



2016 Annual Drinking Water Quality Report *Charlotte Water*

Water System Number: 01-60-010

We are pleased to present to you this year's Annual Drinking Water Quality Report. This report is a snapshot of last year's water quality. Included are details about your source(s) of water, what it contains, and how it compares to standards set by regulatory agencies. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water and to providing you with this information because informed customers are our best allies. **If you have any questions about this report or concerning your water, please call 311 or 704-336-7600. We want our valued customers to be informed about their water utility.**

What EPA Wants You to Know

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 health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. 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).

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. Charlotte Water is responsible for providing high quality drinking water, but 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 <http://www.epa.gov/safewater/lead>.

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 viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife; inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm water 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 storm water runoff, and residential uses; organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems; and radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

When You Turn on Your Tap, Consider the Source

Mountain Island Lake and Lake Norman supply our treatment plants with high quality water for your home, business or school. These surface waters are part of the Catawba River Basin, which provides water for more than 1.5 million people in our growing region. Charlotte Water operates three water treatment plants, and they collectively clean an average of 107 million gallons a day for about a million people in Mecklenburg County.

Our Treatment Process

Long before you step in the shower or turn on the tap, Charlotte Water employees have managed numerous processes to protect our drinking water and those who use it. First we pump the water from Mountain Island Lake and Lake Norman to one of the three water treatment plants - Franklin, Vest or Dukes. We add aluminum sulfate (alum) in the rapid mix phase to cause dirt particles to clump together, where they are removed through settling. The water then flows through filters that trap even smaller particles. We add chlorine to prevent bacterial growth and fluoride to promote dental health. We also use lime to adjust the water's pH and prevent pipe corrosion. We then pump the water to homes, businesses and storage tanks through 4,200 miles of water pipes.

Source Water Assessment Program (SWAP) Results

The North Carolina Department of Environmental Quality (DEQ) Public Water Supply (PWS) Section, Source Water Assessment Program (SWAP) conducted assessments for all drinking water sources across North Carolina. The purpose of the assessments was to determine the susceptibility of each drinking water source (well or surface water intake) to Potential Contaminant Sources (PCSs). The results of the assessment are available in SWAP Assessment Reports that include maps, background information and a relative susceptibility rating of Higher, Moderate or Lower.

The relative susceptibility rating of each source for Charlotte Water was determined by combining the contaminant rating (number and location of PCSs within the assessment area) and the inherent vulnerability rating (i.e., characteristics or existing conditions of the well or watershed and its delineated assessment area). The assessment findings are summarized in the table below:

Susceptibility of Sources to Potential Contaminant Sources (PCSS)

Source	Inherent Vulnerability Rating	Contaminant Rating	Susceptibility Rating	Date
Mt. Island Lake/Catawba River	Moderate	Higher	Higher	July 2015
Lake Norman	Moderate	Higher	Higher	July 2015

The complete SWAP Assessment report for Charlotte Water may be viewed on the Web at: www.ncwater.org/pws/swap. Note that because SWAP results and reports are periodically updated by the PWS Section, the results available on this web site may differ from the results that were available at the time this Consumer Confidence Report (CCR) was prepared. If you are unable to access your SWAP report on the web, you may mail a written request for a printed copy to: Source Water Assessment Program – Report Request, 1634 Mail Service Center, Raleigh, NC 27699-1634, or email requests to swap@ncdennr.gov. Please indicate your system name, number, and provide your name, mailing address and phone number. If you have any questions about the SWAP report please contact the Source Water Assessment staff by phone at 919-707-9098.

It is important to understand that a susceptibility rating of “higher” does not imply poor water quality, only the system’s potential to become contaminated by PCSs in the assessment area.

Help Protect Your Source Water

Protection of drinking water is everyone’s responsibility. Charlotte Water is partnering with Charlotte-Mecklenburg Storm Water Services to expand the scope of source water quality sampling in Lake Norman and Mountain Island Lake. Multiple locations from both source waters are now being monitored. In addition, chlorophyll concentrations and phytoplankton densities are monitored from both source water intake locations on a monthly basis. You can help protect your community’s drinking water source(s) in several ways: If you see or suspect potential water contaminations, water leaks, or sewage spills, please call 311 or 704-336-7600. We will respond 24 hours-a-day, 365 days-a-year. Dispose of chemicals properly and take used motor oil to the four Mecklenburg County recycling centers.

