

ANNUAL WATER QUALITY REPORT

REPORTING YEAR 2019

Presented By
**Chesterfield County
Department of Utilities**



Quality First

The Chesterfield County Department of Utilities is proud to present its annual water quality report. This edition covers all testing completed from January 1 through December 31, 2019. We dedicate ourselves to producing drinking water that meets all state and federal standards. We continually strive to adopt new and better methods for delivering the best-quality drinking water to you. As new challenges to drinking water safety emerge, we remain vigilant in meeting the challenges of source water protection, water conservation, and community education while continuing to serve the needs of all our water users.

The Chesterfield County Department of Utilities is a long-standing member of the Partnership for Safe Water and was the first utility in Virginia to meet the program standards. This joint venture of the U.S. Environmental Protection Agency and the American Waterworks Association assesses utilities to develop excellence in treatment. The Partnership for Safe Water has consistently recognized Chesterfield County Utilities with the Director's Award for producing excellent water quality and continuous improvements.

For more information about this report, or to ask questions about your drinking water, call the quality assurance coordinator at (804) 744-1360. A map of water sources is available at www.chesterfield.gov/utilities.

Source Water Assessment

The Safe Drinking Water Act mandates source water assessments be performed by the Virginia Department of Health for all public water sources, including those servicing Chesterfield County. During 2001, the Virginia Department of Health conducted a source water assessment of its system.

Using criteria developed by the state in its U.S. EPA-approved Source Water Assessment Program, Swift Creek Reservoir, James River, and Lake Chesdin were determined to be of high susceptibility to contamination. The assessment reports consist of maps showing the source water assessment area, an inventory of known land use activities of concern, and documentation of any known contamination within the previous five years. These reports are available by contacting the local Virginia Department of Health office at (804) 864-7409 or writing the VDH East Central Support Office, Office of Water Programs, 109 Governor Street (UB23), Richmond, VA 23219.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised individuals such as people with cancer undergoing chemotherapy, those who have undergone organ transplants, those with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. Environmental Protection Agency and 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 Safe Drinking Water Hotline at (800) 426-4791.

Chesterfield County's Water Sources

Chesterfield County Utilities Department customers are fortunate because their water is supplied by three sources. These sources assure adequate water supply well into the 21st century. The three sources that supply Chesterfield County's potable water are Swift Creek Reservoir, Lake Chesdin, and James River. An average of 39.8 million gallons of water per day (mgd) was treated and delivered from these three water supplies in 2019.

The Department of Utilities owns and operates Addison-Evans Water Production and Laboratory Facility, which is located on Swift Creek Reservoir. This facility has a capacity of 12 mgd and produced an average of 6.9 mgd. The county is one of five members of the Appomattox River Water Authority, which is located on Lake Chesdin. The county has a daily allocation of 66.54 mgd from the authority and received an average of 23.1 mgd from the facility. The third water source is the James River, which supplies the treatment facility owned and operated by the city of Richmond. This plant supplies water to Richmond and the counties of Chesterfield, Goochland, Hanover, and Henrico. The county's contract with the city assures an available supply of 32 mgd. The James River supplied an average of 9.8 mgd of drinking water in 2019.

Cryptosporidium in Water

Cryptosporidium is a microbial parasite found in surface water. Filtration methods cannot guarantee 100-percent removal, and current test methods are unable to determine if the organisms are dead or capable of causing disease. Cryptosporidium must be ingested to cause illness, and it may be spread through means other than drinking water. Symptoms include nausea, diarrhea, and abdominal cramps. Healthy individuals usually overcome their illness within a few weeks. Cryptosporidium can be life threatening for immunocompromised people, who should consult their doctors for precautions to take to avoid infection.

The source water for all three treatment plants supplying Chesterfield County's potable water distribution system was tested for Cryptosporidium between 2015 and 2018. This testing meets the requirements of the Long Term 2 Enhanced Surface Treatment Rule, or LT2. Test results showed that all three county water sources had a monthly average below the LT2 designated limit of 0.075 oocyst per liter. These results determined no additional treatment was needed for the three treatment facilities based on the results, as dictated by LT2.

SOURCE WATER	LEVEL DETECTED
Swift Creek Reservoir	0.002 oocyst per liter
James River	0.054 oocyst per liter
Lake Chesdin	0.039 oocyst per liter

Sampling Results

During the past year, water delivered to homes or businesses complied with all state and federal primary drinking water regulations. The table below shows what substances were detected in drinking water during 2019. Although all the substances listed are below the maximum contaminant limit set by the U.S. Environmental Protection Agency, we believe it is important that you know exactly what was detected and how much of the substance was present in the water.

