ANNUAL WATER QUALITY REPORT

WATER TESTING PERFORMED IN 2016

Presented By

Burlington DPW
Water Division

PWS ID#: VT0005053

We've Come a Long Way

Once again we are proud to present our annual water quality report covering the period between January 1 and December 31, 2016. In a matter of only a few decades, drinking water has become exponentially safer and more reliable than at any other point in human history. Our exceptional staff continues to work hard every day—at any hour—to deliver the highest quality drinking water without interruption. Although the challenges ahead are many, we feel that by relentlessly investing in customer outreach and education, new treatment technologies, system upgrades, and training, the payoff will be reliable, high-quality tap water delivered to you and your family.

Following the departure of our long time leader Laurie Adams, Megan Moir became the head of the Water Resources (Water, Wastewater, and Stormwater) Division. She holds an M.S. in Water Resources from the University of Vermont and previously served as the Stormwater Program Manager from the inception of our City's Stormwater Utility in 2009.

Our Water Resources Team is proud to report that we received the Partnership for Safe Water's 15-Year Directors Award for the Burlington Public Works Division Francis J. O'Brien Water Treatment Facility! The award was presented through the American Water Works Association at the annual conference held in Chicago last June. Go Team! This year we also had our Sanitary Survey inspection with the State (an every-5-year occurrence) and are proud to report that we had no noted deficiencies in our Water System.

This past year's improvements began with the removal and rebuilding of the last of three vertical turbine pumps in our automatic backwash filter room. The turbine pumps send first stage filtered water to the eight finished rapid sand filters and are a vital step in our treatment process. This work completes all three rebuilds over the past few years.

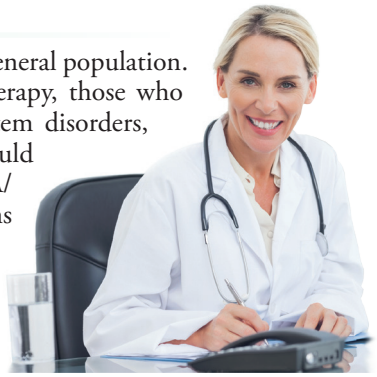
Another improvement was the removal of our raw water intake screen from Lake Champlain. Annually, the intake screen is inspected and cleaned by removing zebra mussels from around the outside of the screen. After last year's inspection, we decided to remove the screen and add access hatchways for future (underwater) pressure washing. While the screen was out for repairs, it also enabled us to effectively clean the intake screen completely (see pictures) and thoroughly.

This past Fall during a routine inspection and maintenance of our clearwell, we found an interior cinder block wall compromised and deteriorating. After consulting with a structural engineer, we had the wall rebuilt, creating a more substantial, more durable wall from the original and extending life expectancy.

Improvements also came by way of relining some of our aging water mains. After an extensive priority study of repairing and replacing water mains throughout the city, the new relined water mains (using Aqua-Pipe reliners) in phase one consisted of Pitkin, Isham, Lower King, and Industrial Parkway. For more information on the relining technology we used, please visit http://www.aqua-pipe.com/. After successful completion of phase one, an $8.34 million bond vote passed in November, providing a future of relining and replacing for years to come.

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.

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.

Community Participation

Call us at (802) 863-4501 for information about the next opportunity for public participation in discussions about our drinking water. Find out more about Burlington Public Works Water Division on the Internet at www.burlingtonvt.gov/dpw.

Questions?

For more information about this report, or for any questions relating to your drinking water, please call Steve Asselin, Chief Plant Operator, at (802) 863-4501.

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.

Impact of Zebra Mussels

The zebra mussel is a small mussel native to Russia. In 1988, it reached North America by a transatlantic freighter. Since then, they have continued to spread throughout the country. Zebra mussels are very successful invaders because they live and feed in many different aquatic habitats and breed prolifically for their entire five-year lifespan. (Each female produces 1 million eggs per year.)

Adult zebra mussels colonize on living and non-living surfaces, including boats, buoys, piers, plants, and clams. They are a great concern to drinking water utilities because they can attach to water intake pipes, severely restricting the flow of fresh water. They can also impact water quality by increasing taste-and-odor problems in the water supply.

Zebra mussels are almost impossible to eradicate once they become established. Water utilities have had to retool their water intake systems to prevent zebra mussel-related problems, costing millions of dollars a year. Utilities rely on a variety of methods to remove mussels from intake pipes; since there is no single, ideal removal solution, new methods are constantly under investigation.

While complete removal may be impossible, preventing zebra mussel spread is not. Human activities have spread them into many inland lakes and streams, usually through recreational boating, fishing, and diving practices. Simple steps such as draining live wells, cleaning vegetation off boat trailers, removing attached zebra mussels from boat hulls, and not dumping bait into lakes or rivers can prevent the spread of zebra mussels into non-infested waters.

Where Does My Water Come From?

The City of Burlington is fortunate to have Lake Champlain as a source for our raw water. Lake Champlain extends from the Canadian border south along the western side of the state for nearly 120 miles. The City of Burlington is located near the widest portion of the lake. Our point of intake is located well beyond the Burlington Harbor, which prevents contaminants that may be present in the harbor from entering our system. The intake line is also located deep enough to prevent most surface contaminants from entering and to ensure a continuous supply of water even during the most severe drought conditions. The water entering our treatment plant is of high quality, which eliminates the need to treat for large numbers of contaminants to meet safe drinking standards.

Source Protection Plan

The Burlington Public Works Water Division obtains its raw water from Lake Champlain, a surface water source. Potential sources of contamination include urban and agricultural runoff and wastewater discharges. The Water Division source protection plan was updated on August 11, 2011, as required by the Vermont Water Supply Division. The report details possible sources of contamination as well as the risks associated with each. The completed plan is available for viewing by contacting the Water Division during regular business hours.

