

Annual
WATER
QUALITY
REPORT

Reporting Year 2013



Presented By _____
Manchester Water Works

PWS ID#: NH1471010

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

You are invited to attend our Water Board meetings and participate in discussions about your drinking water. A schedule of meeting times is posted on our Web site at www.manchesternh.gov/wtr. Please call our office at (603) 792-2803 to confirm your intent to attend.

Where Does My Water Come From?

For more than 135 years, Lake Massabesic has served as the water supply for Manchester and portions of six surrounding communities. In order to satisfy stringent state and federal drinking water regulations, the lake water is purified at Manchester's Water Treatment Plant. This facility was completed in 1974 and has since been routinely updated with state-of-the-art equipment to improve quality control and operational efficiency and was significantly upgraded in 2003-06. Located adjacent to Lake Massabesic, the plant treats all of the city's water before it is pumped into a 500-mile piping network for distribution to homes and industries.

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 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.

Water Treatment Process

Raw Water Pumping

Raw water from Lake Massabesic is conveyed through a 60-inch high density polyethylene pipeline intake that extends 430 feet from the shoreline into a low-lift pump station constructed in 1997. The original intake and pump station built in 1906 and renovated for raw water service in 1974 is maintained for redundancy. A combination of four variable speed pumps delivers raw water through a 48-inch pipeline to the rapid mix chambers. This pipeline is equipped with a soda ash feed point where alkalinity is boosted prior to coagulation.

Rapid Mixing (Replaced mixers during plant upgrade in 2003-06)

In the rapid mix chamber, the primary treatment chemical, aluminum sulfate, is added to begin the process of coagulation. Two rapid mix chambers are configured in series with the capability of adding the coagulants into either or both chambers. High speed mixers ensure complete dispersion of these chemicals, enabling them to react with the natural dissolved and particulate matter in the water, causing them to collide and form larger particles.

Flocculation

Flow from the rapid mix chambers is distributed evenly into each of the four flocculation basins. The flocculation basins are configured in two stages separated by a baffle wall, with the second stage mixers set at a slightly slower speed than the first stage mixers.

Sedimentation (Improved sludge removal process during plant upgrade in 2003-06)

The sedimentation process is achieved by allowing the water to flow slowly through a long, deep, quiescent basin that allows sufficient time for the floc particles to settle to the bottom forming sludge, a treatment process by-product. Sludge is periodically removed by isolating one of the four basins each week, decanting, and pumping the sludge layer to a lagoon where it is eventually dried and moved to a landfill.

Intermediate Ozone (Added during plant upgrade in 2003-06)

Settled water flows into an intermediate pump station where it is lifted into the ozone contact chambers. Ozone is a powerful oxidant and disinfectant that removes color, taste, and odor, along with killing or inactivating harmful organisms in the water. Ozone is generated on-site by passing a high-voltage electric current across a dielectric discharge gap through a pure oxygen stream. A combination of three, 500-pound-per-day ozone generators produces the required ozone gaseous stream that is injected into each of four ozone contact chambers through fine bubble diffusers. The contact chambers provide the necessary time for completion of the ozone reaction. Residual (excess) ozone is removed from the water by applying sodium bisulfite before the water exits the contact chambers and continues on to the filters. Excess ozone gas that accumulates above the ozone contact chambers is removed under vacuum through a thermal-catalytic ozone destruct process and vented to the atmosphere.

Anthracite and Granular Activated-Carbon Filtration (Replaced original ABW filters as part of upgrade in 2003-06)

Following intermediate ozone, the water passes through either one of four deep-bed anthracite filters, or one of four deep-bed granular activated carbon (GAC) filters. Each filter contains six feet of biologically active media that completes the physical removal process. While both filter media have proven to be effective, they are being studied side-by-side to determine which will be the most beneficial and economical in the long term. Anthracite is an excellent filter medium, but it does not have the adsorption capability of GAC. However, GAC requires periodic reactivation or replacement to restore its adsorption characteristics. Comparing each type side by side will enable Manchester Water Works to make an informed decision as to which will most benefit our customers in the future.

Clearwell and Finished Water Pumping (Expanded clearwell and replaced pumps during plant upgrade in 2003-06)

From the hydraulic control structure, water flows into a 700,000 gallon clearwell and finished water pumping station. A series of seven vertical turbine pumps (three for the Low Service pressure zone and four for the High Service pressure zone) lifts finished water into the distribution system.

