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City of Columbia 2015 Water Quality Report

Public Water System 401001 • Columbia, SC • City of Columbia Water Works

A publication of the City of Columbia's Department of Utilities and Engineering

Columbia Water: Recovering from the October Flood

The October 2015 flood threatened to devastate our community. But even through the worst, we came together as neighbors to help each other.

As flood waters washed away roads, they carried away water lines and caused widespread breaks. The pressure loss from these breaks led to a system-wide Boil Water Advisory. The Columbia Canal breach further threatened to shut down one of the City's two water treatment plants.

City staff worked tirelessly with our partners, including the National Guard, several South Carolina utilities, local citizens, and a host of others to help save our water supply and provide clean drinking water to our community. Who could forget the sight of a Chinook helicopter moving construction equipment near the Gervais Street bridge like children's play toys?

Amazingly, both City water plants produced treated water throughout the entire flood. At one point, the Canal plant almost doubled its normal production to make up for water lost through line breaks while pipe-repair crews fixed them.

The City will see impacts from the flood for years to come – the Broad River was muddier than normal for months afterwards, and the Canal repair will take some time to complete. But our commitment to protect our community's water has only been strengthened by this experience.

The enormity of what our community faced in surviving the flood cannot be understated. **We would like to thank everyone who played a part in the emergency response and our customers for your patience throughout our recovery.**



The 60 foot breach in the Columbia Canal on October 6th, 2015

Addressing Customers' Lead Concerns

The City of Columbia wants you to know what our staff is doing to prevent lead from leaching into your drinking water and what you can do to protect yourself and your family from possible lead exposure.

How does lead get into drinking water?

Lead in drinking water typically does not come from treatment plants or water mains. Lead levels in the water leaving the City's drinking water treatment plants are consistently below detection levels and well below the maximum levels set by the US Environmental Protection Agency (US EPA).

The most common sources of lead are from home plumbing. This includes lead-based solder used to join copper pipes, faucets with brass fittings, and, in some cases, lead pipes that connect a home to the water main. According to the US EPA, homes built before 1986 are more likely to have lead in their plumbing.

Replacing old lead-based plumbing can be expensive for homeowners, which is why the City uses **Corrosion Control Measures** to reduce the amount of lead that water picks up from old pipes. You can also protect yourself by **Flushing At The Tap** to remove lead-contaminated water before you drink or cook and **Testing Your Water**.

Corrosion Control Measures

In the 1990s, the City started a corrosion control program by adding orthophosphates at the water treatment plants. This material coats the inside of water pipes and acts as a barrier to prevent corrosion. Orthophosphate and pH levels also act as indicators for optimum corrosion control. These levels are tested at both plants each day, and they help City staff ensure that lead and copper concentrations are at or below safe levels at your tap.

Because of the City's consistently good performance in lead testing, the South

Carolina Department of Health and Environmental Control (SC DHEC) allows the City to perform "reduced" monitoring. The City tests 50 of its most at-risk sites every three years. In 2014, the last time the City performed this testing, all of the at-risk locations were below the US EPA Action Limit of 0.015 mg/L.

Flushing At The Tap

While the City's corrosion control measures can put a protective barrier on your home plumbing, water that has been sitting in lead-containing pipes for several hours can still absorb significant amounts of lead. If you suspect your home has lead pipes or other lead-based materials, you can reduce lead exposure by flushing any standing water from your tap before you use it for cooking or drinking.

Let the cold water run from the tap until you notice a distinct temperature change before using it for drinking or cooking. This may take two minutes or more.



Let cold water run until you feel a temperature change before using if you think your pipes have lead

Testing Your Water

If your home's plumbing is all plastic or was installed after 1986, there is very little chance for high lead levels in your drinking water due to the types of materials used in plumbing today. If you are concerned that your house may have copper pipes with lead-based solder, the City will perform free lead testing of your tap water.

For more information about water testing, call the City's Customer Care line at 803-545-3300.

What is in Columbia's Drinking Water?

