2003 Water Quality Report

Report's Purpose

The Littleton Water Department (LWD) is pleased to present this annual report on the quality of our water for the 2003 calendar year. As the stewards of the town's drinking water, we are proud to relate that it is of the highest quality, meeting and exceeding all primary drinking water standards set forth by the US Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MADEP). While this report satisfies a state requirement for reporting water quality data, it also gives us an opportunity to share with you important information on the sources of our water supply, treatment techniques, conservation measures and protection activities. The photos on the cover depict the progress of the department over the past 20 years. Please take the time to review the report and save it as a reference.

Source Water Assessment Program

The Source Water Assessment Program (SWAP) was developed by MADEP to help communities identify potential contamination sources that may compromise the source water quality. LWD has delineated the wellhead protection areas for each of the four wells that include identifying the location of potential contaminant sources within each well's watershed. The town map indicates the location of the wells, the aquifer areas and the watershed areas that recharge the wells.

The Town of Littleton and LWD have integrated land-use planning, environmental audits, and groundwater monitoring into an aggressive and comprehensive aquifer and watershed protection program that has been used as a model for other communities nationwide. Begun in 1981, much of the success of the program is due to a cooperative relationship between community planners and industrial and commercial developments. Currently, more than 100 groundwater-monitoring wells are sampled annually throughout the community by LWD. All compliance monitoring costs are borne by the property owners. Through communication, monitoring and public awareness, the program has become a proactive tool in protecting the groundwater resources of the community.

Residents can assist in protecting the groundwater by practicing good septic system maintenance, such as pumping out their septic tank every two years, and not using the septic system to dispose of solvents and paints. Limiting the use of pesticides, herbicides and fertilizers on the lawns will also help. Utilizing Littleton's hazardous waste collection day will help reduce the potential improper disposal of hazardous materials.

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Water Sources

The Town of Littleton's drinking water comes from four wells that penetrate the shallow sand and gravel aquifer deposits located within the Beaver Brook and Bennett's Brook watersheds. The sand and gravel aquifers act as huge underground reservoirs that are continually replenished by rainfall and snowmelt.

LWD's four groundwater production wells yield over two and one-half million gallons per day of drinking water. After the water is pumped from the ground, it enters the distribution system that consists of over 42 miles of water main and three standpipes (water towers). The standpipes, located on Newtown Hill, Cedar Road, and Oak Hill, can store over four million gallons of water. This storage capacity helps maintain system-wide water pressure while at the same time providing sufficient amounts of water during periods of high water demand (i.e., fire protection). Water personnel not only service and maintain the existing distribution system, but also provide assistance required for system growth and development.

Drinking Water Quality Standards

In order to ensure that tap water is safe to drink, the MADEP and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) and the Massachusetts Department of Public Health (DPH) regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

Primary drinking water standards have been established by the EPA to insure the protection of human health. These standards relate to regulated chemicals (natural and man-made) commonly identified within drinking water recharge areas. The LWD routinely monitors the four municipal drinking water wells, as well as sample locations within the distribution system, to evaluate the water quality of the entire distribution system. We are pleased to report that the drinking water within our system currently meets or exceeds all established primary drinking water standards. Secondary drinking water standards have been set for those chemicals that manifest themselves as nuisance or aesthetic water quality problems.

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

Radon in Water

Radon is a radioactive gas that you cannot see, taste, or smell. It is found throughout the U.S. Radon can move up through the ground and into a home through cracks and holes in the foundation. Radon can build up to high levels in all types of homes. Radon can also get into indoor air when released from tap water from showering, washing dishes, and other household activities. Compared to radon entering the home through soil, radon entering the home through tap water will be (in most cases) a small source of radon in indoor air. Radon was detected in the water supply during the 1999 sampling period. The highest level detected was 1,900 picocuries per liter of air (pCi/l), which is well below the advisory limit of 10,000 pCi/l.

Radon is a known human carcinogen. Breathing air containing elevated radon levels can lead to lung cancer. Drinking water containing radon may also cause increased risk of stomach cancer. If you are concerned about radon in your home, test the air in your home. Testing is inexpensive and easy. Fix your home if the level of radon in your air is 4 pCi/l or higher. There are simple ways to fix a radon problem that aren't too costly. For additional information call the DPH at 413-586-7525 or call EPA's Radon Hotline, 800-SOS-RADON.

