Memphis Water: Clearly Superior

Water Quality Report 2018

Memphis Light, Gas and Water is proud to present its 2018 Water Quality Report, which includes required information about the testing, monitoring and treatment of our drinking water.

The experts agree: Memphis water is sweet and it has a wonderful taste, making it one of the best-tasting waters in the world, partly because it has very few minerals so that it can be used with minimum treatment after it is withdrawn from underground wells. Memphis water is extremely pure as it comes from about 125 wells underneath the Memphis area, and it only requires a basic process of aeration, which eliminates iron and dissolved gases. Nevertheless, after the water is directly extracted from the Memphis aquifer, it goes through processes of filtration, chlorination and fluoridation, all required by law for public drinking water, which makes our water even cleaner, healthier and better tasting. These treatments are not required for industrial use.

But that's not it. Memphis has water that is not only sweet to the palate but also so plentiful, which results in it being very inexpensive as we deliver it to our customers. Memphis is one of the largest cities in the world with a water supply that relies exclusively on artesian wells. The water we use for consumption and industry comes from an aquifer, under the surface of the Earth. The Memphis Aquifer is a natural underground reservoir located from 350 to 1,100 feet below ground surface. It is a part of a larger system of aquifers extending to a depth of 2,600 feet. The aquifers are composed of layers of clay, sand and gravel that act as natural filters and remove many impurities from the water. The wells connected into this system are known as "artesian wells" because they draw the naturally purified water to the surface by releasing the built-up pressure which forces the water up the well like liquid through a straw.

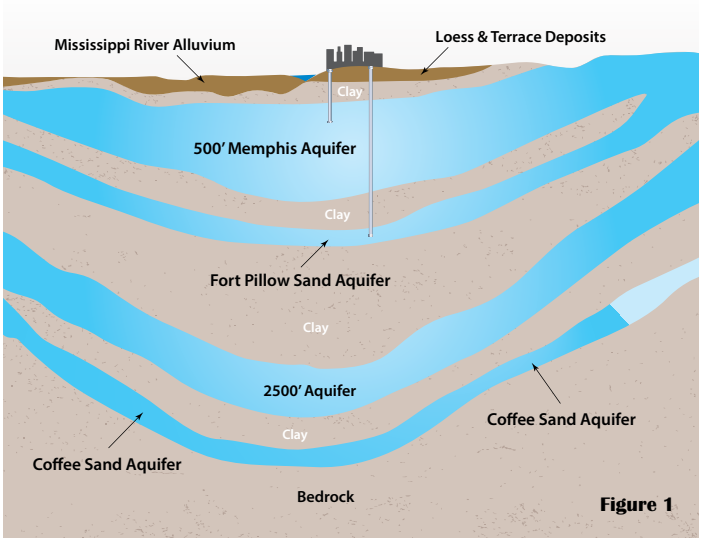


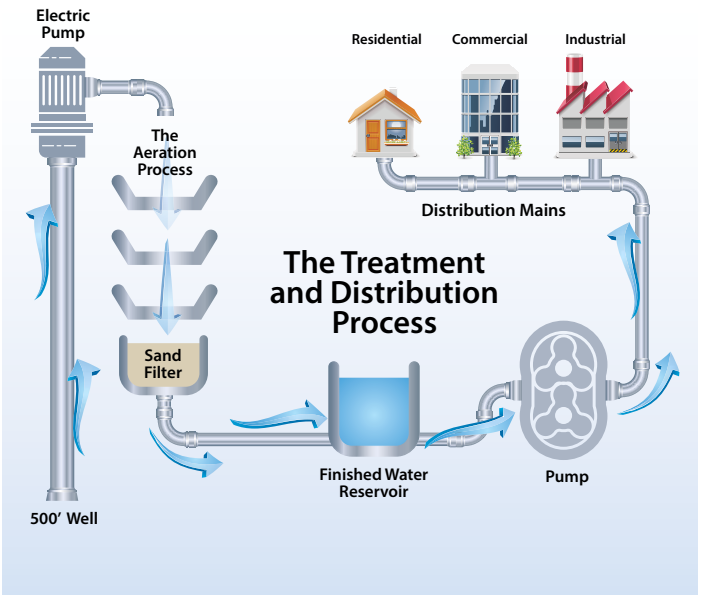
Figure 1

The Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) have asked all public water suppliers, including MLGW, to include the following language in their Water Quality Reports for your general knowledge:

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 EPA's Safe Drinking Water Hotline at 800-426-4791.

