulations determine limits for contaminants in bottled water which must provide the same protection for public health.

Cryptosporidium

Cryptosporidium is a microscopic parasite that causes the diarrheal disease cryptosporidiosis. Both the parasite and the disease are commonly known as "Crypto."

Contaminants That May Be Present In Source Water:

- 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 agriculture, urban storm water runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, 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 be the result of oil and gas production and mining activities.

While this parasite can be spread in several different ways, water (drinking water and recreational water) is the most common way to spread the parasite. According to the Centers for Disease Control and Prevention, Cryptosporidium is a leading cause of waterborne disease among people in the U.S.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised individuals such as people with cancer undergoing chemotherapy, people 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.

By Tania Flores, Memphis Academy of Science and Engineering

Call the Safe Drinking Water Hotline at 1-800-426-4791 for guidelines on how to lessen the risk of Crypto and other microbial contaminants.

Source water and wellhead protection

An explanation of Tennessee's Source Water Assessment Program, the Source Water Assessment summaries, susceptibility scorings, and the overall TDEC report to the EPA can be viewed online at: tn.gov/environment.

MLGW's wellhead protection plan and source water assessment are available for public review by calling Quinton Clark, Manager, Water Engineering and Operations, at 901-320-3939, 7 a.m. - 4 p.m., Monday-Friday.

For more information on groundwater protection, call the EPA at 800-490-9198 to request a copy of the EPA's Citizen's Guide to Ground Water Protection. You also can view it online by searching for the title, EPA's Citizen's Guide to Ground-Water Protection or by clicking here: EPA's Citizen's Guide.

Opportunities to discuss water quality issues

MLGW holds meetings of its Board of Commissioners, which are open to the public, on the first and third Wednesdays of each month at 8:30 a.m. The meetings are held in MLGW's Administration Building, 220 South Main Street, Memphis, TN.

Public meetings are also held periodically by the Shelby County Groundwater Control Board. For more information on the time and location of future meetings, call the Water Quality Section of the Shelby County Health Department at 901-222-9599.

By Patricia Gipson, Memphis Academy of Science and Engineering

Unregulated Contaminant Monitoring Rule

The EPA requires MLGW to participate in the Unregulated Contaminant Monitoring Rule (UCMR). This testing identifies chemical contaminants in drinking water that may require future regulation.

By Joselyn Navarro, Promise Academy

2019 Water Quality Table

RESULTS OF INORGANIC ANALYSES

Component	Average Amount Detected	Maximum Contaminant Level (MCL)	Maximum Contaminant Level Goal (MCLG)	Range of Levels Detected	Major Sources in Drinking Water
FLUORIDE	0.6 parts per million	4.0 parts per million	4.0 parts per million	0.06 - 1.30 parts per million	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
NITRATE as Nitrogen (N)	0.05 parts per million	10.0 parts per million	10.0 parts per million	BDL - 0.27 parts per million	Erosion of natural deposits; leaching from septic tanks; sewage; runoff from fertilizer use
SODIUM *	8.7 parts per million	Not applicable	Not applicable	5.5 - 11.8 parts per million	Naturally present in the environment

Results surpass state and federal drinking water regulations.

Fluoride Reduction

Fluoridation has been successfully practiced in the U.S. since the mid-1900s. MLGW began adding fluoride to the water supply according to mandates set by a City of Memphis Ordinance at a concentration of 1.0 ppm. In December 2010, the U.S. Department of Health and Human Services (HHS) proposed through the CDC that the fluoride level recommended for drinking water be set at 0.7 mg/L. The Rules of the Tennessee Department of Environment and Conservation made this same recommendation.

MLGW changed the fluoride content in finished water from 1.0 mg/L to 0.7 mg/L in 2013. Because of its contribution to the dramatic decline in tooth decay over the past 75 years, the CDC named community water fluoridation as one of the 10 greatest public health achievements of the 20th century.