Substances Expected to be in Drinking Water

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential heath effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

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. Contaminants that may be present in source water include:

Microbial Contaminants, such as include viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Organic Chemical Contaminants, including synthetic and volatile organic compounds, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, and farming.

2003 Contaminant Violations

LWD received two "Notice of Noncompliance (NON)" violations in 2003. The following is an explanation of the enforcement actions:

NON-CE-03-035D2181 was issued on October 2, 2003 for reportedly not submitting iron and manganese laboratory data during the required compliance period. LWD records indicated the laboratory results were submitted on time and the MADEP rescinded the NON on December 2, 2003.

NON-CE-03-5D055 was issued on October 31, 2003 for exceeding the monthly and acute MCL's for coliform bacteria in the months of August and September, 2003. The NON also identified errors in LWD's public notification submittals. A description of the incident and LWD's response actions is provided in this report.

Bacteria Finding: A Review

On August 6, 2003 LWD was notified by its laboratory that water samples collected from Well #3 and the Oak Hill water tank had detectable levels of total coliform bacteria. Additional analysis of the Oak Hill water tank sample revealed E.coli bacteria. Repeat testing at both locations exhibited either no bacteria or total coliform bacteria. No additional samples confirmed as E.coli.

LWD initially surmised the detections at Oak Hill were the result of a bacteria regrowth or biofouling in the tank due to the humid air of the wet summer and the less than normal water demand by customers. Additional investigation, however, revealed that a portion of the Whitcomb Avenue well field had been submerged for a period of time as a result of a 1.5-inch rain event on August 4th. A beaver dam, located immediately down stream of Well #3, caused water levels in Beaver Brook to encroach into the well field. It is likely the source of the bacteria in the distribution system was the result of surface water infiltration into one of the wells in the field. Well #3 was subsequently taken off-line on August 7th and the Oak Hill water tank was taken off-line on August 11th. The tank, and associated trunk line off the water main, was chlorinated the next day. The tank was put back into service on August 14th, after several rounds of negative bacteria results.

Public notification of the E.coli detection was conducted on August 12th to residents downgradient of the Oak Hill storage tank, specifically the Harvard Road area. Public notification consisted of a hand delivered summary letter that contained the required MADEP public notification language. The notice was also posted on the LWD website.

Water samples collected from Well #1 on August 11th also exhibited total coliform bacteria. This well was also taken off-line. Wells #1 and #3 were chlorinated and/or flushed until consecutive rounds of laboratory results exhibited no total coliform bacteria. Well #3 was returned to service on August 18th and Well #1 on September 2nd.

On August 19th, samples collected during the monthly bacteria sampling at nine of our 18 sampling locations revealed total coliform at the Oak Hill water tank and the Newtown Road water tank. Upon learning of the coliform detections within two of the three water towers, LWD decided to initiate a low-level chlorination program at the well houses in an effort to disinfect the entire distribution system. Chlorination into the system began on August 21st. Public notification of the chlorination activity was conducted via LWD's website on August 21st, the local newspaper on August 23rd, and by a direct mailer on September 2nd.

The sporadic nature of bacteria detections throughout the distribution system, as well as the prevalence of background bacteria in the water samples, supported our theory of bacteria regrowth in the distribution system as opposed to a single contaminant source similar to what occurred at the Cedar Hill water tank in 2002. Laboratory speciation of the bacteria revealed *Klebsiella*, a coliform bacteria that can become established in the sediments of a distribution system and is associated with bacteria regrowth in public water systems. Since E.coli bacteria was never subsequently detected in the Oak Hill water tank after the August 5th sample and the number of total coliform colonies was not indicative of E.coli contamination, it is LWD's belief that the initial laboratory detection of E.coli bacteria was erroneous.

As a result of this bacteria event, MADEP has mandated that Wells #1 and #3 be chlorinated until further notice. The other water supply wells do not require chlorination. LWD has conducted additional tests to Wells #1 and #3 and has petitioned MADEP to rescind the chlorination order.

Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. Fecal coliforms and E.coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches or other symptoms. They may pose a special health risk for infants, young children, and people with severely-compromised immune systems. Waterborne E.coli are different than the more severe food-borne strain of E.coli. Food-borne E.coli is often associated with undercooked meat or unpasturized milk, and is not the strain detected in groundwater samples.

