

Presented By
Henrico County
Public Utilities



ANNUAL
**WATER
QUALITY
REPORT**

WATER TESTING PERFORMED IN 2017

Quality First

Once again we are pleased to present our annual water quality report. As in years past, we are committed to delivering the best-quality drinking water possible. To that end, we remain vigilant in meeting the challenges of new regulations, source water protection, water conservation, and community outreach and education, while continuing to serve the needs of all of our water users. Thank you for allowing us the opportunity to serve you and your family.

We encourage you to share your thoughts with us on the information contained in this report. Well-informed customers are our best allies.

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.

Where Does My Water Come From?

During the past fiscal year (July 1, 2016, to June 30, 2017), Henrico County customers received an average of 22 million gallons per day of water from the County's water treatment facilities and 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 ensure our ability to provide drinking water during local power outages.

Water Treatment Process

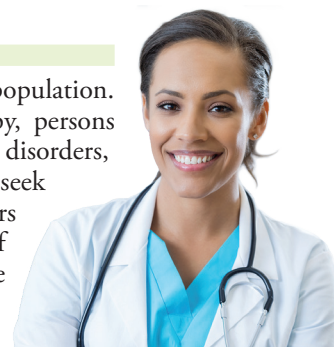
The treatment process consists of a series of steps.

First, raw (untreated) water is pumped from the river to the Water 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 the water. Next, the water goes through deep-bed granular activated carbon (GAC) filters. The GAC filters are used for removing turbidity, unpleasant taste and odors, and any biodegradable organics and/or ozonation by-products that remain 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.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons 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>.





Cryptosporidium

Cryptosporidium is a microscopic parasite that can cause cryptosporidiosis, a type of gastrointestinal illness in humans. Henrico County recently completed 24 months of monitoring of the untreated water in the James River for *cryptosporidium*, to determine if the level of treatment provided at the Henrico Water Treatment Plant is adequate for the concentration of *cryptosporidium* detected in the river. The average concentration detected in the river water was 0.033 oocysts per liter. If the average concentration detected in the river water had exceeded 0.075 oocysts per liter, additional treatment would be required at the Henrico Water Treatment Plant.

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, 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.

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 storm-water 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 may also come from gas stations, urban storm-water 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.

Water treatment is a complex, time-consuming process.

What's Your Water Footprint?

You may have some understanding about your carbon footprint, but how much do you know about your water footprint? The water footprint of an individual, community, or business is defined as the total volume of fresh water that is used to produce the goods and services that are consumed by the individual or community or produced by the business. For example, 11 gallons of water are needed to irrigate and wash the fruit in one half-gallon container of orange juice. Thirty-seven gallons of water are used to grow, produce, package, and ship the beans in that morning cup of coffee. Two hundred and sixty-four gallons of water are required to produce one quart of milk, and 4,200 gallons of water are required to produce two pounds of beef.

According to the U.S. EPA, the average American uses over 180 gallons of water daily. In fact, in the developed world, one flush of a toilet uses as much water as the average person in the developing world allocates for an entire day's cooking, washing, cleaning, and drinking. The annual American per capita water footprint is about 8,000 cubic feet; twice the global per capita average. With water use increasing six-fold in the past century, our demands for fresh water are rapidly outstripping what the planet can replenish.

To check out your own water footprint, go to <http://goo.gl/QMoIXT>.

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 website at <http://henrico.us/public-data/water-quality-report-2017>.

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 cannot control the variety of materials used in plumbing components. If 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.



BY THE NUMBERS

The number of gallons of water produced daily by public water systems in the U.S.

34
BILLION

1
MILLION The number of miles of drinking water distribution mains in the U.S.

The amount of money spent annually on maintaining the public water infrastructure in the U.S.

135
BILLION

300
MILLION The number of Americans who receive water from a public water system.

The age in years of the world's oldest water (found in a mine at a depth of nearly two miles).

2
BILLION

151
THOUSAND The number of active public water systems in the U.S.

Unidirectional Flushing

Unidirectional flushing (UDF) is performed by 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 will begin working on Year 6 of the 10-year program in the spring of 2018. The Year 6 flushing area is in the western part of the county; 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 website. If you have any questions, please call our Community Liaison at (804) 501-7540.



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		City of Richmond 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)	2017	2	2	0.034	NA	0.030	NA	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chloramines ¹ (ppm)	2017	[4]	[4]	2.9	0.0–5.6	4.0	0.1–5.1	No	Water additive used to control microbes
Combined Radium (pCi/L)	2017/2012 ²	5	0	<0.52	NA	<0.6	NA	No	Erosion of natural deposits
Fluoride (ppm)	2017	4	4	0.85	NA	0.6	NA	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Gross Beta (pCi/L)	2017/2012 ²	50	0	3	NA	2.3	NA	No	Erosion of natural deposits
Haloacetic Acids [HAA] (ppb)	2017	60	NA	25	<1–28	19	3–28	No	By-product of drinking water disinfection
Nitrate (ppm)	2017	10	10	0.14	NA	0.16	NA	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	2017	80	NA	36	0.5–54	31	16–39	No	By-product of drinking water disinfection
Total Coliform Bacteria ³ (# positive samples)	2017	TT	NA	0.65% (1 sample)	NA	2.3% (3 samples)	NA	No	Naturally present in the environment
Total Organic Carbon ⁴ (removal ratio)	2017	TT	NA	2.1	1.0–3.0	1.4	1.0–2.8	No	Naturally present in the environment
Turbidity ⁵ (NTU)	2017	TT	NA	0.93	NA	0.184	NA	No	Soil runoff
Turbidity (lowest monthly percent of samples meeting limit)	2017	TT = 95% of samples meet the limit	NA	100	NA	100	NA	No	Soil runoff
Tap Water Samples Collected for Lead and Copper Analyses from Sample Sites throughout the Community									
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE) ⁶	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		

¹ Amount detected is the maximum of the rolling annual average. Range is the minimum and maximum of all 2017 samples used to calculate those averages.

² Henrico's year sampled was 2017 and Richmond's year sampled was 2012.

³ We sample for coliforms each month, and the highest number of positive samples during any month for Henrico County occurred in April, May, June, August, and November. The highest amount for the City of Richmond occurred in October. For Henrico, the highest number of positive samples during any given month was 1, and the percentage of the total monthly samples this number represents is 0.65%. For the City of Richmond, the highest number of positive samples during any given month was 3, and the percentage of the total monthly samples this number represents is 2.3%.

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.

Definitions

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

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.