



City of Danville 2014 Water Quality Report



Each year, the City of Danville compiles and distributes this report to comply with one of many state and federal requirements. The purpose of this report is to provide you an overview of last year's (2014) drinking water quality. It includes details about where your water comes from and what it contains. We hope this report will provide the facts and perspective you need to make an informed evaluation of your tap water.

In this report, you will find a table showing the City of Danville had no violations of water quality standards during the 2014 calendar year. The substances detected were all well below the levels allowed. This does not happen by chance. Your drinking water is carefully protected from its source, the Dan River, through our treatment plant, and to your tap. Under the Safe Drinking Water Act, the U.S. Environmental Protection Agency (EPA) is responsible for setting national limits for hundreds of substances in drinking water and for specifying treatment processes to remove them. State-certified water quality labs perform over 4,000 tests of water samples each month. Our treatment and distribution facilities are periodically inspected by the State.

We hold ourselves accountable to the public. Opportunities for increased understanding and involvement in water-related decision and policy making include attendance at the Danville Utility Commission Meetings, held at 4:00 p.m. on the fourth Monday of each month on the fourth floor at City Hall, and the Danville City Council Meetings held at 7:00 p.m. on the first and third Tuesday of each month at City Hall. City Council meetings are also broadcast on River City TV (Comcast cable TV channel 10). If you have questions about this Water Quality Report or want more information about your drinking water, contact the Water Treatment Plant on Monday through Friday between 8:00 a.m. and 5:00 p.m. at 434-799-6473. To report leaks or tank over flows please call 799-5284 at any time, day or night. For customer service, please call 799-5155. If you have billing questions, please call 799-5159. Tours of our facilities are scheduled during business hours.

TREATED WATER CHARACTERISTICS	
PARAMETER	TYPICAL VALUES
pH, standard units ⁽¹⁾	7.0- 8.2, avg.=7.3
Alkalinity, mg/L	23-31, avg.=24
Calcium, mg/L	11.6
Total Hardness, mg/L ⁽¹⁾	24-88, avg.=74
Sodium, mg/L	4.55
Zinc, mg/L	<0.01
Aluminum, mg/L (SMCL ⁽²⁾ =0.05-0.2)	<0.05
Iron, mg/L (SMCL ⁽²⁾ =0.3)	<0.05
Manganese, mg/L (SMCL ⁽²⁾ =0.05)	<0.01
Water temperature, °F Winter	36-70, avg. = 57
Water temperature, °F Summer	61-81, avg. = 75
Annual average daily production: 4 –8 MGD Yearly avg.= 5.47 MGD	
(1) Varies with type of post pH adjustment used.	
(2) SMCL-Secondary Maximum Contaminant Level.	

Source Water

Danville's drinking water comes from what is classified as a surface water source, the Dan River. The Virginia Office of Drinking Water conducted a source water assessment on the Dan River in 2002. The assessment report consists of maps showing the source water assessment area, an inventory of known land use activities of concern, and documentation of any known contamination within the last five years. The report is available by contacting the Water Treatment Plant. The river was determined to be "highly susceptible" to contamination using the criteria developed by the State in its approved Source Water Assessment Program. The sources of substances in the Dan River come from surface runoff as water travels over the surface of the land and dissolves naturally occurring minerals and substances resulting from the presence of animals and 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 byproducts 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. The presence of these substances in pretreated water does not necessarily indicate that the treated water is unsafe. 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 the water poses a health risk. 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/Center for Disease Control (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 1-800 426-4791 or EPA web page: www.epa.gov/ow

Water Quality Summary

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water produced by public water systems. The Food and Drug Administration regulations establish limits for contaminants in bottled water that must provide the same protection for public health. We constantly monitor for various compounds in the water supply to meet all regulatory requirements. The table on the following page lists only those compounds that had some level of detection. Many other compounds have been analyzed, but were not present or were below the detection limits of the lab equipment.

Crypto

Cryptosporidium are microscopic organisms that may enter surface waters from runoff containing animal wastes. If ingested, Cryptosporidium may cause diarrhea, fever and other gastrointestinal symptoms. The EPA Long Term 2 Enhanced Surface Water Treatment Rule required the City to test the raw water for Cryptosporidium, beginning February 2008, and continuing through January 2010. We are happy to report the organisms were not detected.

