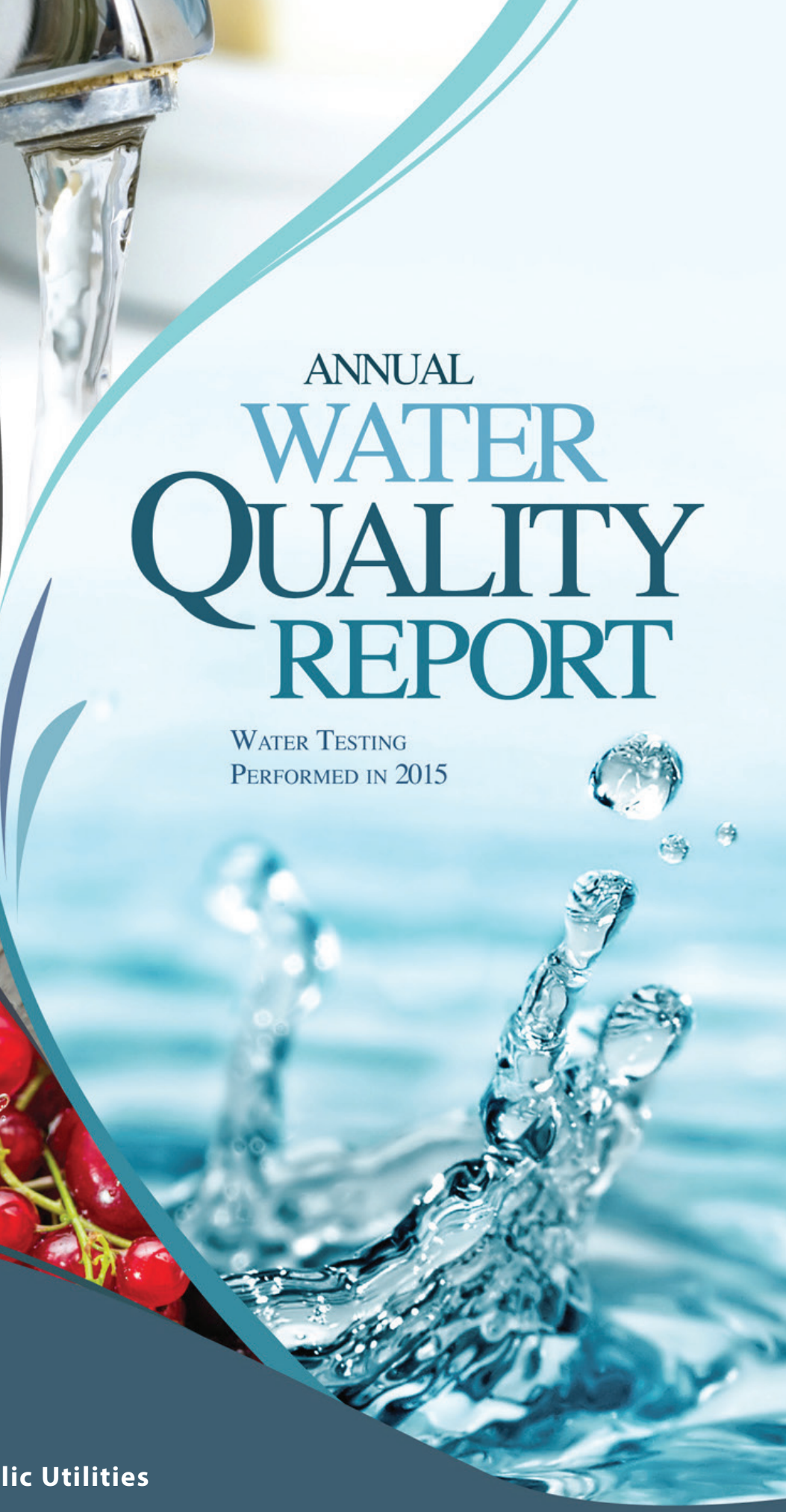
ANNUAL WATER QUALITY REPORT

Water Testing
Performed in 2015



Presented By
Henrico County Public Utilities

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Meeting the Challenge

Once again we are proud to present our annual drinking water report, covering all drinking water testing performed between January 1 and December 31, 2015. Over the years, we have dedicated ourselves to producing drinking water that meets all state and federal standards. We continually strive to adopt new methods for delivering high-quality drinking water to your homes and businesses. As new challenges to drinking water safety emerge, we remain vigilant in meeting the goals of source water protection, water conservation, and community education while continuing to serve the needs of all of our water users.

Please remember that we are always available to assist you should you ever have any questions or concerns about your water.

Community Participation

Regular meetings of the Henrico Board of Supervisors are typically held on the second and fourth Tuesdays of every month in the Board Room, Administration Building, Government Center, 4301 East Parham Road. The Board meeting schedule and agenda can be found at http://henrico.us/supervisors/.

Each Board agenda has a public comment period.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as those with cancer undergoing chemotherapy, those who have undergone organ transplants, people 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. EPA/CDC (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 or http://water.epa.gov/drink/hotline.

Substances That Could Be in Water

To ensure that tap water is safe to drink, the U.S. EPA 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.

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, 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 by-products of industrial processes and petroleum production and may also come from gas stations, urban stormwater runoff, and septic systems;

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

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

Where Does My Water Come From?

During the past fiscal year (July 1, 2014 to June 30, 2015) Henrico County customers received an average of about 22 million gallons per day of water from the county's water treatment facilities and about 12 million gallons per day from the City of Richmond's water treatment facilities. The source water for both facilities is surface water drawn from the James River. The county's water treatment facility began operations in April 2004 and can produce up to 80 million gallons per day to meet the county's future drinking water needs. The facility has multiple sources of electric power and emergency generators to enhance our ability to provide drinking water during local power outages.