Ways you can help protect our water supply:

- Never put anything down a storm drain, wisely dispose of household and lawn/garden chemicals. Never pour hazardous wastes on the ground, in a storm drain or in an indoor drain. Consider using non-toxic alternatives to toxic household and lawn chemicals.
- Recycle used motor oil. Many auto stores and gas stations will accept used motor oil. Two gallons of used motor oil can be reprocessed into fuel and provide enough electricity to run the average household for about 24 hours.
- Wash your car at a car wash and prevent the soaps, polishes, waxes and other chemicals from entering the storm drain system.
- Think before you flush! Flushing unused or expired medicines can be harmful to our drinking water. Properly disposing of unused or expired medication helps protect you and the environment. The Memphis Police Department has installed several Prescription Drug Take-Back Locations throughout the city at specific Memphis Police precincts, Shelby County Sheriff precincts and specific Walgreens and CVS locations. The bins are located in the lobby area

By Jaylen Mark, Central High School

of a precinct near you that are fully staffed 24/7, 365 days a year. The prescription drug take-back program is for citizen use only. For an interactive map of the Tennessee locations participating in the program, go to rxtakeback or for a full Tennessee listing of the locations participating search online for Tennessee's Permanent Household Prescription Drug Take Back locations or click here.

- Recycle batteries, paints, solvents and chemicals by contacting local recycling companies or by taking them to the "Household Hazardous Waste Collection" site located at 6305 Haley Rd., Memphis, TN 38134. This location is open weekly on Tuesday and Saturday from 8:30 a.m. to 1 p.m. For additional information, contact the Water Quality Section of the Shelby County Health Department at 901-320-3962.

RESULTS OF LEAD AND COPPER SAMPLING AT RESIDENTIAL WATER TAPS

Component	Amount Detected	Maximum Contaminant Level (MCL)	Maximum Contaminant Level Goal (MCLG)	Sites Exceeding Action Level (AL)	Major Sources in Drinking Water
LEAD	8.72 parts per billion (90% of homes tested had lead levels less than 8.72 ppb)	Action Level (AL) = 90% of the homes tested must have lead levels less than 15 parts per billion	Zero parts per billion	1 site of 50 exceeded AL	Corrosion of household plumbing systems; erosion of natural deposits
COPPER	0.30 parts per million (90% of homes tested had copper levels less than 0.30 ppm)	Action Level (AL) = 90% of the homes tested must have copper levels less than 1.3 parts per million	1.3 parts per million	0 sites of 50 exceeded AL	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

Lead and Copper

Plumbing materials could contribute to lead and copper levels at the tap. There is no detectable lead in Memphis' source water. Regarding copper, very low levels of this metal occur naturally. Standing water in pipes for six hours or more along with lead or lead component plumbing may yield low levels of lead at the tap. It's rare that the lead levels exceed the action level. Depending on the specific circumstances, copper levels at the tap may be high.

The results reported here on lead and copper are from tests performed in 2018 at a targeted group of homes served by MLGW in areas of Memphis and Shelby County.

Fifty homes, most of which had some lead plumbing constituents, were tested. Out of that number, only one site exceeded the lead action level and none exceeded the copper action level. The samples were collected after six to eight hours of no water usage. The 90th percentile result for lead was 8.72 ppb and the 90th percentile result for copper was 0.30 ppm.

If present, elevated levels 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. MLGW 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 two 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 (1-800-426-4791) or at epa.gov/safewater/lead.

MLGW offers a free lead testing kit that allows MLGW water customers in Memphis and Shelby County to have their tap water tested. To request a free lead kit, you can email us at waterlab@mlgw.org or call 901-320-3962. When contacting us, please provide your name, address and a contact number.

For more information about your drinking water, contact MLGW's Customer Care Center at 901-544-6549, between the hours of 8 a.m. to 6 p.m., Monday-Friday. To view this report online, visit: mlgw.com/waterquality or you can request a hard copy by calling 901-320-3950. You can email your comments to us at: waterlab@mlgw.org.