The City of Columbia's drinking water met all state and federal requirements during 2015, with the exception of a brief time during the October flood, and is considered safe to drink. The City's SC DHEC-certified laboratory performs more than 200,000 analyses each year to ensure that the water the City supplies to its customers meets all US EPA and SC DHEC standards. Additional analyses are performed by SC DHEC, the state agency that regulates

and oversees public water systems. Samples are tested at every stage of the treatment process and at hundreds of points throughout more than 2,400 miles of pipeline that make up the City's distribution system. The City also conducts voluntary testing for microbial contaminants. Since 2004, the City has been participating in the Partnership for Safe Water. The Partnership's mission is to improve the quality of water delivered to customers by improving water system operations. The substances listed below were detected in the City's water supply during 2015.

Substance	Highest Level Allowed (MCL)	Detected Level	Range of Detection	Goal (MCLG)	Violated	Year Sampled	Source of Contaminant
INORGANIC COMPOUNDS							
Lead	15 ppb (Action Level)	0.0 ppb (90th%) 0-7 ppb (range)	No sites exceeded the action level	0	None	2014	Corrosion of household plumbing systems & naturally occurring in the environment*
Copper	1.3 ppm (Action Level)	0.059 ppm (90th%) 0-0.089 ppb (range)	No sites exceeded the action level	0	None	2014	Corrosion of household plumbing systems & naturally occurring in the environment
Fluoride	4 ppm	0.54 ppm	0.53-0.55 ppm	4 ppm	None	2015	Naturally occurring in the environment by erosion of natural deposits and added at the treatment plants as an aid in preventing tooth decay
Nitrate/Nitrite (as Nitrogen)	10 ppm	0.24 ppm	0.08-0.39 ppm	10 ppm	None	2015	Runoff from fertilizer use, leaching from septic tanks, sewage, erosion of natural deposits
Chlorite (Lake Plant)	1 ppm	0.667 ppm	0.260-0.667 ppm	0.8 ppm	None (1)	2015	By-product of drinking water chlorination
Chlorite (Canal Plant)	1 ppm	0.569 ppm	0.191-0.569 ppm	0.8 ppm	None	2015	By-product of drinking water chlorination
ORGANIC COMPOUNDS							
Total Trihalomethanes (THMs) (Chloroform, Bromodichloromethane, Dibromochloromethane, Bromoform)	80 ppb (LRAA - Locational Running Annual Average)	39 ppb (LRAA - Locational Running Annual Average)	14-59 ppb	0	None	2015	By-product of drinking water chlorination; formed when chlorine reacts with organic matter
Haloacetic Acids (HAAs) (Monochloroacetic Acid, Monobromoacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Dibromoacetic Acid)	60 ppb (LRAA - Locational Running Annual Average)	50 ppb (LRAA - Locational Running Annual Average)	13-68 ppb	0	None	2015	By-product of drinking water chlorination; formed when chlorine reacts with organic matter
Total Organic Carbon (Lake Plant)	TT	43.92% removal (36.67% removal required)	35.40-53.40% removal	None	None	2015	Naturally occurring in the environment
Total Organic Carbon (Canal Plant)	TT	47.14% removal (36.67% removal required)	30.40-80.70%** **Ratio met through alternate criteria	None	None	2015	Naturally occurring in the environment
MICROORGANISMS							
Turbidity (Lake Plant)	<0.3 NTU TT	0.09 NTU-Highest single measurement 100%-Lowest monthly percentage meeting standard		N/A	None	2015	Naturally occurring in the environment
Turbidity (Canal Plant)	<0.3 NTU TT	20.0 NTU-Highest single measurement 96%-Lowest monthly percentage meeting standard		N/A	Yes (2)	2015	Naturally occurring in the environment
Total Coliform Bacteria	Presence of coliform bacteria in <5% of monthly samples	4.28% (Highest monthly percentage positive)	N/A	0	None	2015	Naturally occurring in the environment

*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. The City of Columbia 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 in your pipes 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 online at <http://www.epa.gov/safewater/lead>.