Source Water Assessment

In compliance with a federal mandate, the NH Department of Environmental Services performed a Source Water Assessment on Lake Massabesic in September of 2002. The assessment looked at the drainage area for the lake and ranked its vulnerability to contamination. Lake Massabesic received four high and four medium vulnerability ratings, while it ranked at low vulnerability for five additional categories. Concern was raised over the detection of MTBE, now prohibited, which came from reformulated gasoline. Concern was also raised over Potential Contamination Sources (PCSs) on the watershed such as highways. Overall, the report presents a positive picture of Manchester's water source and its condition. While Manchester Water Works has done its best to protect Lake Massabesic, we understand more than ever that we rely heavily upon the standards and practices of each citizen and each community on the watershed for their continued efforts to preserve this precious resource.

The complete Assessment Report is available for review at our Web site or at the NH DES Drinking Water Source Water Assessment page at <http://des.nh.gov/organization/divisions/water/dwgb/dwspp/dwsap.htm>.

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 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 that time. 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.

QUESTIONS?

For more information about this report, or for any questions relating to your drinking water, please call David G. Miller, P.E., Deputy Director - Water Supply, at (603) 792-2851.

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>.

Your public water supply is fluoridated. According to the Centers for Disease Control and Prevention, if your child under the age of 6 months is exclusively consuming infant formula reconstituted with fluoridated water, there may be an increased chance of dental fluorosis. Consult your child's health care provider for more information.

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.

Violation Information

Coliform bacteria were detected in several routine water samples taken in July. Manchester takes over 120 monthly distribution-system water samples as required by the Safe Water Drinking Act. The number of coliform-positive samples taken in July exceeded the allowable limit (no more than 5% of all samples taken). Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in more samples than allowed, and this was a warning of potential problems. Manchester did not detect any harmful bacteria in the system after extensive additional testing. In addition, several immediate steps were taken to eliminate coliform bacteria from the system. Public notification was also completed as required via a statement in all customer water bills. While the definitive source(s) of the bacteria in our system was not determined (not uncommon), the actions taken were successful in eliminating the bacteria, and no subsequent MCL violation has occurred.

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.

We participated in the 3rd stage of the EPA's Unregulated Contaminant Monitoring Regulation (UCMR3) program by performing additional tests on our drinking water for 30 unregulated contaminants. 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. Any UCMR3 detections are shown in the data tables in this report. Contact us for more information on this program.

REGULATED SUBSTANCES							
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Alpha Emitters (pCi/L)	2013	15	0	1.0	1.0–1.0	No	Erosion of natural deposits
Barium (ppm)	2013	2	2	0.0095	0.008–0.0108	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Beta/Photon Emitters ¹ (pCi/L)	2013	50	0	0.5	NA	No	Decay of natural and man-made deposits
Chloramines (ppm)	2013	[4]	[4]	2.25	2.06–2.52	No	Water additive used to control microbes
Chlorine (ppm)	2013	[4]	[4]	2.36	2.09–2.68	No	Water additive used to control microbes
Fluoride (ppm)	2013	4	4	0.67	0.58–0.81	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Haloacetic Acids [HAAs]–Stage 2 (ppb)	2013	60	NA	6.3	2.1–12.8	No	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes]–Stage 2 (ppb)	2013	80	NA	4.0	0.7–25.8	No	By-product of drinking water disinfection
Total Coliform Bacteria ² (% positive samples)	2013	5% of monthly samples are positive	0	16	NA	Yes	Naturally present in the environment
Total Organic Carbon (ppm)	2013	TT	NA	2.0	1.6–2.5	No	Naturally present in the environment
Turbidity ³ (NTU)	2013	TT=1 NTU	NA	0.096	0.033–0.096	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 (ppm)	2013	1.3	1.3	0.062	0/84	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2013	15	0	2	0/84	No	Corrosion of household plumbing systems; Erosion of natural deposits

¹ The MCL for beta particles is 4 mrem/year. The U.S. EPA considers 50 pCi/L to be the level of concern for beta particles.

² Typically, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes). Whenever coliform bacteria are detected in any sample, follow-up testing is performed to see if other bacteria of greater concern, such as fecal coliform or *E. coli*, are present. MWW did not find any of these bacteria in our subsequent testing.

³ Turbidity is a measure of the cloudiness of the water. It is monitored by surface water systems because it is a good indicator of water quality and thus helps measure the effectiveness of the treatment process. High turbidity can hinder the effectiveness of disinfectants.

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

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.