Lead Levels

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 Danville is responsible for providing high quality drinking water, but cannot control the variety of materials used in the plumbing components inside your home or business. You can minimize the potential for lead exposure by flushing your tap for 15 to 30 seconds or until it becomes cold or reaches a steady temperature 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>.

Trihalomethane Levels

The levels of total trihalomethanes (TTHMs) in some samples collected during 2014 were greater than the PMCL of 80 ppb but were not a violation of the drinking water standard. Compliance with the PMCL is based on a running annual average (4 quarters) of the quarterly samples collected and you will note the water supply did not exceed the drinking water limits on this basis. TTHMs are formed when trace amounts of naturally occurring organic compounds in the raw water source combine with chlorine that is used to disinfect the treated water. All locations do not have the same levels of TTHMs. Higher levels are expected in the areas with highest residence time (generally the furthest points in the system) and during the warmer months of the year. Some people who drink water containing TTHMs in excess of the PMCL over many years could experience problems with their liver, kidneys or central nervous system and may have increased risk of getting cancer. This water system will continue to be monitored for TTHMs. We intend to maintain compliance with the drinking water contaminants.

Trihalomethane (THM) Removal Project

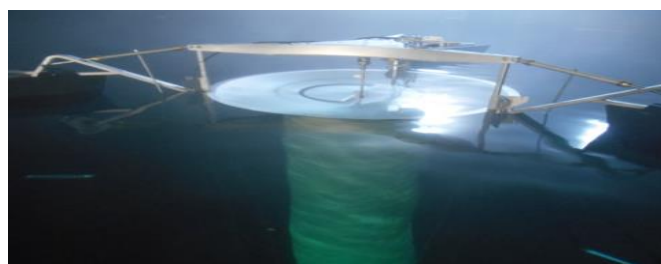
For some time now the city has been testing water samples from four sites within the distribution system for THMs. Compliance has been based on averaging quarterly samples from the four sites. The city has always been in compliance with the limit for THMs of 80 micrograms per liter (ug/L or ppb). However the criteria has changed to require each site to meet the limit of 80 ug/L based on the averaging of the consecutive four quarterly samples from that site and not averaging all samples together. Meeting the new compliance limit at all sample sites would not likely be possible as new sites were included with the revised compliance limit. Therefore the city hired Hazen and Sawyer to evaluate alternatives for reduction of the THMs. Hazen and Sawyer recommended mixing and aeration in the Ballou Park 8 million gallon storage tank as the best alternative for removing the THMs. Design has been completed and construction should start in late summer and be completed by April 15, 2015.

Due to the time requirements of this project, the city asked the Virginia Department of Health, Office of Drinking Water (ODW) for a two year extension to meet the new requirements. The ODW granted the time extension and gave an exemption for the compliance determination to be done as specified in the Stage 1 rules. These testing results as well as other testing results will be reported to the city customers.

We have been granted an extension to the new tighter requirements for TTHM/Haloacetic Acids (HAA5) compliance. We were unable to meet the October 2013 regulatory deadline because we need to construct mixing and aeration treatment in the City's 8 million gallon reservoir at Ballou Park and may also include additional modifications such as aeration in select distribution system storage tanks. We plan to complete this work by September 30, 2015. Until then, we will be implementing both temporary and permanent operational changes during the interim period to provide the water with the lowest TTHM levels possible. The HAA5 concentrations have always been below the required level in the city water and no problems are anticipated with the new compliance criteria. The new compliance criteria for HAA5 is the same as for the TTHM.



Aeration equipment used to remove THM's



Mixing equipment used to thoroughly mix tank

The following two tables list many of the contaminants of concern for drinking water

Unregulated Contaminant Monitoring Rule (UCMR3 – sampling started in July 2014, therefore only 2 consecutive quarters for CY14)

Contaminant & Unit of Measurement	MCLG	MCL	Level Detected And / or Range	Violation	Requires 4 consecutive quarters	Sources of Substance or Compound
Chromium, ppb	N/A	N/A	0.3 All results 0.3	No	July & October	Chromium can be found in low levels in water supplies either as the result of industrial activities or from naturally occurring sources.
Strontium, ppb	N/A	N/A	Max 63 Range: 51-63	No	July & October	High levels of strontium can occur in water drawn from bedrock aquifers that are rich in strontium minerals. Strontium occurrence is also linked to other sources such as air contamination from milling processes, coal burning, and phosphate fertilizers
Vanadium, ppb	N/A	N/A	Max 1.0 Range: 0.7-1.0	No	July & October	Vanadium is a metal that naturally occurs in many different minerals and in fossil fuel deposits. The primary industrial use of vanadium is in the strengthening of steel.
Hexavalent Chromium, ppb	N/A	N/A	Max 0.34 Range: 0.24-0.34	No	July & October	Same definition as Chromium above, but the natural chromium element has been altered to the +6 oxidation state.