Important Definitions

Maximum Contaminant Level (MCL) - 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.
Maximum Contaminant Level Goal (MCLG) - 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.
Action Level (AL) - The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.
Massachusetts Office of Research and Standards Guideline (ORSG) - This is the concentration of a chemical in drinking water, at or below which, adverse health effects are unlikely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.
Secondary Maximum Contaminant Level (SMCL) - These standards are developed to protect the aesthetic qualities of drinking water and are not health based.
90th Percentile - Out of every 10 homes sampled, 9 were at or below this level.
PCE - Tetrachloroethylene
ND - not detected above laboratory method detection limits.
ppm - parts per million, or milligrams per liter (mg/l)
ppb - parts per billion, or micrograms per liter (µg/l)
pCi/l - picocuries per liter. A unit of radiation.
NA - Not Applicable

Bacteria, continued.

Water Quality Data Table

The following table provides information about substances that have been detected in Littleton's water system during the 2003 calendar year. These data are the same data used to comply with the EPA and MADEP monitoring and testing requirements. The MADEP requires LWD to monitor for certain substances less than once a year. In these cases, the most recent sample data are included, along with the year the sample was collected. Unless otherwise noted, only detected substances are included in the table.

Regulated Contaminants

Substance (units)	Sample Date	MCLG	MCL	Highest Detected	Range Detected	Violation	Possible Source(s) of Contamination
Alpha emitters (pCi/L)	2003	0	15	2.3 ± 1.2	0.4-2.3	No	Erosion of natural deposits.
Barium (ppm)	2002	2	2	0.04	0.01-0.04	No	Discharge of drilling wastes; erosion of natural deposits.
Fluoride (ppm)	2001	4	4	0.18	0.10-0.18	No	Erosion of natural deposits.
Nitrates (ppm)	2003	10	10	1.0	0.46-1.0	No	Fertilizer use; leaching from septic tanks; sewage.
PCE (ppb)	1999	0	5	0.6	ND-0.6	No	Discharge from factories and dry cleaners.

Unregulated Contaminants

Substance (units)	Sample Date	SMCL	ORSG	Highest Detected	Range Detected	Violation	Possible Source(s) of Contamination
Iron (ppm)	2003	0.30	--	0.24	0.07-0.24	No*	Erosion of natural deposits.
Manganese (ppm)	2003	0.05	--	0.06	ND-0.06	Yes*	Erosion of natural deposits.
MTBE (ppb)	1999	20-40	70	0.6	ND-0.6	No	Leaking underground storage tanks or gasoline spill.
Sodium (ppm)	2003	--	20	33.4	21.9-33.4	Yes**	Erosion of natural deposits; road salt.
Sulfate (ppm)	2003	250	--	15.6	8.6-15.6	No	Erosion of natural deposits.

Lead & Copper

Substance (units)	Sample Date	MCLG	MCL/AL	No. of Sites Sampled	90th Percentile	Sites above AL	Possible Source(s) of Contamination
Copper (ppm)	2003	1.3	1.3	20	1.1	1	Corrosion of household plumbing, see statement below.
Lead (ppb)	2003	0	15	20	0.005	1	Corrosion of household plumbing.

Bacteria Sampling

	Sample Date	MCLG	MCL	Highest No. Positive in Routine Monthly Samples	Violation	Possible Source(s) of Contamination
Total Coliform	2003	0	<2 /month	3	Yes	Naturally present in the environment. See E.coli narrative in text.
Fecal Coliform or E.coli	2003	0	***	1	Yes	Human or animal fecal waste. See E.coli narrative in text.

Important Notes

-- = No applicable standard.

* - Elevated concentrations can cause aesthetic problems such as staining on laundry and bathroom fixtures, but are not a health concern.

** - Sodium levels fluctuate seasonally and are the result of road salting activities. If you are concerned about your daily intake of sodium, please contact your physician.

*** - Compliance with the Fecal Coliform/E.coli MCL is determined upon additional repeat sampling.

Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

Drinking Water Treatment

In May 1998, the Spectacle Pond water treatment plant began operation to remove iron and manganese from the water supply well located near the pond. Excessive iron and manganese can cause aesthetic problems such as staining on laundry and bathroom fixtures, but are not a health concern. The application of ozone to the water causes the iron and manganese to form solid precipitates that are then removed by the treatment plant's fine-pore filters (ultrafiltration).

Potassium hydroxide is added to the all of the Town of Littleton's drinking water sources prior to entering the distribution system. It is added at very low concentrations to increase the pH of the water and reduce its natural corrosivity. Corrosive water is undesirable because it can cause service leaks, stain plumbing fixtures, and even degrade the drinking water quality by leaching copper or lead out of private service lines and home plumbing. LWD does not add fluoride to its drinking water.