Certain substances less than once per year because the concentrations do not change frequently, as required by the state. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

We participated in the fourth stage of the U.S. EPA's Unregulated Contaminant Monitoring Rule program (UCMR4) by performing additional tests on our drinking water. UCMR4 benefits the environment and public health by providing the U.S. EPA with data on the occurrence of contaminants suspected to be in drinking water, in order to determine if the U.S. EPA needs to introduce new regulatory standards to improve drinking water quality.

REGULATED SUBSTANCES											
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	ARWA		Addison-Evans		Richmond		VIOLATION	TYPICAL SOURCE
				AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH		
Alpha Emitters (pCi/L)	2019	15	0	ND	NA	ND	NA	ND	NA	No	Erosion of natural deposits
Barium (ppm)	2019	2	2	0.024	NA	0.029	NA	0.028	NA	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beta/Photon Emitters¹ (pCi/L)	2019	50	0	1.6	NA	1.4	NA	0.7	NA	No	Decay of natural and man-made deposits
Chloramines² (ppm)	2019	[4]	[4]	3.03	0.2–4.6	3.03	0.2–4.6	3.03	0.2–4.6	No	Water additive used to control microbes
Chlorite (ppm)	2019	1	0.8	0.36	ND–0.36	ND	NA	ND	NA	No	Byproducts of drinking water disinfection
Combined Radium (pCi/L)	2019	5	0	ND	NA	ND	NA	ND	NA	No	Erosion of natural deposits
Fluoride (ppm)	2019	4	4	0.81	0.07–0.81	0.82	0.54–0.82	0.82	0.38–0.82	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Haloacetic Acids [HAAs] (ppb)	2019	60	NA	20.5	7.9–30	21.8	11–32	21.5	2.6–27	No	Byproducts of drinking water disinfection
Nitrate (ppm)	2019	10	10	0.16	NA	ND	NA	0.23	NA	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Total Coliform Bacteria (% positive samples)	2019	TT	NA	1.10	NA	1.10	NA	1.10	NA	No	Naturally present in the environment
Total Organic Carbon³ (removal ratio)	2019	TT	NA	1.44	1.27–1.54	1.26	1.14–1.37	1.3	1.1–2.1	No	Naturally present in the environment
TTHMs [Total Trihalomethanes] (ppb)	2019	80	NA	28.2	12–41	29.2	12–45	28.5	11–46	No	Byproducts of drinking water disinfection
Turbidity⁴ (NTU)	2019	TT	NA	0.12	0.01–0.12	0.08	0.02–0.08	0.32	ND–0.32	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2019	TT = 95% of samples meet the limit	NA	100	NA	100	NA	100	NA	No	Soil runoff

Tap water samples were collected for lead and copper analyses from sample sites throughout the community

				ARWA		Addison-Evans		Richmond			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH %ILE)	SITES ABOVE AL/ TOTAL SITES	AMOUNT DETECTED (90TH %ILE)	SITES ABOVE AL/ TOTAL SITES	AMOUNT DETECTED (90TH %ILE)	SITES ABOVE AL/ TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2019	1.3	1.3	0.152	0/50	0.113	0/50	0.087	0/50	No	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)	2019	15	0	ND	0/50	ND	0/50	ND	0/50	No	Corrosion of household plumbing systems; erosion of natural deposits

SECONDARY SUBSTANCES

				ARWA		Addison-Evans		Richmond			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Sulfate (ppm)	2019	250	NA	24.5	NA	33.8	NA	27.2	NA	No	Water additive to remove particles

UNREGULATED SUBSTANCES

		ARWA		Addison-Evans		Richmond			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE	
Bromodichloromethane (ppb)	2019	4.4	2.1–7.7	5.2	1.8–8.5	4.3	1.9–9.1	Byproducts of drinking water disinfection	
Chlorodibromomethane (ppb)	2019	0.9	ND–1.4	0.9	ND–1.6	0.6	ND–1.5	Byproducts of drinking water disinfection	
Chloroform (ppb)	2019	15.8	10–32	20.6	10–35	19.5	8.8–35	Byproducts of drinking water disinfection	

Definitions

90th %ile: The levels reported for lead and copper represent the 90th percentile of the total number of sites tested. The 90th percentile is equal to or greater than 90 percent of our lead and copper detections.

