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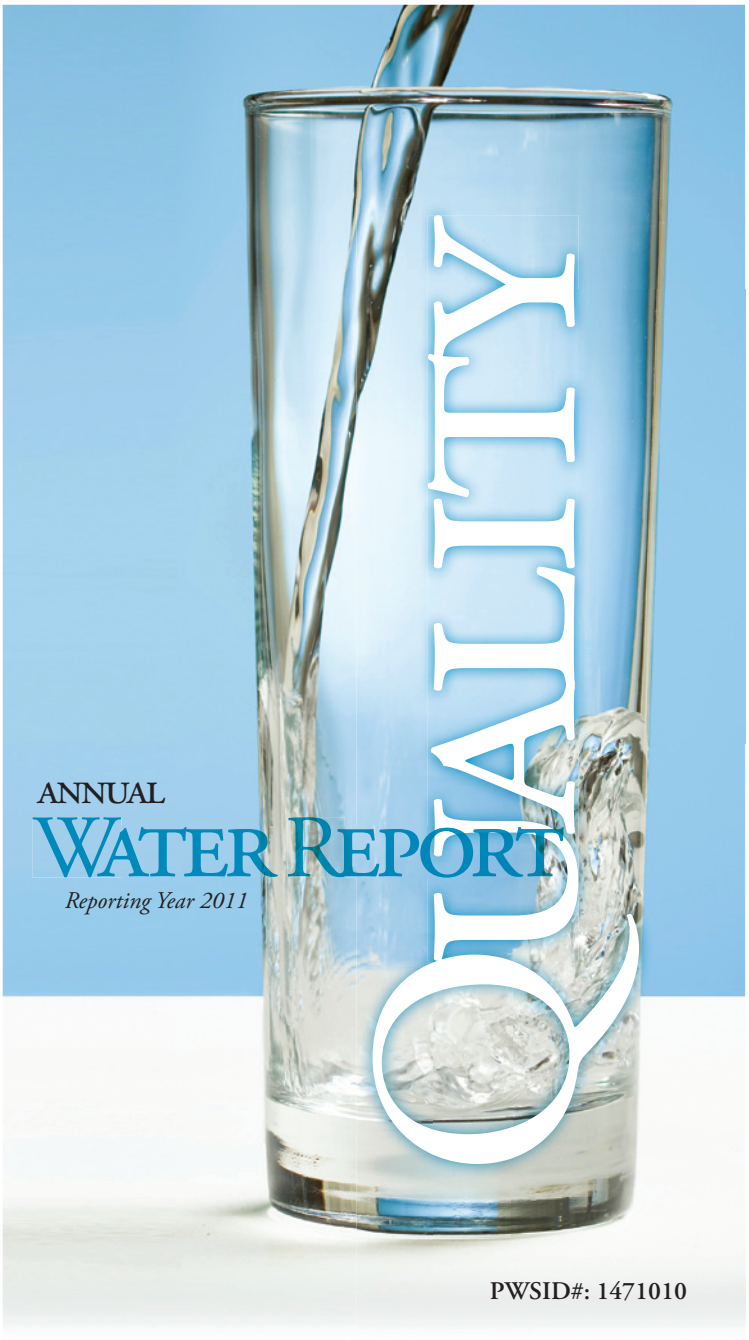
Annual water report reporting year 2011

Manchester Water Works



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Meeting the Challenge

We are once again proud to present our annual water quality report covering all testing performed between January 1 and December 31, 2011. 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 continuous plant improvement, source water protection, water conservation, infrastructure improvement, and community education while continuing to serve the day-to-day needs of all our water users.

A new challenge is emerging for water utilities in the United States, one that for many years was largely buried in our national consciousness. Now it can be buried no longer. Much of our drinking water infrastructure is nearing the end of its useful life and approaching the age at which it must be replaced. With nearly 17 percent of our 500 miles of distribution mains exceeding 100 years old, Manchester Water Works has put in place a long-term plan to replace its aging pipe infrastructure to assure the integrity and reliability of the distribution system well into the future.

Please share with us your thoughts or concerns about the information in this report. After all, well-informed customers are our best allies.

Did You Know?

Manchester's water was judged to be among the top five "Best of the Best" in the United States at the American Water Works Association Annual Conference and Exhibition, Washington, DC, June 2011.

According to a 2009 water rate survey conducted by NHDES, Manchester Water Works water rates are the second lowest of all major water utilities in the state of New Hampshire.

For more information about this report, or for any questions relating to your drinking water, please call David Paris, Water Supply Administrator, at (603) 624-6482.

Community Participation

You are invited to attend our Water Board meetings and participate in discussions about your drinking water. A schedule of meeting dates and times is posted on our website at www.manchesternh.gov/wtr. Please call our office at (603) 624-6494 to confirm your intent to attend.

Where Does My Water Come From?

For more than 138 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 constructed 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 2006. 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.

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. Lead service lines that once connected water mains to homes and businesses in Manchester were long ago replaced with copper service lines. We are responsible for providing high-quality drinking water but cannot control the variety of materials used in home 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.

Water Treatment Process

The Lake Massabesic Water Treatment Plant has a maximum capacity of 50 million gallons per day and presently delivers an average of 17.5 million gallons per day to approximately 160,000 consumers in the greater Manchester area. Manchester's modern treatment facility is designed to treat a wide range of water quality problems, to ensure that our customers receive the best possible drinking water.

