ANNUAL WATER QUALITY REPORT

Reporting Year 2018

Presented By

Town of Hanover
Department of Public Works

PWS ID#: 4122000

Our Mission Continues

We are once again pleased to present our annual water quality report covering all testing performed between January 1 and December 31, 2018. 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 should you ever have any questions or concerns about your water.

Where Does My Water Come From?

The Town of Hanover's water supply comes from nine groundwater sources. The Pond Street Water Treatment Plant draws water from Pond Street Well #1, Pond Street Well #2, and Pond Street Well #3). The Beal Water Treatment Plant draws water from Beal Well #1 and Beal Well #2). And the Broadway Water Treatment Plant draws water from Broadway Well #1, Broadway Well #2, Hanover Well #1, and Hanover Well #2. Combined, our treatment facilities provide roughly 500 million gallons of clean drinking water every year.

What's a Cross-Connection?

Cross-connections that contaminate drinking water distribution lines are a major concern. A cross-connection is formed at any point where a drinking water line connects to equipment (boilers), systems containing chemicals (air conditioning systems, fire sprinkler systems, irrigation systems), or water sources of questionable quality. Cross-connection contamination can occur when the pressure in the equipment or system is greater than the pressure inside the drinking water line (backpressure). Contamination can also occur when the pressure in the drinking water line drops due to fairly routine occurrences (main breaks, heavy water demand), causing contaminants to be sucked out from the equipment and into the drinking water line (backsiphonage).

Outside water taps and garden hoses tend to be the most common sources of cross-connection contamination at home. The garden hose creates a hazard when submerged in a swimming pool or when attached to a chemical sprayer for weed killing. Garden hoses that are left lying on the ground may be contaminated by fertilizers, cesspools, or garden chemicals. Improperly installed valves in your toilet could also be a source of cross-connection contamination.

Community water supplies are continuously jeopardized by cross-connections unless appropriate valves, known as backflow prevention devices, are installed and maintained. We have surveyed industrial, commercial, and institutional facilities in the service area to make sure that potential cross-connections are identified and eliminated or protected by a backflow preventer. We also inspect and test backflow preventers to make sure that they provide maximum protection.

For more information on backflow prevention, contact the Safe Drinking Water Hotline at (800) 426-4791.

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 Massachusetts Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (U.S. EPA) prescribe regulations limiting the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration (FDA) and Massachusetts Department of Public Health (DPH) 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.

> We remain vigilant in delivering the best-quality drinking water

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 can pick up 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.

More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Source Water Assessment

A Source Water Assessment Plan (SWAP) is available at our office. This plan is an assessment of the delineated area around our listed sources through which contaminants, if present, could migrate and reach our source water. It also includes an inventory of potential sources of contamination within the delineated area, and a determination of the water supply's susceptibility to contamination by the identified potential sources.

Hanover's wells are located in aquifers with high vulnerability to contamination due to the absence of hydrogeologic barriers (e.g., clay) that can prevent contaminant migration. As a result, Hanover's sources are considered highly susceptible to contamination from a variety of sources such as petroleum products, industrial solvents, fertilizers, and microbial contaminants. Susceptibility is a measure of a water supply's potential to become contaminated due to land uses and activities within its recharge area and does not imply poor water quality.

In November of 2015, gasoline constituents were detected in the soil and groundwater at 831 Washington Street. The site is currently used as an automobile repair facility. However, it was at one time used as a gasoline filling station, and it is likely that this contamination is due to the former on-site gasoline tanks and a dispenser that were removed from the property in 1985. This contamination is located approximately 1,500 feet south-southeast of Hanover Pond Street Well #1. We are pleased to report that the firm in charge of the clean-up (Irwin Engineers of Natick, Massachusetts) has concluded that the down gradient extent toward the supply wells appears to be limited to the site and does not extend north of Rawson Road. In addition, we routinely monitor our finished water for volatile organic compounds, and we have not detected any gasoline constituents in the Pond Street finished water. Please contact this office if you have additional questions.

QUESTIONS?

For more information about this report, or for any questions relating to your drinking water, please call Neal Merritt, Deputy Superintendent of Public Works (Water Operations), at (781) 826-3189.

Level 1 Assessment Update

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, waterborne pathogens may be present or that a potential pathway exists through which contamination may enter the drinking water distribution system. In November of this year, we found coliforms in our Union Street water storage tanks. As a result, we conducted a Level 1 Assessment in accordance with MassDEP regulations to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system. The assessment found no obvious issues with our storage tanks but, out of a sense of precaution, we will be contracting the services of a tank inspection company (Suez) to clean, inspect, and disinfect our three water storage tanks in the Spring of 2019. Please note that at no time in 2018 was *E. coli* detected in your drinking water.