In short, the sweetness, the great taste, the low cost, and the abundance of Memphis water makes for water that is … clearly superior.

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 2018, as years before, Memphis water met or exceeded Environmental Protection Agency (EPA) standards. 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.

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 human activity.

In order to ensure that tap water is safe to drink, EPA and the Tennessee Department of Environment and Conservation (TDEC) prescribe 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.

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

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.

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/Center for Disease Control (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 800-426-4791.

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/program-areas/wr-water-resources/water-quality/source-water-assessment.html.

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, 7:30 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 or view it online at: epa.gov/sites/production/files/2015-10/documents/2006_08_28_sourcewater_guide_citguidegwp_1990.pdf.

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 1 p.m. unless otherwise noted. 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, please call Greg Parker, Supervisor, Water Quality Section, Shelby County Health Department, 901-222-9599.

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.

2018 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	0.11 - 0.17 parts per million	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
NITRATE as Nitrogen (N)	0.06 parts per million	10.0 parts per million	10.0 parts per million	BDL - 0.43 parts per million	Erosion of natural deposits; leaching from septic tanks; sewage; runoff from fertilizer use.
SODIUM *	8.63 parts per million	Not applicable	Not applicable	5.46 - 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 United States since the mid-1900s. Memphis Light, Gas and Water 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 Centers for Disease Control and Prevention 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 accepted the recommendation and changed the fluoride content in the finished water from 1.0 mg/L to 0.7 mg/L in 2013.

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.
- Washing your car at a car wash prevents 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 Drugs 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 of precincts 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:

tdeconline.tn.gov/rxtakeback. For a full Tennessee listing of the locations participating in the program, go to: tn.gov/content/dam/tn/environment/sustainable-practices/documents/opsp_pharm_take-back-locations-updated-january.pdf.

- 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 Greg Parker, Supervisor, Water Quality Section, Shelby County Health Department by email: greg.parker@shelbycountytn.gov or call 901-222-9599.

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 is 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 Memphis Light, Gas and Water in areas of Memphis and Shelby County. Shown is the most recent data collected.

Fifty homes, most of which had some lead plumbing constituents, were tested. Out of that number, only three sites 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, please contact MLGW's Customer Care Center at 901-544-6549, 7 a.m.-7 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 0.004% in Mar. 2018	Presence of coliform bacteria in 5% of monthly samples	Zero bacteria detected	Number of positives out of number of samples for the year: 1 out of 2,901 or 0.03%	Naturally present in the environment.

Results surpass state and federal drinking water regulations.

The Coliform Group

Water Quality Assurance Laboratory staff analyzed 2,901 bacteriological tests in 2018 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 2018 year proved to be negative.

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. We found coliforms indicating the need to look for potential problems in water treatment or distribution. When this occurs we are required to conduct an assessment to identify problems and to correct any problems that were found during this assessment.

During the past year we were required to conduct one Level 1 assessment. One Level 1 assessment was completed. In addition, we were required to take one corrective action and we completed one of these actions.

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	***4.72 parts per billion	80 parts per billion	Not applicable	BDL - 17.0 parts per billion	By-products of drinking water disinfection.
HALOACETIC ACIDS (HAA5)	***1.7 parts per billion	60 parts per billion	Not applicable	BDL - 4.9 parts per billion	By-products of drinking water disinfection.
CHLORINE	1.2 parts per million	MRDL - 4.0 parts per million	MRDLG – 4.0 parts per million	1.05 - 1.5 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 2018. 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)	52	20 - 105	Erosion of natural deposits.
Calcium (ppm)	9.5	4.15 - 22.25	Erosion of natural deposits.
Chloride (ppm)	**5.3***	**2.4 - 34.7***	Erosion of natural deposits.
Hardness (ppm)	45	16 - 97	Erosion of natural deposits.
Hardness (grains/gallon)	2.7	0.9 - 5.7	Erosion of natural deposits.
Iron (ppm)	0.03	0.01 - 0.2	Naturally occurring.
pH (Standard)	7.2	6.4 - 7.5	-------
Phosphate (ppm)	1.03	0.03 - 1.7	Water additive for corrosion control.
Sulfate (ppm)	**22.2***	**4.9 - 30.1***	Naturally present in the environment.
Temperature (°F)	65.1	59.7 - 71.1	-------

The values with an asterisk are the most recent analyses conducted in 2017 at the water treatment plants. The next testing will be done in 2020.

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 2018 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 2,901 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.