En español

Información para personas de habla hispana: Este reporte contiene información muy importante sobre su agua potable. Hágalo traducir o pida que se lo lea alguien que lo entienda bien. O mejor aún, lea la versión en español en nuestro sitio de red, mlgw.com.

RESULTS OF MICROBIOLOGICAL TESTING

Component	Maximum Monthly Detected	Maximum Contaminant Level (MCL)	Maximum Contaminant Level Goal (MCLG)	Annual Amount Detected	Major Sources in Drinking Water
Total Coliform Bacteria**	Highest positive monthly sample detected was 0.42% in Sept. and Nov. 2019	Presence of coliform bacteria in 5% of monthly samples	Zero bacteria detected	Number of positives out of number of samples for the year: 2 out of 2,940 or 0.07%	Naturally present in the environment

Results surpass state and federal drinking water regulations.

The Coliform Group

Water Quality Assurance Laboratory staff analyzed 2,940 bacteriological tests in 2019 using samples of water treated and distributed throughout Memphis and Shelby County. We primarily test for the indicator organisms that are part of the coliform group prevalent in the environment. Whenever these organisms are found in the environment, it may be a possible indication that other types of harmful organisms are present as well. However, it is possible to obtain a misleading result as these organisms may be coming from the faucet itself, not necessarily from the water, from some other source while sampling or from accidental contamination of the sample during its analysis. Any sample indicating a positive result for coliform is methodically rechecked. All rechecks during the 2019 year proved to be negative.

RESULTS OF DISINFECTION BY-PRODUCTS

Component	Average Amount Detected	Maximum Contaminant Level (MCL)	Maximum Contaminant Level Goal (MCLG)	Range of Amount Detected	Major Sources in Drinking Water
TOTAL TRIHALOMETHANES	***7.6 parts per billion	80 parts per billion	Not applicable	BDL - 22.5 parts per billion	By-products of drinking water disinfection
HALOACETIC ACIDS (HAA5)	***1.8 parts per billion	60 parts per billion	Not applicable	BDL - 2.4 parts per billion	By-products of drinking water disinfection
CHLORINE	0.91 parts per million	MRDL - 4.0 parts per million	MRDLG – 4.0 parts per million	0.81 - 0.99 parts per million	Water additive used to control microbes

Results surpass state and federal drinking water regulations.

Chlorine Residual

Federal and state drinking water regulations require detectable disinfectant (chlorine) residuals throughout our water distribution system. MLGW's water contains approximately one part per million of chlorine in order to ensure the proper residuals. This is done to prevent the possibility of waterborne disease. Both the maximum residual disinfectant level and maximum residual disinfectant level goal are set at four parts per million.

Disinfection By-Products

Disinfection is an absolutely essential component of drinking water treatment. Disinfection prevents the occurrence and spread of many serious and potentially deadly water-borne diseases. When chlorine is used for disinfection, it can react with naturally-occurring organic matter in the water. Minute amounts of disinfection by-products can be formed as a consequence of these reactions.

As a result, regulations limit the amount of disinfection by-products in your water. Two categories of disinfection by-products are specifically limited by these regulations: Total Trihalomethanes and Haloacetic Acids. These by-products must be reported to the state of Tennessee annually. Averages are calculated quarterly on samples taken at various locations through our distribution system. As the table above shows, our water meets the disinfection by-products standards.

ADDITIONAL WATER QUALITY PARAMETERS OF INTEREST

This table shows levels of additional water quality parameters which are often of interest to our customers. Values shown are averages from our water treatment plants for 2019. There are no health-based limits for these substances in drinking water.

