

CITY OF **Clemson**

Annual Water Quality Report



2022



City of Clemson, SC PWSID #SC3910004
2022 Annual Water Quality Report
Developed April, 2023

We're pleased to present to you this year's Annual Water Quality Report. This report is designed to inform you about the quality of your drinking water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. The City of Clemson is committed to providing residents with a safe and reliable supply of high-quality drinking water. Your water is tested using sophisticated equipment and advanced procedures. Your water meets state and federal standards for both appearance and safety. The annual "Consumer Confidence Report," required by the Safe Drinking Water Act (SDWA), informs you where your water comes from, what our tests show about it, and other things you should know about your drinking water.

If you have any questions about this report or concerning your water utility, please contact Teddy Atkins or Benjie McGill at 864-653-2046. We want our valued customers to be informed about their water utility. If you want to learn more, please attend any of our regularly scheduled City Council meetings. They are held on the first and third Monday of each month at City Hall. The time of the meeting is posted at City Hall and on the City website at <http://www.cityofclemson.org>.

Water Source:

Our water source is supplied by surface water from the U.S. Army Corps of Engineers Hartwell Lake Reservoir. The water from Lake Hartwell Reservoir is purchased from Anderson Regional Joint Water System (ARJWS). The plant operates 24 hours per day, every day of the year. During 2022, the plant treated 7.6 billion gallons of water. The plant is operated by highly trained state certified operators.

An Explanation of the Water-Quality Data Table:

The table shows the results of the water-quality analyses. This report is based upon tests conducted in the year 2022 by the City of Clemson and the Anderson Regional Joint Water System's Hartwell Lake Filter Plant (ARJWS). In addition to the continuous monitoring of water quality parameters, the ARJWS operators perform over 200 laboratory tests daily. The data presented in this report is from the most recent testing done in accordance with State and Federal regulations. Every regulated contaminant that was detected in the water, even in the minutest traces, is listed here. The table contains the name of each substance, the highest level allowed by regulation (MCL), the ideal goals for public health, the amount detected, the usual sources of such contaminants, footnotes explaining our findings, and a key to units of measurement. Definitions of MCL and MCLG are important.

Terms used in the Water -Quality Table and in other parts of this report are defined below.

Maximum Contaminant Level or (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 or (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.

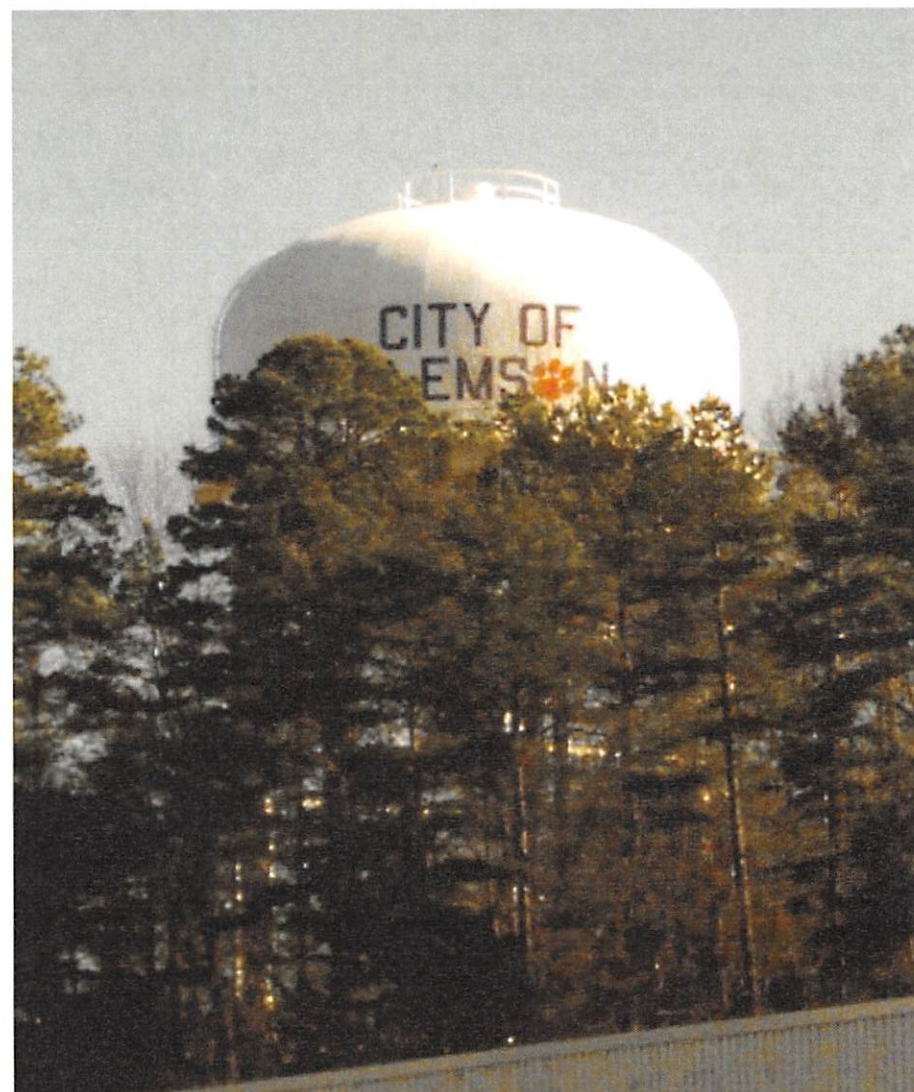
Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

