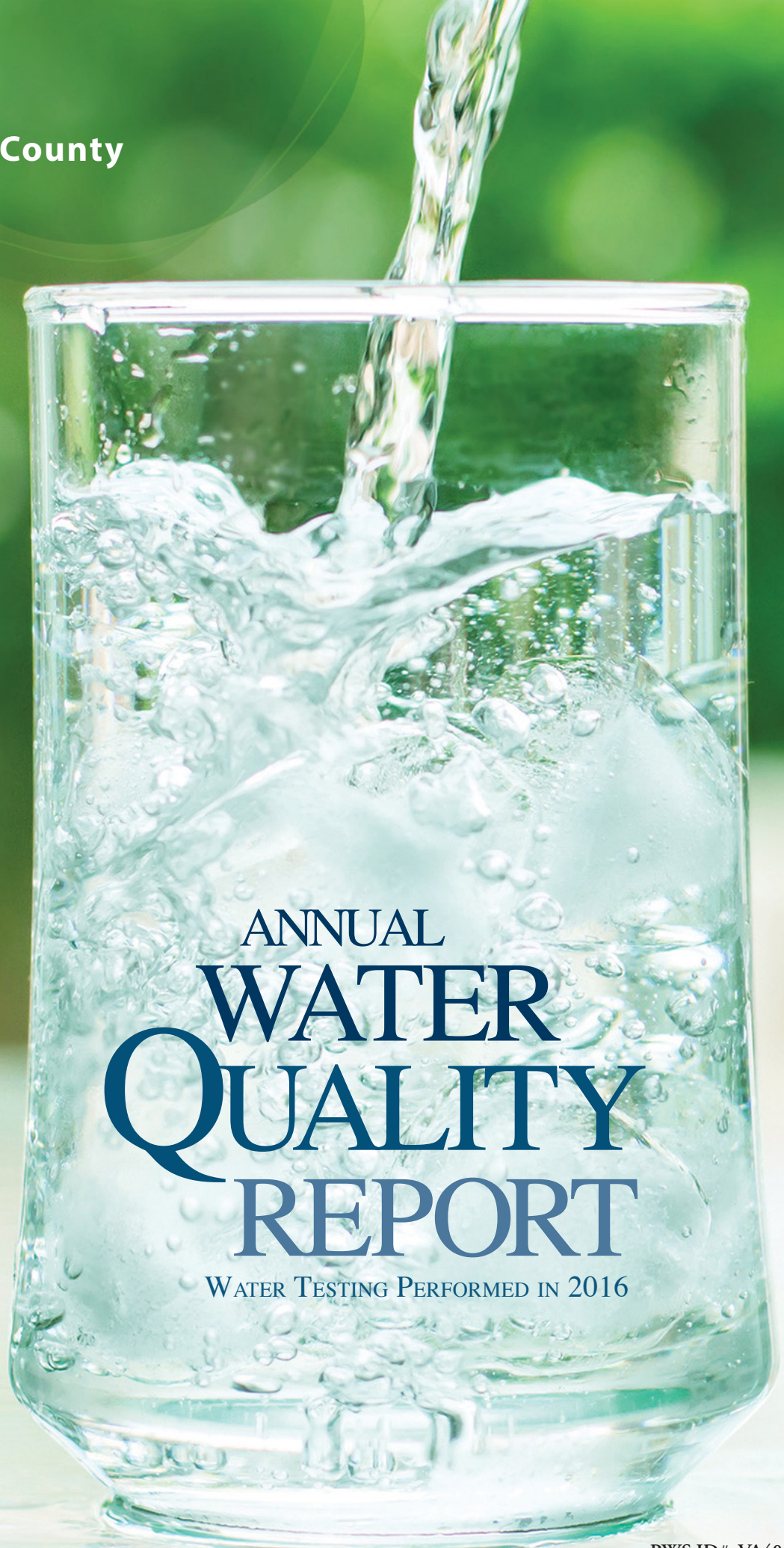


Presented By
Chesterfield County



ANNUAL
WATER
QUALITY
REPORT

WATER TESTING PERFORMED IN 2016

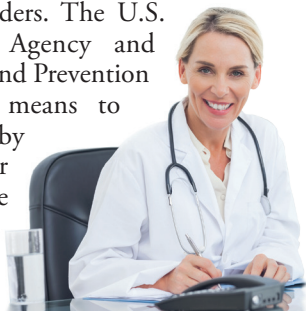
Quality First

The Chesterfield County Department of Utilities is proud to present its annual water quality report. This edition covers all testing completed from Jan. 1 through Dec. 31, 2016. 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. 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 longstanding member of the Partnership for Safe Water and is 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.

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.



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 at www.epa.gov/safewater/lead.

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 or mining activities.

To ensure that tap water is safe to drink, the U.S. Environmental Protection Agency prescribes regulations limiting the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water that 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 EPA's Safe Drinking Water Hotline at (800) 426-4791.

Cross-Connections and Backflow

Cross-connections are the links between a drinking-water system and a potentially hazardous source or substance, including but not limited to irrigation pipes and garden hoses that may carry fertilizers, pesticides, or weed killers. Backflow can occur when water pressure unexpectedly increases or decreases. To protect the drinking water from such hazards, mechanical safety devices called backflow preventers must be installed and routinely maintained. For more detailed information, visit www.chesterfield.gov/utilities.