Substance	Highest Level Allowed (MCL)	Detected Level	Range of Detection	Goal (MCLG)	Violated	Year Sampled	Source of Contaminant
DISINFECTANTS							
Chloramine	4 ppm	2.6 ppm (Highest quarterly average)	1.8-2.6 ppm	4 ppm	None	2015	Water additive to control microbial growth
Chlorine Dioxide (Lake Plant)	800 ppb	301 ppb	0-301 ppb	800 ppb	None	2015	Water additive to control microbial growth
Chlorine Dioxide (Canal Plant)	800 ppb	279 ppb	0-279 ppb	800 ppb	None	2015	Water additive to control microbial growth

NOTIFICATIONS

(1) On February 3rd, 2016, the required samples for chlorite in the distribution system were not analyzed due to laboratory error. This resulted in a monitoring and reporting violation. Additional sampling conducted on February 4th, 2016 indicated that the chlorite levels in the distribution system were within the acceptable range. Due to the monitoring error, the following mandatory notice is required: "Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia." Additional sampling has shown that the finished water and distribution system chlorite values continue to be within the normal range. No additional action is needed.

(2) The October 2015 historic flooding caused turbidity standard exceedances, but the system was under a boil water advisory during this time period. In November of 2015, one turbidity measurement exceeded the standard of 1.0 NTU. Turbidity (cloudiness) levels are used to measure effective filtration of drinking water.

What Do These Terms and Symbols Mean?

Action Level — A limit, that is not a MCL, that applies to contaminants such as lead and copper that enter the water after treatment. Action levels may trigger special monitoring, public education or treatment techniques.

Detected Level — The concentration of a substance detected in a water sample. The detected levels specified in the table to the left are the highest levels detected if multiple samples were collected, except for Total Organic Carbon (TOC) or unless specified otherwise. For TOC, the specified removal rate is the rate required by SC DHEC based on data reported by the City.

HRL (Health Reference Level) — A US EPA-defined benchmark for evaluating contaminant occurrence based on health effects information.

LRAA (Locational Running Annual Average) — An average at each sample point for four quarters in the calendar year.

MCL (Maximum Contaminant Level) — US EPA's regulation limit for the highest allowable amount of a substance in drinking water.

MCLG (Maximum Contaminant Level Goal) — The US EPA's target level for a contaminant below which there are no known or suspected health effects. The MCLG is not necessarily a level achievable with currently available treatment techniques.

N/A (Not Applicable) — Does not apply.

NTU (Nephelometric Turbidity Unit) — Units of measure to indicate water clarity.

ppb (parts per billion) — One part in a billion parts (equivalent to one penny in \$10,000,000).

ppm (parts per million) — One part in a million parts (equivalent to one penny in \$10,000).

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

90th% (90th Percentile) — The Action Level for lead and copper for a water system that serves more than 100,000 people.

< Less than.

> Greater than.

FUN FACT DROPLET

Approximately **2,400 MILES OF PIPE** carry water through the Midlands. That's as far as driving to Los Angeles, CA!

SC DHEC has completed a comprehensive water assessment report on the Broad River Diversion Canal (also referred to as the Columbia Canal) and Lake Murray. These Source Water Assessment reports are available and can be reviewed at 1136 Washington Street or by contacting 803-545-3300.

US EPA requires that all annual water quality reports contain the following:

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 US 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 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 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, stormwater runoff, and residential uses.

- Organic chemical contaminants, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production and can also come from gas stations, urban stormwater runoff, and septic systems.
- 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, the US EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

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 are available from the Safe Drinking Water Hotline (800-426-4791). Testing since 1994 has revealed no signs of Cryptosporidium in Columbia's treated water.

2015 UCMR 3 Unregulated Contaminants

Unregulated contaminants are those substances that do not have a drinking water standard set by EPA. Every five years, EPA is required by the Safe Drinking Water Act to identify a list of potential contaminants, make a rule for water systems to test for them, and then make a decision whether regulation is necessary. As part of the Unregulated Contaminant Monitoring Rule 3 (UCMR 3), DHEC recently tested Columbia's treated

and distribution system water for 30 unregulated contaminants. Twenty-three of the contaminants under review were not detected, but seven were detected. Those contaminants that were detected are included in this report. **If you have questions about these results or are interested in the full list of contaminants that were monitored, please contact Jonathan Sherer at (803) 255-8160 or jdsherer@columbiasc.net.**