System Improvements

LWD continues to upgrade the distribution system to meet the needs of our customers. A new water main was installed on Lake Shore Drive to replace an older portion of the distribution system. Crews also installed new water main on Scott Road as part of a betterment project for the area.

Once a year, LWD carries out its water main flushing program to help reduce the adverse impacts caused by manganese buildup in the distribution system. The town-wide flushing program was initiated in October and took approximately three weeks to complete. The dates and locations of the flushing schedule were posted weekly in the local newspaper. We also posted daily updates on our website, www.lelwd.com, and our after-hours information line (978-486-3104, ext 460). We are committed to making the necessary enhancements to provide you with clean, safe water.

LWD continues to manage income generated from cell towers installed on town-owned property. In 2003, a total of $249,989.15 was collected and distributed to the Conservation Commission, Clean Lakes Committee and Water Department. The Conservation Commission received $137,741.62 which goes toward preserving open space in Littleton. The Clean Lakes Committee received $75,382.84 to further their protection and clean-up of the lakes and ponds in town. The Water Department received $36,864.69. We are pleased to be a part of a program that brings additional revenue to the town for the protection of our natural resources.

Conservation Measures

Above normal rainfall during the months of June and August prevented the department from having to institute mandatory water restrictions during the summer of 2003. However, it is always important to continue to look for ways to use water wisely and to practice basic conservation measures to avoid stressing the water system.

The single greatest contributing factor to increased water usage is excessive lawn watering, primarily via sprinkler systems. Water from lawn sprinklers and garden hoses alone can often account for about 50 percent of the water used by individual consumers during the months of July and August. It is important to note that one inch of water per week is all that is necessary for proper lawn maintenance. For customers with automatic sprinklers, that translates to approximately 15 minutes per zone.

As new home construction continues, we must redouble our efforts to promote more naturally wooded lots, smaller lawns and drought-resistant landscaping. We must remain cognizant of the fact that our water is not an unlimited resource and we must continue to use it wisely both indoors and outdoors. The use of water conservation measures may reduce the likelihood of water restrictions during future periods of peak demand.

Water-Saving Tips

Install moisture sensors on sprinklers systems. Do not water during the hottest part of the day; water once or twice per week in the very early morning before sunrise.

Run your washing machine only when full. Washing machines use 30 to 60 gallons per load. Don't run half loads. For smaller loads, adjust the water-setting level carefully or wait until you have enough laundry for a full load.

Install low-flow showerheads and faucet aerators. Low-flow showerheads can save 20-40 gallons of water during one 10-minute shower. A low-flow aerator can reduce faucet flow by 25%.

Sampling Schedule

The MADEP requires LWD to sample the four production wells yearly for volatile organic compounds, iron, manganese and nitrate. The MADEP has reduced the monitoring requirements for asbestos, inorganics, synthetic organic compounds (pesticides & herbicides), nitrite, radionuclides, lead and copper. The sampling frequency for these compounds is reduced because the water sources are not at risk of contamination by these substances.

All MADEP sampling parameters, with the exception of asbestos, inorganics, and pesticides & herbicides, were required to be sampled in 2003. Asbestos and inorganics were last sampled for in 2002 and were found to meet all applicable EPA and MADEP standards. Pesticides & herbicides were last sampled for in 1999 and the results met all applicable EPA and MADEP standards.

Special Health Information

Some people may be more vulnerable to contaminants in drinking water than the general public. Immuno-compromised 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 can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

Additional Information

LWD's Public Water Supply Number is 2158000

This is LWD's fifth annual Consumer Confidence Report (CCR). For additional information or a complete breakdown of the analyses conducted at wells and distribution locations, please contact Gregory Woods, Environmental Analyst, or Savas Danos, General Manager, at (978) 486-3104, between the hours of 7:00 AM and 4:00 PM, M-F. In addition, you can view the 2003 CCR and other information at our web site www.lelwd.com. Our information line is accessible after 4:00 PM at (978) 486-3104, extension 460.

You are welcome to join the monthly Board of Water Commissioners meetings on Tuesday evenings at 7:00 PM. Meeting notices are posted at the Town Hall and at the Light and Water Administration Building, located at 39 Ayer Road.

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Littleton Water Department
39 Ayer Road
P.O. Box 2406
Littleton, MA 01460

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