Annual

WATER QUALITY REPORT

Reporting Year 2013

Presented By

Henrico County Public Utilities

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There When You Need Us

We are once again proud to present our annual water quality report covering all testing performed between January 1 and December 31, 2013. 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 the best-quality drinking water to you. 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 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://www.co.henrico.va.us/supervisors/.

Each Board agenda has a public comment period.

Where Does My Water Come From?

Henrico County customers receive water from the county's and 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 currently produces up to 51 million gallons of drinking water daily. Henrico's facility was designed to meet the county's future drinking water needs and can produce up to 58 million gallons per day. The facility has multiple sources of electric power and emergency generators to enhance our ability to provide drinking water during local power outages.

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.

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/safewater/lead.

Benefits of Chlorination

Disinfection, a chemical process used to control disease-causing microorganisms by killing or inactivating them, is unquestionably the most important step in drinking water treatment. By far, the most common method of disinfection in North America is chlorination.

Before communities began routinely treating drinking water with chlorine (starting with Chicago and Jersey City in 1908), cholera, typhoid fever, dysentery, and hepatitis A killed thousands of U.S. residents annually. Drinking water chlorination and filtration have helped to virtually eliminate these diseases in the U.S. Significant strides in public health are directly linked to the adoption of drinking water chlorination. In fact, the filtration of drinking water plus the use of chlorine is probably the most significant public health advancement in human history.

How chlorination works:

Potent Germicide Reduction in the level of many disease-causing microorganisms in drinking water to almost immeasurable levels.

Taste and Odor Reduction of many disagreeable tastes and odors like foul-smelling algae secretions, sulfides, and odors from decaying vegetation.

Biological Growth Elimination of slime bacteria, molds, and algae that commonly grow in water supply reservoirs, on the walls of water mains, and in storage tanks.

Chemical Removal of hydrogen sulfide (which has a rotten egg odor), ammonia, and other nitrogenous compounds that have unpleasant tastes and hinder disinfection. It also helps to remove iron and manganese from raw water.

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.

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 www.henrico.us/assets/CCReport13.pdf.

Testing for *Cryptosporidium*

Cryptosporidium is a microbial parasite found in surface water throughout the United States. We collected 24 samples between 2006 and 2008 and found an average level of 2.1 Oocysts/100 L. We also purchase water from Richmond. They collected 48 samples between 2004 and 2005 and found an average of 2.9 Oocysts/100 L. Both values are less than the Action Level of 7.5 Oocysts/100 L.

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.

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 freshwater 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 freshwater are rapidly outstripping what the planet can replenish.

To check out your own water footprint, go to www.h2oconserve.org or visit www.waterfootprint.org to see how the water footprints of other nations compare.

Unidirectional Flushing

Unidirectional flushing (UDF) is utilizing 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.

Year 3 of our 10-year program was completed on March 21, 2014. Our contractor, WachsWater, has flushed approximately 450 miles of water mains in the eastern part of Henrico County and in older sections of the near west end.

Year 4 will begin in the fall and will continue into the summer of 2015. During year 4, our goal is to flush 150 miles in older sections of the near west end.

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 remove turbidity, taste and odors, and any biodegradable 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 keep us in compliance with federal regulations. Finally, the finished water is pumped into the distribution system which delivers the water to your home or business.

Sampling Results

During the past year, we have taken more than a thousand 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 concentration 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

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppm)	2013	2	2	0.033	0.025–0.033	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chloramines[1] (ppm)	2013	[4]	[4]	2.9	ND–4.8	No	Water additive used to control microbes
Combined Radium (pCi/L)	2011	5	0	2.3	ND–2.3	No	Erosion of natural deposits
Fluoride (ppm)	6/2013	4	4	0.7	ND–0.7	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Haloacetic Acids [HAA][1] (ppb)	2013	60	NA	29	ND–43	No	By-product of drinking water disinfection
Nitrate (ppm)	1/2013	10	10	0.46	0.44–0.46	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
TTHMs [Total Trihalomethanes][1] (ppb)	2013	80	NA	33	1.2–47	No	By-product of drinking water disinfection
Total Coliform Bacteria[2] (# positive samples)	4/2013	5% of monthly samples are positive	0	1.3 (2 positive samples)	NA	No	Naturally present in the environment
Total Organic Carbon[3] (ppm)	2013	TT	NA	1.5	-2.9–2.9	No	Naturally present in the environment
Turbidity[4] (NTU)	2013	TT≤1.0 NTU	NA	2.96	ND–2.96	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2013	TT≥95% of samples≤0.3 NTU	NA	100	NA	No	Soil runoff

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

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/ TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper[5] (ppm)	2012	1.3	1.3	0.1	0/64	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead[5] (ppb)	2012	15	0	1	0/64	No	Corrosion of household plumbing systems; Erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
pH (Units)	7/2013	6.5–8.5	NA	6.42	NA	No	Naturally occurring

OTHER SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE
Hardness–Total (ppm)	7/2013	60	NA	Compounds of calcium and magnesium

Sampling Results Footnotes

[1] Amount detected is the maximum of the rolling annual average. Range is the minimum and maximum of all 2013 samples used to calculate those averages.

[2] We sample for coliforms each month, and our highest monthly total occurred in April. The results listed are the highest number of positive samples during any given month (2) and what percentage of the total monthly samples this number represents (1.3 percent).

[3] 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.)

[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. The combined turbidity reading exceeded the 1.0 NTU limit on June 13, June 20, and September 11. There was no violation because these readings did not appear to accurately represent the actual water quality. Both the before and after readings and the individual/component readings were consistently in the 0.1 NTU range. In each instance, the reason for the high level appears to have been caused by switching from the power grid to generators.

[5] 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 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).

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