Source Water Assessment

The Safe Drinking Water Act mandated that the Virginia Department of Health (VDH) perform source water assessments for all public water sources. 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. The VDH assessed our system in 2002 and determined that the source water for our system, the James River, was highly susceptible to contamination. As a result, both Richmond's and Henrico's water treatment facilities have systems that remove harmful contaminants from source water to ensure that high-quality drinking water is supplied to you. Information about the source water assessment is available from our Water Quality Engineer, Henrico County, Department of Public Utilities, at (804) 727-8700.

Community Water Fluoridation

The safety and benefits of fluoride are well documented. For over 70 years, U.S. citizens have benefited from drinking water containing fluoride, leading to better dental health. Drinking fluoridated water keeps the teeth strong and has reduced tooth decay by approximately 25 percent in children and adults.

Over the past several decades, there have been major improvements in oral health. Still, tooth decay remains one of the most common chronic diseases of childhood. Community water fluoridation has been identified as the most cost-effective method of delivering fluoride to all members of the community, regardless of age, educational attainment, or income level.

Nearly all water contains some fluoride, but usually not enough to help prevent tooth decay or cavities. Public water systems can add the right amount of fluoride to the local drinking water to prevent tooth decay.

Community water fluoridation is recommended by nearly all public health, medical, and dental organizations in the U.S. Because of its contribution to the dramatic decline in tooth decay, the Centers for Disease Control and Prevention (CDC) named community water fluoridation one of the greatest public health achievements of the 20th century. (Courtesy of CDC: cdc.gov/fluoridation)

Failure in Flint

The national news coverage of water conditions in Flint, Michigan, has created a great deal of confusion and consternation over the past year. The water there has been described as being corrosive; images of corroded batteries and warning labels on bottles of acids come to mind. But is corrosive water necessarily bad?