Water Main Flushing

Distribution mains (pipes) convey water to homes, businesses, and hydrants in your neighborhood. The water entering distribution mains is of very high quality; however, water quality can deteriorate in areas of the distribution mains over time. Water main flushing is the process of cleaning the interior of water distribution mains by sending a rapid flow of water through the mains.

Flushing maintains water quality in several ways. For example, flushing removes sediments like iron and manganese. Although iron and manganese do not themselves pose health concerns, they can affect the taste, clarity, and color of the water. Additionally, sediments can shield microorganisms from the disinfecting power of chlorine, contributing to the growth of microorganisms within distribution mains. Flushing helps remove stale water and ensures the presence of fresh water with sufficient dissolved oxygen and disinfectant levels, and an acceptable taste and smell.

During flushing operations in your neighborhood, some short-term deterioration of water quality, though uncommon, is possible. You should avoid tap water for household uses at such times. If you do use the tap, allow your cold water to run for a few minutes at full velocity before use, and avoid using hot water, to prevent sediment accumulation in your hot water tank.

Please contact us if you have any questions or if you would like more information on our water main flushing schedule.

Thirty Three Years of Service

This past spring, the Water Resources Team said goodbye to Laurie Adams after a long tenure of dedication and leadership for over 33 years as our Assistant DPW Director for Water Resources. Laurie's passion for Water Resources started in Burlington in 1983 as Lab Director for wastewater. In the mid 80s, Laurie earned the position of Chief Water Operator and by the end of the 80s followed her upward trend into the role of Water Department Superintendent. In the mid 90s, wastewater was added under Laurie's wing, creating a conglomerate nest we all looked to as home. This led us into the 2000 era, and around 2012, when storm water was building momentum, it safely landed into our expanding Water Resources family. Last, engineering soon followed, completing our current Water Resources Team. Laurie will definitely be missed by all, and we wish her happiness on her next adventure and all the success she achieved with us.

Test Results

Our water is monitored for many different kinds of contaminants on a very strict sampling schedule. The information below represents only those substances that were detected; our goal is to keep all detects below their respective maximum allowed levels. The State recommends monitoring 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.

We participated in the 3rd stage of the U.S. EPA's Unregulated Contaminant Monitoring Rule (UCMR3) program by performing additional tests on our drinking water. UCMR3 benefits the environment and public health by providing the EPA with data on the occurrence of contaminants suspected to be in drinking water, in order to determine if the EPA needs to introduce new regulatory standards to improve drinking water quality. Contact us for more information on this program.

We add fluoride to our water supply to promote public health through the prevention of tooth decay. For more information concerning fluoride, infant formula, and community water fluoridation, go to http://www.healthvermont.gov/wellness/oral-health

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Chlorine (ppm)	2016	[4]	[4]	0.77	0.04–1.94	No	Water additive used to control microbes
Di(2-ethylhexyl) Phthalate (ppb)	2013	6	0	3.5	0–3.5	No	Discharge from rubber and chemical factories
Haloacetic Acids [HAAs][1] (ppb)	2016	60	NA	45	3.9–60.6	No	By-product of drinking water disinfection
Nitrate (ppm)	2016	10	10	0.26	0.26–0.26	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
TTHMs [Total Trihalomethanes] (ppb)	2016	80	NA	59	33.3–76.1	No	By-product of drinking water disinfection
Total Coliform Bacteria (% positive samples)	2016	5% positive monthly samples	0	0	NA	No	Naturally present in the environment

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 (ppm)	2015	1.3	1.3	0.066	0/30	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
Lead (ppb)	2015	15	0	0	0/30	No	Corrosion of household plumbing systems; Erosion of natural deposits

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

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).

SMCL (Secondary Maximum Contaminant Level): SMCLs are established to regulate the aesthetics of drinking water like appearance, taste and odor.

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum (ppb)	2016	200	NA	47	NA	No	Erosion of natural deposits; Residual from some surface water treatment processes
Chloride (ppm)	2016	250	NA	19	NA	No	Runoff/leaching from natural deposits
Fluoride (ppm)	2016	2.0	NA	0.8	0.4–0.8	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Iron (ppb)	2016	300	NA	<20	NA	No	Leaching from natural deposits; Industrial wastes
Manganese (ppb)	2016	50	NA	20	NA	No	Leaching from natural deposits
pH (Units)	2016	6.5–8.5	NA	7.25[2]	NA	No	Naturally occurring
Silver (ppb)	2016	100	NA	<20	NA	No	Industrial discharges
Sulfate (ppm)	2016	250	NA	13	NA	No	Runoff/leaching from natural deposits; Industrial wastes
Total Dissolved Solids [TDS] (ppm)	2016	500	NA	73	NA	No	Runoff/leaching from natural deposits
Zinc (ppm)	2016	5	NA	0.24	NA	No	Runoff/leaching from natural deposits; Industrial wastes

UNREGULATED AND OTHER SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE
Alkalinity, as CaC03 (ppm)	2016	41	NA	Naturally occurring
Calcium, Total (ppm)	2016	17	NA	Naturally occurring
Chlorate (ppb)	2013	480	NA	Pyrotechnics and rain fall
Hardness, Total as CaC03 (ppm)	2016	61	NA	Naturally occurring
Hexavalent Chromium (ppb)	2013	0.035	NA	Stainless steel, dyes, and wood preservative production
Magnesium, Total (ppm)	2016	4.6	NA	Leaching from natural deposits
Strontium (ppb)	2013	84	NA	Naturally occurring; Used to produce cathode ray tubes

[1] Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.

[2] Result listed is the annual average of our finished water.