Put only toilet paper in the toilet. All other products should go in the trash including ‘flushable’ wipes.

Water Quality Data Tables of Detected Contaminants

We routinely monitor for over 150 contaminants in your drinking water according to Federal and State laws. The tables below list all the drinking water contaminants that we detected in the last round of sampling for each particular contaminant group. The presence of contaminants does not necessarily indicate that water poses a health risk. **Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, (2016).** The EPA and the State allow us to monitor for certain contaminants less than once per year because the concentrations of these contaminants are not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Important Drinking Water Definitions:

Not-Applicable (N/A) – Information not applicable/not required for that particular water system or for that particular rule.

Non-Detects (ND) - Laboratory analysis indicates that the contaminant is not present at the level of detection set for the particular methodology used.

Parts per million (ppm) or Milligrams per liter (mg/L) - One part per million corresponds to one minute in two years or a single penny in \$10,000.

Parts per billion (ppb) or Micrograms per liter (ug/L) - One part per billion corresponds to one minute in 2,000 years, or a single penny in \$10,000,000.

Parts per trillion (ppt) or Nanograms per liter (nanograms/L) - One part per trillion corresponds to one minute in 2,000,000 years, or a single penny in \$10,000,000,000.

Parts per quadrillion (ppq) or Picograms per liter (picograms/L) - One part per quadrillion corresponds to one minute in 2,000,000,000 years or one penny in \$10,000,000,000,000.

Picocuries per liter (pCi/L) - Picocuries per liter is a measure of the radioactivity in water.

Million Fibers per Liter (MFL) - Million fibers per liter is a measure of the presence of asbestos fibers that are longer than 10 micrometers.

Nephelometric Turbidity Unit (NTU) - Nephelometric turbidity unit is a measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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

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

Maximum Residual Disinfection Level (MRDL) – 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.

Maximum Residual Disinfection Level Goal (MRDLG) – 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.

Locational Running Annual Average (LRAA) – The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters under the Stage 2 Disinfectants and Disinfection Byproducts Rule.

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.

RAA- Running annual average

Total Organic Carbon (TOC) - has no health effects, however, organics provide a medium for the formation of disinfection byproducts. The TOC compliance criterion applies only to treated water.

Tables of Detected Contaminants

Microbiological Contaminants in the Distribution System

Contaminant (units)	MCL Violation Y/N	Your Water	MCLG	MCL	Likely Source of Contamination
Total Coliform Bacteria (presence or absence)	No	0.08% monthly average 0.33% highest monthly average	0	No more than 5% of monthly samples are positive (Note: If either an original routine sample and/or its repeat samples(s) are fecal coliform or <i>E. coli</i> positive, a Tier 1 violation exists.)	Naturally present in the environment
Fecal Coliform or <i>E. coli</i> (presence or absence)	No	0 positive sample	0		Human and animal fecal waste

E.coli - 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, some of the elderly, and people with severely-compromised immune systems.

Turbidity*

Contaminant (units)	Year Sampled	Treatment Technique (TT) Violation Y/N	Your Water	MCLG	Treatment Technique (TT) Violation if:	Likely Source of Contamination
Turbidity (NTU) - Highest single turbidity measurement Franklin Vest Dukes	2016	No	0.09 0.10 0.21	N/A	Turbidity > 1 NTU	Soil runoff
Turbidity (NTU) - Lowest monthly percentage (%) of samples meeting turbidity limits Franklin Vest Dukes	2016	No	100% 100% 100%	N/A	Less than 95% of monthly turbidity measurements are \leq 0.3 NTU	

* Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system. The turbidity rule requires that 95% or more of the monthly samples must be less than or equal to 0.3 NTU.

Inorganic Contaminants

Contaminant	Year Sampled	Your Water (average)	Range Low-High	MCLG	Likely source of contamination
Fluoride (ppm) Franklin Vest Dukes	2016	0.70 0.70 0.69	N/A	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Thallium* (ug/L) Vest	2016	1.2 (Highest Level Detected)	ND -1.2	0.50	Leaching from ore-processing sites; discharge from electronics, glass and drug factories.