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

Maximum Residual Disinfectant Level or (MRDL): The highest level of 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 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 contamination.

Total Organic Carbon (TOC): The measure of the total amount of organic matter within a water solution. For drinking water purposes, it is an indicator of overall water quality prior to and after treatment.



Key To Table	
AL = Action Level	NTU = Nephelometric Turbidity Units
BDL = Below Detectable Level	pci/l = picocuries per liter (a measure of radioactivity)
MCL = Maximum Contaminant Level	ppm = parts per million, or milligrams per liter (mg/L) (This compares to one penny in \$10,000)
MCLG = Maximum Contaminant Level Goal	ppb = parts per billion, or micrograms per liter (mg/L) (This compares to one penny in \$10,000,000)
MFL = Million Fibers per Liter	ppt = parts per trillion, or nanograms per liter
mrem/year = millirems per year - (a measure of radiation absorbed by the body)	ND = Non-detectable
MRDL = Maximum Residual Disinfectant Level	RAA = Running Annual Average
MRDLG = Maximum Residual Disinfectant Level Goal	TT = Treatment Technique

SECONDARY STANDARDS/OPERATIONS DATA: These tests indicate results that may affect the appearance, odor, and taste in drinking water. Parameters of pH, alkalinity, chlorine, hardness, and fluoride are all monitored routinely at the filter plant. These data represent the annual average of those parameters. Iron, manganese, sodium, and sulfate were collected as grab samples and analyzed by a third-party lab separately.

Constituent	Annual Average	MCL
pH	7.12	6.5 - 8.5
Alkalinity	12.36 mg/L	N/A
Chlorine	1.75 mg/L	4.0 mg/L, MRDL
Hardness	13.70 mg/L	N/A
Iron	BDL	0.30 mg/l
Manganese	0.009 mg/L	0.05 mg/L
Sodium	5.1 mg/L	N/A
Sulfate	10.8 mg/L	250 mg/L
Fluoride	0.56 mg/L	4.0 mg/L

SOURCE WATER ASSESSMENT AND PROTECTION PLANS

Source Water Assessment and Protection Plans (SWAP) were completed for all public water systems in South Carolina in May, 2003. SWAPs identify potential sources of contamination to drinking water supplies. The SC Department of Health and Environmental Control completed the plans for all SC public water systems. A copy of this assessment report can be obtained by contacting the Bureau of Water in Columbia, South Carolina at 1-803-898-4300.