Corrosive water can be defined as a condition of water quality that will dissolve metals (iron, lead, copper, etc.) from metallic plumbing at an excessive rate. There are a few contributing factors but, generally speaking, corrosive water has a pH of less than 7; the lower the pH, the more acidic, or corrosive, the water becomes. (By this definition, many natural waterways throughout the country can be described as corrosive.) While all plumbing will be somewhat affected over time by the water it carries, corrosive water will damage plumbing much more rapidly than water with low corrosivity.

By itself, corrosive water is not a health concern; your morning glass of orange juice is considerably more corrosive than the typical lake or river. What is of concern is that exposure in drinking water to elevated levels of the dissolved metals increases adverse health risks. And there lies the problem.

Public water systems are required to maintain their water at optimal conditions to prevent it from reaching corrosive levels. Rest assured that we routinely monitor our water to make sure that what happened in Flint never happens here. For more information on how corrosivity impacts water quality, download this informative pamphlet: http://goo.gl/KpTmXv.

Questions?

If you have any questions about this report or your drinking water quality, please call our Water Quality Engineer, Henrico County, Department of Public Utilities, at (804) 727-8700. Also, you can view this report on our Web site at http://henrico.us/public-data/water-quality-report-2015.

Unidirectional Flushing

Unidirectional flushing (UDF) is using a high velocity of released water to clean the interior of the drinking water pipes. This procedure is used to enhance the water quality by removing any collected sediment from the water pipes.

Our contractor, WachsWater, is currently working on Year 5 of the 10 year program and is currently flushing in the western part of the county. Year 6 will begin in the fall of 2016, and we anticipate flushing 150 miles of water mains. Each resident affected by the flushing program will receive notification in the form of a letter two weeks in advance and a door hanger 48 hours ahead of the flushing. You will also see signs in your neighborhood advertising the flushing. A list of streets affected by the flushing will be maintained on our Web site. If you have any questions, please call our Community Liaison at (804) 501-7540.

Water Treatment Process

The treatment process consists of a series of steps.

First, raw (untreated) water is pumped from the river to the treatment plant. After it enters the plant, a coagulant is added and the water then goes to a rapid mixing basin followed by a flocculation basin. These two steps cause particles to adhere to one another (called floc), making them heavy enough to settle to the bottom of the sedimentation basins, where the sediments are removed.

The water then undergoes intermediate ozonation, which is used for primary disinfection of settled water prior to filtration. Next, the water goes through deep-bed granular activated carbon (GAC) filters. The GAC filters are used for removing turbidity, taste, and odors, and any bio-degradable organics and/or ozonation by-products remaining in the water following ozonation. Chloramines and fluoride are added to the filtered water, chloramines as a secondary disinfectant and fluoride to promote strong teeth. We also add a corrosion inhibitor to prevent the leaching of harmful metals from materials and components associated with service lines and home plumbing. Finally, the finished water is pumped into the distribution system, which delivers the water to your home or business.

Lead in Home Plumbing

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. We are 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 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 or at www.epa.gov/lead.

Tip Top Tap

The most common signs that your faucet or sink is affecting the quality of your drinking water are discolored water, sink or faucet stains, a buildup of particles, unusual odors or tastes, and a reduced flow of water. The solutions to these problems may be in your hands.

Kitchen Sink and Drain

Hand washing, soap scum buildup, and the handling of raw meats and vegetables can contaminate your sink. Clogged drains can lead to unclean sinks and backed up water in which bacteria (e.g., pink and black slime) can grow and contaminate the sink area and faucet, causing a rotten egg odor. Disinfect and clean the sink and drain area regularly. Also, flush regularly with hot water.

Faucets, Screens, and Aerators

Chemicals and bacteria can splash and accumulate on the faucet screen and aerator, which are located on the tip of faucets and can collect particles like sediment and minerals resulting in a decreased flow from the faucet. Clean and disinfect the aerators or screens on a regular basis.