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

LRAA (Locational Running Annual Average): The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters. Amount Detected values for TTHMs and HAAs are reported as the highest LRAAs.

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 treatment 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.

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.

MRDLG (Maximum Residual Disinfectant Level Goal): 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.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L (picocuries per liter): A measure of radioactivity.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

removal ratio: A ratio between the percentage of a substance actually removed to the percentage of the substance required to be removed.

SMCL (Secondary Maximum Contaminant Level): These standards are developed to protect aesthetic qualities of drinking water and are not health based.

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



UNREGULATED CONTAMINANT MONITORING RULE - PART 4 (UCMR4)

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	ARWA		Addison-Evans		Richmond		TYPICAL SOURCE
		AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	
Bromochloroacetic Acid (ppb)	2019	2.1	1.1–3.3	2.2	1.1–3.7	1.6	1.0–2.0	Byproducts of drinking water disinfection
Bromodichloroacetic Acid (ppb)	2019	1.3	0.72–2.7	1.6	0.7–2.8	1.4	1.1–2.1	Byproducts of drinking water disinfection
Chlorodibromoacetic Acid (ppb)	2019	0.22	ND–0.57	0.21	ND–0.43	0.19	ND–0.43	Byproducts of drinking water disinfection
Dibromoacetic Acid (ppb)	2019	0.13	ND–0.37	ND	NA	ND	NA	Byproducts of drinking water disinfection
Dichloroacetic Acid (ppb)	2019	10.8	8.5–17.1	12.3	8.8–17.0	10.9	6.8–14	Byproducts of drinking water disinfection
HAA5 (ppb)	2019	17	12–32	21	13–34	19	14–22	Byproducts of drinking water disinfection
HAA6Br (ppb)	2019	3.7	1.8–6.6	4.1	1.8–7.6	3.2	2.1–4.1	Byproducts of drinking water disinfection
HAA9 (ppb)	2019	20	16–39	24	16–41	22	17–26	Byproducts of drinking water disinfection
Manganese (ppb)	2019	7.3	6.4–7.3	2.7	0.6–2.7	1.1	0.42–1.1	Erosion of natural deposits
Monobromoacetic Acid (ppb)	2019	ND	NA	0.06	ND–0.38	ND	NA	Byproducts of drinking water disinfection
Monochloroacetic Acid (ppb)	2019	0.51	ND–2.1	0.37	ND–2.2	ND	NA	Byproducts of drinking water disinfection
Trichloroacetic Acid (ppb)	2019	5.4	3.6–13	7.8	4.1–15	7.0	5.8–8.0	Byproducts of drinking water disinfection

¹ The MCL for beta particles is 4 mrem/year. U.S. EPA considers 50 pCi/L to be the level of concern for beta particles.

² Chloramine MRDL and MRDLG compliance is regulated by calculating a running annual average. The county distribution system's running annual average was 3.03 ppm (in compliance with the MRDL and MRDLG). Every month 180 measurements of total chlorine are performed in the distribution system and used in this calculation. Note that individual measurements are allowed by regulation to exceed the MRDL and MRDLG, as the highest measurements in 2019 were above 4 ppm.

³ The value reported under Amount Detected for TOC is the lowest ratio of the percentage of TOC actually removed to the percentage of TOC required to be removed. An average value greater than 1 indicates the water system is in compliance with the TOC removal requirement. Individual values less than 1 are allowed per regulation provided the average value was above 1. All average values in 2019 were above 1, and the lowest value was 1.1.

⁴ Turbidity is a measure of the cloudiness of the water. It is monitored because it is a good indicator of the effectiveness of the filtration system.

Substances That Could Be in Water Sources

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 substances resulting from the presence of animals or from human activity. Substances 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, or wildlife;

Inorganic contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater 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 stormwater runoff, and residential uses;

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and may also come from gas stations, urban stormwater runoff, and septic systems;

Radioactive contaminants, which can occur naturally or may be the result of oil and gas production and mining activities.

To ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (U.S. EPA) prescribes regulations that limit the amount of certain contaminants in water that is provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Lead and 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. The Chesterfield County Utilities Department is responsible for providing high-quality drinking water, but we 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. Customers concerned about lead in their water may wish to have their water tested. Information about lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at (800) 426-4791 or www.epa.gov/safewater/lead.