Compliance Sampling Results

Contaminant	Date Tested	Unit	MCL	MCLG	Results	Range	Major Sources	Violation
Microbiological Contaminants								
Total Coliform	2022	0	0	0	0		Coliforms are bacteria that are naturally present in the environment & are used as an indicator that other potentially harmful bacteria may be present. If Coliforms were found in more samples than allowed, this was a warning of potential problems.	NO
E. Coli	2022	0	0	0	0		Fecal coliforms & E. Coli are bacteria whose presence indicates that the water may be contaminated with human or animal waste. Microbes in these waste can cause short-term effects such as diarrhea, cramps, nausea, headaches, & other symptoms. They may pose a special health risk for infants, young children, & people with severely-compromised immune systems.	NO
Turbidity								
Highest Single Measurement	2022	NTU	Treatment Technique, 1 NTU	N/A	0.30	0.03-0.30	Soil Runoff. Turbidity is a measurement of the cloudiness of the water caused by suspended particles.	NO
Lowest Monthly % Meeting Limit	2022	NYU	Treatment Technique, 0.3 NTU	N/A	99.5%	99.5%	Soil Runoff. Turbidity is a measurement of the cloudiness of the water caused by suspended particles	NO
Inorganic Contaminants								
Lead	2022	ppb	AL=15	0	90th%= 0.012	ND-0.613	Corrosion of household plumbing Erosion of natural deposits	NO
Copper	2022	ppm	AL=1.3	1.3	90th%= 0.166	0.006-0.027	Corrosion of household plumbing Erosion of natural deposits	NO
Chlorine	2022	ppm	MRDL = 4	MRDLG = 4	1.75	1.5-1.9	Water additives used to control microbes	NO
Fluoride	2022	ppm	4	4	0.58	0.58	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories	NO
Nitrate	2022	ppm	10	10	0.14	0.14	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits	NO
Volatile Organic Contaminants								
TTHMs (Total Trihalomethanes)	2022	ppb	80	N/A	18	7.6-18.3	By-products of drinking water chlorination	NO
HAA (Haloacetic Acids)	2022	ppb	60	N/A	26	6.8-25.7	By-products of drinking water chlorination	NO
Synthetic Organic Contaminants								
Pentachlorophenol	2021	ppb	1	0	0.015	0.015	Discharge from wood preserving factories.	NO

Table of Detected Contaminants Footnote

The above table shows only the contaminants that had detections. Anderson Regional Joint Water System (ARJWS) and The City of Clemson had no violations. In summary, we are pleased to report that your drinking water meets or exceeds all Federal and State requirements.

****Lead in Drinking Water:** If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. For 2022, The City of Clemson had no sites tested exceeding the action level. The City of Clemson is on reduced monitoring for lead and copper. Its next monitoring event will be in 2025. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Clemson 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 1-800-426-4791 or at <http://www.epa.gov/safewater/lead>.

Copper in Drinking Water: The data is from The City of Clemson's most recent test period, June 2022 -Sept 2022 and shows the 90th percentile results. The City of Clemson had no sites tested exceeding the action level.

Total Coliform: Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. No Coliform samples were found positive during the 2022 testing period.

Fecal Coliform and E. coli: Fecal Coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal waste. Microbes in these wastes can cause short term effects such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems. No Fecal Coliform or E. coli was found in any samples during the 2022 testing period.

During 2022, we were monitored for *PCBs/Toxaphene. No detections were noted.

***Polychlorinated biphenyls (PCBs)** are man-made chemicals that belong to a family of chemicals known as chlorinated hydrocarbons. PCBs were manufactured in the U.S. from 1929 until 1979, when their manufacture was banned due to concerns about their persistence, bioaccumulation, and potential for adverse effects on human health and the environment. Because PCBs are chemically stable with a high boiling point, and non-flammable with excellent electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer and hydraulic equipment; as plasticizers in paints, plastics and rubber products (including caulk) and in many other industrial applications.

Toxaphene, a synthetic organic chemical, is an amber, waxy organic solid with a piney odor. It was used as an insecticide for cotton and vegetables, and on livestock and poultry. In 1982, most of its uses were banned and in 1990, all uses were banned in the United States. EPA regulates toxaphene in drinking water to protect public health. Toxaphene may cause health problems if present in public or private water supplies in amounts greater than the drinking water standard set by EPA.