Chesterfield County's Water Sources

Chesterfield County Department of Utilities 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 the James River. An average of 36.5 million gallons of water per day, or mgd, was treated and delivered from these three water supplies in 2016.

The Department of Utilities owns and operates the 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 7.4 mgd. The county is one of five members of the Appomattox River Water Authority, or ARWA. The ARWA is located on Lake Chesdin. The county has a daily allocation of 66.54 mgd from the authority and received an average of 20.1 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 to the counties of Chesterfield, Goochland, Hanover and Henrico. The county's contract with the city assures an available supply of 27 mgd. An average of 9.0 mgd of drinking water was received from the James River in 2016.

Source Water Assessment

The Safe Drinking Water Act mandated 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. Environmental Protection Agency-approved Source Water Assessment Program, the Swift Creek Reservoir, the 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 last five years from the date of the assessment. These reports are available by contacting the local Virginia Department of Health office at 804-674-2880, or writing the VDH East Central Field Office, Office of Water Programs, 300 Turner Road, Richmond, VA 23225.



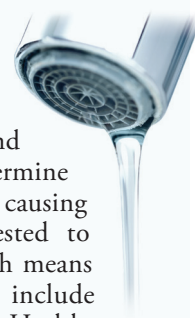
Cryptosporidium in Water

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 the 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 are being tested monthly for cryptosporidium for a two-year period beginning in 2015. This testing meets the requirements of the Long Term 2 Enhanced Surface Treatment Rule, or LT2. Tests results showed that all three county water sources had a monthly average below the LT2 designated limit of 0.075 oocysts per liter in 2016.

- Swift Creek Reservoir, 0.004 oocysts per liter
- James River, 0.051 oocysts per liter
- Lake Chesdin, 0.023 oocysts per liter

The data collected over the next few years will determine if additional treatment is needed; the last study completed in 2008 determined no additional treatment was needed for the three treatment facilities based on the results as dictated by LT2.



QUESTIONS?

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.

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 2016. Although all of 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. The state requires the Chesterfield County Utilities Department to monitor for certain substances less often than once per year because the concentrations do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES											
				ARWA		Addison-Evans		Richmond			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Alpha Emitters (pCi/L)	2013	15	0	0.7	NA	ND	NA	ND	NA	No	Erosion of natural deposits
Barium (ppm)	2016	2	2	0.020	NA	0.032	NA	0.029	NA	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Beta/Photon Emitters ¹ (pCi/L)	2013	50	0	2.0	NA	2.6	NA	2.0	NA	No	Decay of natural and man-made deposits
Chloramines ² (ppm)	2016	[4]	[4]	2.85	0.3–5.1	2.85	0.3–5.1	2.85	0.3–5.1	No	Water additive used to control microbes
Chlorite (ppm)	2016	1	0.8	0.49	ND–0.49	ND	NA	ND	NA	No	Byproduct of drinking-water disinfection
Combined Radium (pCi/L)	2013	5	0	0.7	NA	ND	NA	ND	NA	No	Erosion of natural deposits
Fluoride (ppm)	2016	4	4	0.82	ND–0.82	0.89	ND–0.89	0.84	ND–0.84	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Haloacetic Acids [HAAs] (ppb)	2016	60	NA	24.0	12–29	24.2	12–32	26.8	8.3–34	No	Byproduct of drinking-water disinfection
Nitrate (ppm)	2016	10	10	ND	NA	ND	NA	ND	NA	No	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	2016	80	NA	38.0	18–45	37.5	18–56	32.8	16–52	No	Byproduct of drinking-water disinfection
Total Coliform Bacteria (% positive samples)	2016	TT	NA	4.0	NA	0.6	NA	1.3	NA	No	Naturally present in the environment
Total Organic Carbon (removal ratio)	2016	TT	NA	1.40	1.26–1.51	1.20	1.07–1.30	1.5	1.2–2.5	No	Naturally present in the environment
Turbidity ³ (NTU)	2016	TT	NA	0.20	0.02–0.20	0.09	0.01–0.09	0.33	ND–0.33	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2016	TT=95% of samples <0.3 NTU	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%TILE)	SITES ABOVE AL/TOTAL SITES	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2016	1.3	1.3	0.095	0/50	0.123	0/50	0.120	0/50	No	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb)	2016	15	0	ND	0/50	ND	0/50	ND	0/50	No	Corrosion of household plumbing systems; erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	ARWA		Addison-Evans		Richmond		VIOLATION	TYPICAL SOURCE
				AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH		
Sulfate (ppm)	2016	250	NA	20.6	NA	40.0	NA	37.1	NA	No	Water additive to remove particles

UNREGULATED SUBSTANCES

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	
Bromodichloromethane (ppb)	2016	5.7	3.7–11	6.1	3.9–11	6.8	3.5–11	Byproduct of drinking-water disinfection
Chlorodibromomethane (ppb)	2016	0.9	ND–2.7	0.9	ND–2.8	1.0	ND–2.2	Byproduct of drinking-water disinfection
Chloroform (ppb)	2016	22.8	14–36	24.9	14–43	24.2	13–39	Byproduct of drinking-water disinfection

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

²Chloramine MRDL and MRDLG compliance is regulated by calculating a running annual average. The County's distribution system's running annual average was 2.85 ppm (in compliance with the MRDL and MRDLG). Every month, 150 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 2016 were above 4 ppm.

³Turbidity 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.

Definitions

AL (Action Level): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that 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 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): SMCLs are established to regulate the aesthetics of drinking water including appearance, taste and odor.

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