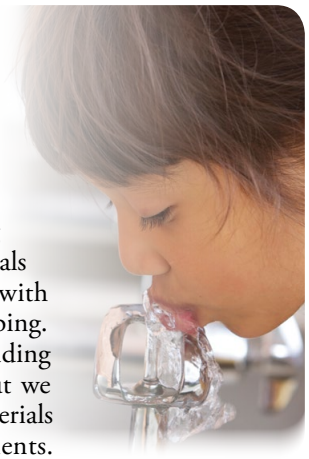
About Our Violation

Currently, our system is operating under an Administrative Consent Order with the State for exceeding the TTHM MCL in June of 2015 and again in September of 2015. On August 12, 2015, we contracted with Weston & Sampson (W&S) of Peabody, Massachusetts, to design a solution to this problem. On July 16, 2017, W&S submitted to the Massachusetts Department of Environmental Protection (DEP) their Action Plan to address the elevated levels of TTHMs. This plan called for the conversion from chlorine to chloramines at the Town's three water treatment plants. Chloramines are commonly used as an alternative to chlorine because they are less reactive than chlorine to organic matter and consequently produce fewer THMs than chlorine. For more information on chloramines, please visit the EPA's Web site at https://www.epa.gov/dwreginfo/chloramines-drinking-water. On March 20, 2018, the DEP approved the W&S design with the condition that treatment plant upgrades be completed no later than December 31, 2019. We are pleased to report that construction is currently underway at all three plants, with completion expected before the December deadline.

As you may be aware, we have recently sent you public notifications regarding elevated levels of TTHMs in your water. After the initial violation in 2015, we managed (through best management practices) to maintain TTHM levels below the 80 ppb limit through 2016, 2017, and a part of 2018. Unfortunately, in September and December of 2018, we had to increase our chlorine dosage rates and, as a result, TTHM levels again increased above the MCL.

Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, livers, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

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 at (800) 426-4791 or at www.epa.gov/safewater/lead.

Test Results

Our water is monitored for many different kinds of substances on a very strict sampling schedule. Also, the water we deliver must meet specific health standards. Here, we show only those substances that were detected in our water. (A complete list of all our analytical results is available upon request.) Remember that detecting a substance does not mean the water is unsafe to drink; 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 4th stage of the U.S. EPA's Unregulated Contaminant Monitoring Rule (UCMR4) program by performing additional tests on our drinking water. UCMR4 sampling 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. Unregulated contaminant monitoring data are available to the public, so please feel free to contact us if you are interested in obtaining that information. If you would like more information on the EPA's Unregulated Contaminant Monitoring Rule, please call the Safe Drinking Water Hotline at (800) 426-4791.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Chlorine (ppm)	2018	[4]	[4]	0.19	0.01–1.09	No	Water additive used to control microbes
Combined Radium (pCi/L)	2015	5	0	1.90	NA	No	Erosion of natural deposits
Fluoride (ppm)	2018	4	4	0.13	NA	No	Erosion of natural deposits
Haloacetic Acids [HAAs] (ppb)	2018	60	NA	21	5–34	No	By-product of drinking water disinfection
Nitrate (ppm)	2018	10	10	1.34	ND–1.34	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Perchlorate (ppb)	2018	2	NA	0.24	ND–0.24	No	Inorganic chemicals used as oxidizers in solid propellants for rockets, missiles, fireworks, and explosives
TTHMs [Total Trihalomethanes]–Site: 70 Ponderosa Drive (ppb)	2018	80	NA	91	51–117	Yes	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes]–Site: 925 Circuit Street (ppb)	2018	80	NA	87	40–107	Yes	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes]–Site: 2060 Washington Street (ppb)	2018	80	NA	84	56–104	Yes	By-product of drinking water disinfection
Tetrachloroethylene (ppb)	2018	5	0	0.8	ND–0.8	No	Discharge from factories, dry cleaners, and asbestos-cement-lined pipes
Total Coliform Bacteria (Positive samples)	2018	TT	NA	5	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 %ILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2017	1.3	1.3	0.51	0/32	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2017	15	0	6	0/32	No	Lead services lines; Corrosion of household plumbing systems including fittings and fixtures; Erosion of natural deposits

SECONDARY SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	MCLG	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Manganese (ppb)	2017	50	NA	23	ND–50	No	Leaching from natural deposits

UNREGULATED SUBSTANCES [1]

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE
Bromodichloromethane (ppb)	2018	24.0	ND–39.2	By-product of drinking water chlorination
Bromoform (ppb)	2018	3.6	ND–8.8	By-product of drinking water chlorination
Chlorodibromomethane (ppb)	2018	17.3	ND–36.8	By-product of drinking water chlorination
Chloroform (ppb)	2018	26.2	ND–83.8	By-product of drinking water chlorination
Sodium (ppm)	2018	67.1	65.6–68.5	Discharge from the use and improper storage of sodium-containing de-icing compounds

UNREGULATED CONTAMINANT MONITORING RULE - PART 4 (UCMR4) [1]

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	TYPICAL SOURCE
HAA5 (ppb)	2018	40.188	5.075–40.188	By-product of drinking water chlorination
HAA6Br (ppb)	2018	43.628	4.329–43.628	By-product of drinking water chlorination
HAA9 (ppb)	2018	76.828	9.029–76.828	By-product of drinking water chlorination
Quinoline (ppb)	2018	0.0209	ND–0.0209	Used as a pharmaceutical (anti-malarial) and flavoring agent

[1] Unregulated contaminants are those for which the U.S. EPA has not established drinking water standards. The purpose of monitoring unregulated contaminants is to assist the EPA in determining their occurrence in drinking water and whether future regulation is warranted.

Definitions

90th %ile: Out of every 10 homes sampled, 9 were at or below this level. This number is compared to the Action Level to determine lead and copper compliance.

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

Level 1 Assessment: A Level 1 assessment is a study of the water system to identify potential problems and determine (if possible) why total coliform bacteria have been found in our water system.

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 the highest 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.

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).

SMCL (Secondary Maximum Contaminant Level): These standards are developed to protect aesthetic qualities of drinking water and are not health based.

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