REGULATED COMPOUNDS

Contaminant & Unit of Measurement ⁽¹⁾	MCLG	MCL	Level Detected And / or Range	Violation	Date of Sample	Sources of Substance or Compound
Gross Alpha ⁽²⁾ pCi/L	0	15	<0.6	NO	May 2014 Every 6 Yrs.	Erosion of natural deposits
Combined Radium ⁽²⁾ pCi/L	0	5	<0.6	NO	May 2014 Every 6 Yrs.	Erosion of natural deposits
Beta Emitters ⁽²⁾ pCi/L	0	50	1.8	NO	May 2014 Every 6 Yrs.	Decay of natural and man-made deposits
Total Coliform	0	Presence of coliform bacteria in no more than 5% samples per month ⁽⁴⁾	Maximum monthly detection level 1.45% for August 2014. 1 of 69 samples	NO	Tested daily at a minimum of 50 locations per month in our service area	Naturally present in the environment
Barium ppm	2	2	0.022	NO	May 2014 Annually	Discharge of drilling waste; Discharge from metal refineries; Erosion of natural deposits
Turbidity NTU	N/A	TT = 1 NTU max	Max = 0.384 Range: 0.010 – 0.384	NO	Tested continuously at plant	Soil runoff
		TT = at least 95% of the monthly samples <0.3 NTU	100%		N/A	
Total Trihalomethanes TTHM ppb	N/A	80	Max 4 qtr. Avg. 58 Range: 15-111	NO	Tested quarterly at four locations in our service area	By-product of drinking water chlorination
Fluoride ppm	4	4	Avg. 0.70 ppm Range: 0.09-0.96	NO	Tested continuously at plant	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories; desired level 0.7
Nitrate ppm	10	10	0.28	NO	May 2014 Annually	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Lead ³ ppb	0	AL = 15	90 th % = 2 <2 –4	NO	July 2012 Every 3 Yrs.	Corrosion of household plumbing systems; erosion of natural deposits
Copper ³ ppm	1.3	AL = 1.3	90 th % = 0.139 <0.020– 0.149	NO	July 2012 Every 3 Yrs.	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Chlorine ppm	MRDL G = 4	MRDL = 4	Highest Qtrly Avg.0.85 Range: ND-2.20	NO	Tested monthly at a minimum of 50 locations in our service area	Water additive used to control microbes.
Haloacetic Acids - HAA ppb	N/A	60	Max 4 qtr. avg. 20 Range 2.1-39	NO	Tested quarterly at four locations in our service area	By-product of drinking water disinfection
Total Organic Carbon - TOC ppm	N/A	TT – Based on the percentage of TOC removed during the treatment process; ratio must be greater than or equal to 1.00	Lowest Running Avg. 1.08 Range: 1.00-1.48	NO	Tested monthly at raw and treated water.	Naturally present in the environment.

See helpful table Definitions & Table Key on next page

Notes:

- ⁽¹⁾ Detected Compounds - Listed are 14 parameters detected in Danville’s drinking water, ten parameters during calendar year 2014. The State allows us to monitor for some compounds less than once per year because the concentrations of these compounds do not change frequently.
- ⁽²⁾ This data is the latest available. The SDWA requires that the highest value/lowest removal ratio detected during the calendar year be provided in this report. Not listed are the hundreds of other compounds for which we tested that were not detected.
- ⁽³⁾ Compliance based on 90% of samples being below action level.
- ⁽⁴⁾ Compliance based on the number of Total Coliform positive samples being divided by the number of samples collected with the monthly % being below 5%.