Raw Water Pumping

Raw water from Lake Massabesic is conveyed through a 60-inch pipeline into a new 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 deliver 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.

Coagulation/Flocculation/Sedimentation

When water enters the treatment process, it contains natural impurities that form solid particles, when reacted with aluminum sulfate, that are later collected in sedimentation tanks. These processes are called coagulation, flocculation, and sedimentation and rely on an extended mixing process followed by a settling period.

Ozone Disinfection

Following sedimentation, 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 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 prior to filtration. 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

Following ozone, water passes through either anthracite or granular activated carbon (GAC) filters. Each filter contains six feet of media that collect any remaining particles and contaminants. Filtration is the final clarification step in the treatment process.

Clearwell and Finished Water Pumping

After filtration, water flows into a 700,000-gallon clearwell where post-filtration chemicals, including ammonia (chloramine residual disinfection), phosphoric acid (corrosion control), fluoride (dental protection), and sodium carbonate (pH adjustment), are added. 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 accordance with federal requirements, the NH Department of Environmental Services performed a Source Water Assessment of Lake Massabesic in September 2002. This assessment investigated the Lake Massabesic drainage area and ranked its vulnerability to potential contamination. Lake Massabesic received four "high" and four "medium" vulnerability ratings and "low" vulnerability ratings in five additional categories. Specific concern was raised over the detection of MTBE, a now prohibited gasoline additive. Concern was also raised over Potential Contamination Sources (PCSs), such as proximity to highways. Overall, the report presents a positive impression of Manchester's water source and its condition. While Manchester Water Works continues to focus on protection of the Lake Massabesic watershed, we understand more than ever our heavy reliance on the citizens of each community we serve and visitors to do their part in helping to preserve this precious resource.

The Manchester Source Water Assessment Report is available for review on our website or at the NHDES Drinking Water Source Water Assessment page at http://des.nh.gov/organization/divisions/water/dwgb/dwspp/reports/documents/manchester.pdf.

NEWS FLASH

LAKE MASSABESIC WATER TREATMENT PLANT ACHIEVES HIGHEST LEVEL OF PLANT PERFORMANCE

The Manchester Water Works Lake Massabesic Water Treatment Plant is proud to have received the rarely achieved Phase IV "Excellence in Water Treatment" recognition from the Partnership for Safe Water - Only the Eleventh Utility in the Nation to Reach this Pinnacle of Performance.

This program is a national volunteer initiative developed by the U.S. EPA and other organizations striving to provide their communities with drinking water quality that surpasses the required federal standards. Phase IV is the highest possible level of performance that can be achieved in the four-phased Partnership for Safe Water program, and signifies optimized plant performance.

"The Manchester Water Works is very pleased to have received the 'Excellence in Water Treatment' recognition from the Partnership for Safe Water. This award truly demonstrates the continued commitment that the department and entire staff place on providing our customers with extremely high-quality drinking water." (Thomas M. Bowen, P.E., Director)

The Partnership for Safe Water currently includes more than 200 water utilities, collectively serving more than 85 million people. This represents over 60 percent of the U.S. population served by surface water. Each utility has committed to the enhancement of drinking water quality and operational excellence in water treatment. As members of the Partnership for Safe Water, utilities make a pledge to their communities to improve their treatment operations to reduce the risk of exposure to microbial contaminants, namely *Cryptosporidium*, a parasite that can cause gastrointestinal illness in humans. By making this commitment the member utilities' treatment practices undergo a rigorous review developed by national experts and include a four-phased self-assessment and peer review process.

The Partnership for Safe Water is sponsored by the American Water Works Association, Association of Metropolitan Water Agencies, Association of State Drinking Water Administrators, United States Environmental Protection Agency, National Association of Water Companies, and the Water Research Foundation.

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 can acquire 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.

Information on the Internet

The U.S. EPA Office of Water (www.epa.gov/watrhome) and the Centers for Disease Control and Prevention (www.cdc.gov) Web sites provide a substantial amount of information on many issues relating to water resources, water conservation and public health.

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.

Sampling Results

During the past year, we have taken thousands of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The table below shows only those contaminants that were detected in the water. The state allows us to monitor for certain substances less 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

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppm)	2011	2	2	0.0135	ND–0.017	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Chloramines (ppm)	2011	[4]	[4]	2.1	1.54–2.7	No	Water additive used to control microbes
Fluoride (ppm)	2011	4	4	0.79	0.49–1.54	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Haloacetic Acids [HAA] (ppb)	2011	60	NA	3.1	2.0–6.0	No	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes] (ppb)	2011	80	NA	1.5	0.9–2.7	No	By-product of drinking water disinfection
Total Coliform Bacteria (% positive samples)	2011	5% of monthly samples are positive	0	2.5	NA	No	Naturally present in the environment
Total Organic Carbon (ppm)	2011	TT	NA	1.8	1.4–2.5	No	Naturally present in the environment
Turbidity[1] (NTU)	2011	TT	NA	0.07	0.02–0.07	No	Soil runoff
Turbidity (Lowest monthly percent of samples meeting limit)	2011	TT	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)	2010	1.3	1.3	0.051	0/55	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2010	15	0	ND[2]	0/55	No	Corrosion of household plumbing systems; Erosion of natural deposits

[1] 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.

[2] The 90th percentile value for lead in 2010 was below the detection limit (ND).

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.

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.