Check with your plumber if you find particles in the faucet screen as they could be pieces of plastic from the hot water heater dip tube. Faucet gaskets can break down and cause black, oily slime. If you find this slime, replace the faucet gasket with a higher-quality product. White scaling or hard deposits on faucets and shower heads may be caused by hard water or water with high levels of calcium carbonate. Clean these fixtures with vinegar or use water softening to reduce the calcium carbonate levels for the hot water system.

Water Filtration and Treatment Devices

A smell of rotten eggs can be a sign of bacteria on the filters or in the treatment system. The system can also become clogged over time so regular filter replacement is important. (Remember to replace your refrigerator filter!)

Sampling Results

During the past year, we have taken hundreds of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The tables below show only those contaminants that were detected in the water. The state requires us to monitor for certain substances less often than once per year because the concentrations of these substances 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

				Henrico County Public Utilities		Richmond City Public Utilities			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppm)	2015	2	2	0.03	NA	0.03	NA	No	Erosion of natural Deposits
Chloramines[1] (ppm)	2015	[4]	[4]	3.0	0.0–4.9	3.0	0.0–4.9	No	Water additive used to control microbes
Combined Radium (pCi/L)	2011/2012[2]	5	0	2.3	NA	<0.6	NA	No	Erosion of natural deposits
Fluoride (ppm)	2015	4	4	0.66	NA	0.8	NA	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Gross Beta (pCi/l)	2011/2012[2]	50	0	4	NA	2.3	NA	No	Erosion of natural deposits
Haloacetic Acids [HAAs] (ppb)	2015	60	NA	27	<1–50	27	<1–50	No	By-product of drinking water disinfection
Nitrate (ppm)	2015	10	10	0.42	NA	<0.05	NA	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	2015	80	NA	34	1.3–47	34	1.3–47	No	By-product of drinking water disinfection
Total Coliform Bacteria[3] (% positive samples)	2015	5% of monthly samples are positive	0	3 samples (1.9%)	NA	3 samples (1.9%)	NA	No	Naturally present in the environment
Total Organic Carbon[4] (removal ratio)	2015	TT	NA	1.7	1.0–2.7	1.5	1.0–2.8	No	Naturally present in the environment
Turbidity[5] (NTU)	2015	TT	NA	0.96	NA	0.21	NA	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2015	TT = 95% of samples < 0.3 NTU	NA	99	NA	100	NA	No	Soil runoff

Tap water samples were collected for lead and copper analyses from sample sites throughout the community[6]

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2015	1.3	1.3	0.139	0/50	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2015	15	0	<1	0/50	No	Corrosion of household plumbing systems; Erosion of natural deposits

OTHER SUBSTANCES

				Henrico County Public Utilities		Richmond City Public Utilities			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Cryptosporidium[7] (Units)	2015	7.5	NA	0.022	ND–0.089	0.04	ND–0.417	No	Found in surface water throughout the United States

[1] Amount detected is the maximum of the rolling annual average. Range is the minimum and maximum of all 2015 samples used to calculate those averages.
[2] Henrico's Year sampled was 2011 and Richmond's Year Sampled was 2012.
[3] Both utilities sample for coliforms each month, and our highest number of positive samples during any month occurred in August. The results listed are the highest number of positive samples during any given month (3) and what percentage of the total monthly samples this number represents (1.9 percent).
[4] Amount detected is the lowest rolling annual average removal ratio. Range is the minimum and maximum of all samples used to calculate those averages. (A value of 1 or greater indicates that the water system complies with the TOC removal requirements.)
[5] 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.
[6] Ninetieth percentile of the latest round of sampling equals the value of lead or copper at the 90% level of ascending results.
[7] Both utilities are in the process of collecting 24 raw water samples for *cryptosporidium*. The final sample data will be completed in 2016. The results in the table are for the 9 samples collected in 2015. All 24 results will be averaged together to determine the level of disinfection treatment that will be required at the treatment plant.

Definitions

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

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.

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