Definitions & Table Key:

< - Less than. **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 Maximum Contaminant Level Goals 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, level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect benefits of use of disinfectants to control microbial contaminants. **NA** – Not Applicable. **ND** – Non Detect. **NTU** - Nephelometric Turbidity Unit, a measure of very small particulate matter in drinking water. **ppb** – one part per billion; the equivalent of 1¢ in \$10,000,000. **ppm** – one part per million, the equivalent of 1¢ in \$10,000. **Sources** – The major sources of the compounds detected in the finished water. **TT** – Treatment Technique, a required process intended to reduce the level of a contaminant in drinking water. **pCi/L** – Picocuries per Liter, a measure of radioactivity. **UCMR** - Unregulated Contaminant Monitoring Rule, purpose is to assist the EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted. The results detected during our UCMR monitoring are noted in a separate table elsewhere in this report. Unregulated contaminants are those for which EPA has not established drinking water standards. **Variations and exemptions** - State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

Duke Energy's Coal Ash Spill

On Sunday, February 2, 2014, a failure of a storm drain pipe under a coal ash storage pond at the Duke Energy Power Station in Eden, North Carolina resulted in an estimated 39,000 tons of coal ash being discharged into the Dan River. The city of Danville's water treatment plant had to treat the water with the coal ash in it. The Danville operators were able to remove the coal ash from the water and were able to keep coal ash material removed separate for later removal and disposal at an approved landfill in North Carolina. Duke Energy employed a contractor to dewater the coal ash solids for disposal. As the coal ash was removed from the water, which was verified by many water tests, the water was safe to drink before, during and after the coal ash spill. Water testing (raw and treated) was instituted daily initially and later decreased when the analyses did not show any signs of the coal ash material. Testing of the sediments, water quality and fish are continuing to determine any impacts to the ecosystem and all testing is being reviewed by several local, state and federal entities.

Taste and Odor Issue

Although it did not occur in CY14, the City did have a taste and odor problem in February and March 2015 that we thought should be addressed in this Water Quality Report. On Monday, February 9, 2015, complaints were received concerning a bad taste and odor in the drinking water. As time went by more and more of these complaints were received and continued through March. The taste and odor was described as muddy, earthy, moldy, musty, woody, etc.. Initially it was thought that the 8 million gallon Ballou Park Reservoir which had been taken out of service for repair the preceding week may have caused flow reversals in the distribution system and thus the bad taste and odor of the water. This was ruled out due to the widespread nature of the complaints throughout the City's system. Samples of the water were collected on February 11th to determine if there was a chemical contamination of the water. The results received the next day indicated no chemical contamination. The Virginia Department of Health – Office of Drinking Water (ODW) was notified of the problem and later the Department of Environmental Quality was notified of the issue. Microscopic examination of the water was performed by the City's Water Chemist with pictures of the work sent to ODW. It was determined that the bad taste and odor were due to algae in the water. On Friday, February 13th, powered activated carbon addition to the raw water pumped from the Dan River was initiated. Later the feed rate was increased as the initial dose was not sufficient to remove the taste and odor. Powered activated carbon was added to the raw water from February 13th through April. No taste and odor were noticed in the treated water after about February 18th, however there continued to be some odor in the raw water. After about Monday, February 20th, no more odor was noted in the raw water. However the water that had been delivered to the 4 million gallon Ballou Park Reservoir for about two weeks did have taste and odor. Therefore until all of the water that had been produced during February and March had been used, the taste and odor would continue with the hot water lasting even longer due to the trapping and heating of the water. Carbon feed was stopped on Wednesday, March 11th as no odor was detected in the raw water and no taste and odor had been noticed in the treated water for some time. However complaints were received the next week and the carbon feed was started back and continued through most of April. The current carbon feeder was installed in 1990 and sized to feed a dosage of 5 to 15 mg/L. The staff has determined that a dosage of about 25 mg/L is needed to address the taste and odor at its maximum level. Therefore the City staff is determining what is needed to replace the existing unit to meet the higher dose needed.

This is a rare event for an algal bloom to occur in a free flowing stream in the winter time. The bloom was seen on Sunday, February 22nd, behind the Schoolfield Dam. The bloom was brilliant green in color and covered the entire width of the Dan River. Samples of the river water were collected by the city and DEQ staffs on Tuesday, February 24th and analyzed by Dr. Todd Egerton at Old Dominion University. Their results identified some algae, but most likely the heaviest algae population had already passed by with the bloom the Sunday and Monday before sampling.

Throughout the period of the taste and odor, the water was safe to drink based on the testing done.

Sample images of the algae detected in raw water samples during the algal bloom



Synura



Asterionella



Synedra



Melosira varians