Total Organic Carbon (TOC) Removal

Analysis	Sample Frequency	Unit	MCL	Results*	Average Source TOC	Source TOC Range	Major Sources	Violation
Total Organic Carbon (TOC)	Monthly	ppm	35% Removal or Alternative Criteria	35% Removal and Alternative Criteria 1 and 2	1.67 mg/L	1.37 - 2.30 mg/L	Naturally present in the environment	NO

*For source water TOC level of >2.0 mg/L and alkalinity between 0–60 ppm, 35% TOC removal is required or the Alternative Criteria as specified in R 61-58.13F

For source water TOC level of <2.0 mg/L, Alternative Criteria 1 is used.

For finished water TOC < 2.0 mg/L, Alternative Criteria 2 is used.

The Lake Hartwell Filter Plant routinely meets Alternative Criteria 2 and typically meets Alternative Criteria 1.



The following is a list of contaminants that were tested for, but not detected, in the drinking water:

Arsenic, Cadmium, Chromium, Mercury, Nickel, Selenium, Hexachlorocyclopentadiene, Propachlor, Hexachlorobenzene, Lindane, Heptachlor, Aldrin, Alachlor, Heptachlor Epoxide, Chlordane, Metolachlor, Butachlor, Dieldrin, Endrin, Methoxychlor, Toxaphene, Simazine, Atrazine, Metribuzin, DBCP, EDB, 2,4,5- TP (Silvex), PCP, Methylene Chloride, Di-2-(Ethylhexyl) Adipate, Di-2-(Ethylhexyl) Phthalate, Aldicarb Sulfoxide, Aldicarb sulfone, Oxamyl (Vydate), Methomyl, 3-Hydroxycarbofuran, Aldicarb, Carbofuran, Carbaryl(Sevin), Dalapon, Dicamba, 2,4-D, Glyphosate, Dinoseb, Picloram, Benzo(a)Pyrene, p-Isopropyltoluene, Chloromethane, Dichlorodifluoromethane, Bromomethane, Chloroethane, , Hexachlorobutadiene, Naphthalene, 1,2,3- Trichlorobenzene, Cis-1,2-Dichloroethene, Cis-1,3 Dichloropropene, Dibromomethane, Antimony, Diquat, 1,1-Dichloropropene, 1,2-Dichloropropane, 2,2-Dichloropropane, trans-1,3-Dichloropropene, 1,2,3-Trichloropropane, 1,3-Dichloropropane, 1,2,4-Trimethylbenzene, 1,2,4-Trichlorobenzene, n-Butylbenzene, Beryllium, 1,3,5-Trimethylbenzene, Tert-Butylbenzene, Sec-Butylbenzene, Bromochloromethane, Xylenes(total), 2-Chlorotoluene, 4-Chlorotoluene, 1,2-Dichlorobenzene, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, Vinyl Chloride, 1,1-Dichloroethylene, 1,1-Dichloroethane, Trans-1,2-Dichloroethene, 1,2-Dichloroethane, 1,1,1-Trichloroethane, Thallium, Carbon Tetrachloride, Trichloroethylene, 1,1,2-Trichloroethane, Tetrachloroethene, 1,1,1,2- Tetrachloroethane, 1,1,2,2-Tetrachloroethane, Chlorobenzene, Benzene, Toluene, Ethylbenzene, Bromobenzene, Isopropylbenzene, Styrene, MTBE n-Propylbenzene, Barium, Trichlorofluoromethane, BCH-Gamma, M-Dichlorobenzene, O-Dichlorobenzene, P-Dichlorobenzene, and Tetrachloroethylene.

*DCPA degradates are not separately determined by these methods; therefore, they will be reported as the sum of both degradates.

Unregulated Contaminant Monitoring Regulation 4

The City of Clemson was monitored for Unregulated Contaminant Monitoring Regulation 4 (UCMR4) in 2021. Results for UCMR4 are kept on file at the City of Clemson Utilities Department. If you have any questions or would like to receive additional information concerning the UCMR4, please contact Teddy Atkins or Benjie McGill at (864) 653-2046.

The unregulated contaminants that were detected during the unregulated contaminant monitoring period are:

Hexavalent Chromium (Dissolved), Strontium, Chromium, and Chlorate.