**On 8/3/16, thallium was detected in a treated water sample collected from Charlotte Water's Vest water treatment facility at a concentration of 1.2 ppb. This concentration of thallium is just slightly higher than the minimum detection level of 1.0 ppb. This was the only treated water sample in which thallium was detected during the 2016 calendar year and is well below the maximum contaminant level (MCL) of 2.0 ppb established for thallium. The maximum contaminant level is defined by the EPA as the highest level of a contaminant allowed in drinking water. MCLs are established to ensure that drinking water does not pose either a short-term or long-term health risk*

Lead and Copper Contaminants

Contaminant (units)	Year Sampled	Your Water	Number of sites found above the AL	MCLG	AL	Likely Source of Contamination
Copper (ppm) (90 th percentile)	2016	None detected at 90 th percentile	0	1.3	AL=1.3	Corrosion of household plumbing systems; erosion of natural deposits
Lead (ppb) (90 th percentile)	2016	None detected at 90 th percentile	1	0	AL=15	Corrosion of household plumbing systems; erosion of natural deposits

Total Organic Carbon (TOC)

Contaminant (units)	Year Sampled	TT Violation Y/N	Your Water (RAA Removal Ratio)	Range Monthly Removal Ratio Low - High	MCLG	TT	Likely Source of Contamination	Compliance Method (Step 1 or ACC#_)
Total Organic Carbon (removal ratio) (TOC)-TREATED (ppm) Franklin Vest Dukes	2016	No	0.90 0.97 0.90	0.79-1.00 0.92-1.10 0.80-1.00	Compliance Method ACC#2 Treated Water<2.00	TT	Naturally present in the environment	ACC#2

Disinfectant Residuals Summary

	Year Sampled	MRDL Violation Y/N	Your Water (highest RAA)	Range		MRDLG	MRDL	Likely Source of Contamination
				Low	High			
Chlorine (ppm) Franklin Vest Dukes	2016	No	1.28 1.27 1.30	0.85-1.75 1.00-1.52 1.00-1.58	4	4.0	Water additive used to control microbes	
Chlorine Dioxide (mg/L)* Dukes	04/05/16-04/06/16	No	0.007	ND - 0.014	0.8	0.8	Water additive used to reduce disinfection byproducts	

**Charlotte Water conducted a commissioning study for the startup of a chlorine dioxide generation system at Lee Dukes plant over a 2 day period last April (4/5/16 & 4/6/16). The application of chlorine dioxide as a pre-oxidant enhances water quality by reducing disinfection byproducts (DBP), and also functions as an oxidizing agent to counter soluble manganese and iron concentrations in untreated, raw water along with providing bacteriological inactivation. The purpose of the commissioning study was to generate chlorine dioxide, apply the chlorine dioxide in the water treatment process, and evaluate performance.*

Other Disinfection Byproducts Contaminants

Contaminant (units)	Year Sampled	MCL/MRDL Violation Y/N	Your Water	Range		MCLG	MCL	Likely Source of Contamination
				Low	High			
Chlorite (ppm) Dukes Distribution System	4/5/16-4/6/16	No	0.100 0.014	0.063 - 0.137 ND - 0.048	0.8	1.0	By-product of drinking water chlorination	

Stage 2 Disinfection Byproduct Compliance - Based upon Locational Running Annual Average (highest LRAA)

Disinfection Byproduct	Year Sampled	MCL Violation Y/N	Your Water (highest LRAA)	Range Low High	MCLG	MCL	Likely Source of Contamination
TTHM (ppb)	2016	No	51.7	24.8 - 65.6	N/A	80	Byproduct of drinking water disinfection
HAA5 (ppb)	2016	No	13.0	7.3 - 16.1	N/A	60	Byproduct of drinking water disinfection

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

For HAA5: *Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.*

Cryptosporidium

Our system monitored for Cryptosporidium and found levels of 0 oocysts.

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes Cryptosporidium, the most commonly-used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of Cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.