Substance	Location	Units	Health Reference Level	Average*	Range	Sources and Notes
Chromium-6	Canal Plant	ppb	0.1 ppb (California)	0.11	0.10-0.12	Naturally-occurring element
	Lake Murray Plant			0.066	0.066-0.066	
	Distribution System 1			0.0975	0.085-0.11	
	Distribution System 2			0.167	0.064-0.27	
1,4 Dioxane	Canal Plant	ppb	0.35 to 35 ppb (US EPA) 0.8 ppb (California)	0.38	0.29-0.47	Cyclic aliphatic ether; used as a solvent or solvent stabilizer in manufacturing and processing of paper, cotton, textile products, automotive coolant, cosmetics, and shampoos
	Lake Murray Plant			0.092	0.085-0.099	
	Distribution System 1			0	0	
	Distribution System 2			0	0	
Total Chromium	Canal Plant	ppb	100 ppb	0.135	0-0.27	See Chromium-6 for use or source information; though the amount measured when analyzing for "total chromium" is the sum of chromium in all of its valence states, the MCL for EPA's current total chromium regulation was determined based upon the health effects of chromium-6
	Lake Murray Plant			0.1	0-0.20	
	Distribution System 1			0.15	0-0.30	
	Distribution System 2			0.285	0.27-0.30	
Molybdenum	Canal Plant	ppb	40 ppb	1.45	1.1-1.8	Naturally-occurring element
	Lake Murray Plant			0	0	
	Distribution System 1			1.55	1.1-1.8	
	Distribution System 2			0	0	
Strontium	Canal Plant	ppb	4,000 ppb	43.5	42-45	Naturally-occurring element
	Lake Murray Plant			52.5	46-59	
	Distribution System 1			50	42-58	
	Distribution System 2			50	50-50	
Vanadium	Canal Plant	ppb	21 ppb	0.54	0.44-0.64	Naturally-occurring elemental metal
	Lake Murray Plant			0.5	0.5-0.5	
	Distribution System 1			0.61	0.47-0.75	
	Distribution System 2			0.575	0.57-0.58	
Chlorate	Canal Plant	ppb	210 ppb (US EPA) 700 ppb (California)	205	160-250	Disinfection byproduct. Although the results found are higher than the Health Reference Level, regulatory limits are potentially in the range of 500 - 700 ppb. The City of Columbia would not have exceeded the probable regulatory limits for this chemical.
	Lake Murray Plant			195	170-220	
	Distribution System 1			235	170-300	
	Distribution System 2			195	180-210	

*From two sampling events in 2015

Finished Water Secondary Standards

Some attributes of water, listed in the table below, affect the taste, odor, and hardness of our drinking water. Because these attributes of water do not impact a person's health, the US EPA has established secondary standards that are non-enforceable, recommended guidelines. The City meets these guidelines in addition to the regulations set forth by the US EPA.

For commercial customers with boilers or chillers, breweries, and other customers who need additional information, please contact **Jonathan Sherer, Water Works Engineer, at (803) 255-8160 or jdsherer@columbiasc.net.**

Parameter	Units	MCL	Range	Average	Noticeable effects above the MCL
Chloride	ppm	250	5.00-18.00	8.72	salty taste
Color	Color units*	15	0.00-1.65	0.00	visible tint
Copper	ppm	1.0	0.003-0.004	0.003	metallic taste; blue-green staining
Fluoride	ppm	2.0	0.50-0.78	0.62	tooth discoloration
Total Iron	ppm	0.3	0.01-0.03	0.02	rusty color; sediment; metallic taste; reddish or orange staining
Manganese	ppm	0.05	0.005-0.018	0.007	black to brown color; black staining; bitter metallic taste
pH	s.u.**	6.5-8.5	7.46-8.75	7.85	low pH: bitter metallic taste; corrosion high pH: slippery feel; soda taste; deposits
Sulfate	ppm	250	14.00-42.00	18.56	salty taste

* A standard scale that was developed for measuring color intensity in water samples.

** Standard unit (s.u.); pH is measured on a logarithmic scale, ranging from 0 to 14 s.u., with 7 s.u. being neutral pH.

For additional information:

City of Columbia Water Quality Complaints, Billing, & Customer Care Center
803-545-3300
columbiasc.net/customer-care

SC DHEC - Bureau of Water
803-898-4300

US EPA Drinking Water Hotline
800-426-4791

National Lead Information Clearinghouse
800-424-LEAD

Consumer Product Safety Commission
800-638-2772

FUN FACT
DROPLET

The average American family uses over **300 GALLONS** of water each day at home.