The unregulated contaminants which were tested for but were not detected are:

1, 1-Dichloroethane, 1,2,3-Trichloropropane, 1,3-butadiene, 1,4-Dioxane, Bromochloromethane, Bromomethane (Methyl Bromide), Chlorodifluoromethane, Chloromethane (Methyl Chloride), Cobalt, Molybdenum, Perfluorooctanesulfonic acid - PFOS, Perfluoro-1-butanesulfonic acid -PFBS, Perfluoro-1-hexanesulfonic acid - PFHxS, Perfluoroheptanoic acid - PFHpA, Perfluoro-n-nonanoic acid -PFNA, Perfluorooctanoic acid - PFOA, and Vanadium.



Anderson Regional Joint Water System (ARJWS) conducted PFAS sampling in its finished treated water on March 30, 2023. This was in addition to the samples collected previously in August 2022. Both sampling results are summarized in the chart below. All results are less than the proposed MCLs.

Compound	Proposed MCL	ARJWS Level August 2022	ARJWS Level March 2023	Unit
PFOA	4.0	2.8	3.0	parts per trillion (ppt)
PFOS	4.0	2.1	2.4	ppt
PFBS, PPFNA, PFHxS, GenX	1.0	0.0014	0.0015	Hazard Index (unitless)
****Hazard Index is an established EPA tool to understand health risks from chemical mixtures. It is a combination equation of the four PFAS listed.****				

Monitoring will continue, coupled with Anderson Regional Joint Water System’s ongoing commitment to source water protection. ARJWS is fully committed to supplying the highest and safest quality water to the 200,000 citizens within their districts.

Should you have any questions or concerns, please contact Jeff Caldwell at (864) 934-0625 or email jcaldwell@arijwater.com.

Required Additional Health Information

To ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes limits on 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.

Drinking water, including bottled water, may contain small amounts of contaminants. The presence of contaminants, however, does not indicate that water poses a health risk. The MCL's are set at very stringent levels. To understand the possible health effects described for many regulated constituents, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at (1-800-426-4791).



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, the elderly, and infants can be particularly at risk from infections. Such individuals should seek advice about drinking water from their health care providers. 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).

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 picks up naturally-occurring minerals, radioactive material, and substances resulting from animal or human activity.

Contaminants that may be present in source water include:

- (A) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- (B) 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.
- (C) Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water runoff, and residential uses.
- (D) 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.
- (E) Radioactive contaminants, which can be naturally-occurring or 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. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Water quality is an important concern for water utility customers everywhere. Very few countries provide the quality of tap water found in the United States. EPA establishes guidelines to help ensure that the water provided to you by the water purveyor is safe and desirable. However, water purveyors cannot control the various conditions of plumbing in households and businesses. When you have a high number of customers drawing water from main lines, water is used at a higher rate creating turnover of older water and allowing for fresher water to enter in its place. The water between the main line and your water faucet has fewer sources drawing water from it; those sources are limited to the occupants of the household or business. With fewer sources drawing water from the customer's service line, the turnover of water in that line is greatly reduced. To illustrate this point, think of the difference between a river and a pond, a river is flowing allowing fresher water to move into the place of older water, a pond stagnates reducing the turnover of older water making it generally less safe. The City of Clemson recommends that you run water from the faucet for at least thirty seconds prior to drinking or cooking to ensure that any residual sediment in plumbing is flushed out and fresher water from the water main has entered through the faucet. Customers should not drink or cook with water from the hot water side of their water faucet. Water drawn from the hot side of their water faucet comes from the hot water heater which stores water for an unspecified amount of time. This increases the age of the water in the tank and decreases the turnover time for fresher water to take its place. Water heaters act as sumps since water enters and leaves from the top of the water heater causing sediment and rust to accumulate leading to possible discolored water.

In our continuing efforts to maintain a safe and dependable water supply it may be necessary to make improvements to the water system. The costs of these improvements may be reflected in the rate structure. Rate adjustments may be necessary in order to address these improvements.

The City of Clemson Utilities Department works around the clock to provide top quality water to every tap. We ask that all our customers help us protect our water sources, which are the heart of our community, our way of life, and our children's future.

We are members of the American Water Works Association (AWWA), the Water Environment Federation, (WEF), the Water Environmental Association of South Carolina (WEASC), and the South Carolina Rural Water Association (SCRWA).

Water Quality Data for community water systems throughout the United States is available at www.waterdata.com.



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