Parameter (unit of measure)	Average Level Detected	Average Range of Levels Detected	Typical Source of Contaminants
Alkalinity (ppm)	53	20 - 110	Erosion of natural deposits
Calcium (ppm)	10.4	3.7 - 22.5	Erosion of natural deposits
Chloride (ppm)	4.8	2.9 - 6.7	Erosion of natural deposits
Hardness (ppm)	46	18 - 103	Erosion of natural deposits
Hardness (grains/gallon)	2.7	1.1 - 6.0	Erosion of natural deposits
Iron (ppm)	0.01	0.01 - 0.03	Naturally occurring
pH (Standard)	7.2	7.0 - 7.5	-------
Phosphate (ppm)	1.0	0.7 - 1.1	Water additive for corrosion control
Sulfate (ppm)	5.3	3.5 - 9.8	Naturally present in the environment
Temperature (°F)	67.2	62.5 - 75.6	-------

RESULTS OF RADIOACTIVE CONTAMINANT TESTING

Component	Average Amount Detected	Maximum Contaminant Level (MCL)	Maximum Contaminant Level Goal (MCLG)	Range of Levels Detected	Major Sources in Drinking Water
COMBINED RADIUM (226/228) (pCi/L)	2.0	5	0	1.5 - 2.5	Decay of natural and man-made deposits
GROSS ALPHA (excluding radon and uranium) (pCi/L)	0.5	15	0	0.3 - 0.6	Erosion of natural deposits

Results surpass state and federal drinking water regulations.

As water travels over land or through the ground, it can dissolve naturally occurring radioactive minerals or radioactive contaminants from human activities such as oil and gas production, mining activities or nuclear facilities. Certain minerals or contaminants may emit a form of radiation known as gross alpha, radium 226 and radium 228 (combined radium). The values shown in the table are the most recent analysis conducted in 2015 at the water treatment plants. The next testing for radiologicals will be done in 2020.

TERMS USED IN THIS REPORT

To protect public health, state and federal agencies set maximum contaminant levels, maximum contaminant level goals or action levels for contaminants. Below are definitions of terms used in this report to help you understand the 2019 results.

Action Level (AL)	The concentration of a contaminant that, if exceeded, triggers a treatment or other requirement that a water system must follow.
Below Detection Limit (BDL)	The concentration of a compound is less than the smallest amount that can be measured by the test method used.
Maximum Contaminant Level (MCL)	The highest level of a contaminant allowed in drinking water. MCLs are set as close to MCL goals 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.
mg/L or ppm	Milligrams per liter or parts per million (one penny in $10,000)
µg/L or ppb	Micrograms per Liter or parts per billion (one penny in $10,000,000)
pCi/L	Picocuries per Liter
Maximum Residual Disinfectant Level Goal (MRDLG)	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.
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 the control of microbial contaminants.
Treatment Technique (TT)	A required process intended to reduce the level of a contaminant in drinking water.

WATER QUALITY TABLE FOOTNOTES

* There is no state or federal MCL for sodium. Monitoring is required to provide information to consumers and health officials who are concerned about sodium intake due to dietary precautions. If you are on a sodium-restricted diet, you should consult a physician about the level of sodium in the water.

** For the highest monthly level detected, there were only two positive samples out of 2,940 samples taken. MLGW immediately responded by resampling above, at and below where the positive samples had been collected, and all the results were negative.

*** Data expressed as LRAA – Locational Running Annual Average: The average of four consecutive quarterly results at each monitored sample location.

By Kali Bowen, Lamplighter Montessori School

Water Quality Report highlights student art

Each year, MLGW sponsors an annual poster art contest for students living in Shelby County. In 2019, students designed a "Water Mane" superhero whose mission is to save the aquifer. We're proud to showcase some of the 205 entries we received.

Congratulations to the 2019 winners: 2nd grader ***Wynn Maceri, Lamplighter Montessori***; 4th grader ***Erin Gray Jr., Shelby Oaks Elementary***, 6th grader ***La'Ron Robinson, Grizzlies Preparatory Charter School*** and 12th grader ***Tierra Dillihunt, Whitehaven High.***