

BROKEN ARROW



Consumer Confidence Report 2016 Annual Water Quality Report for Public Water Supply District [OK1021508]

Is my water safe?

We're very pleased to provide you our 2016 Annual Water Quality Report (Consumer Confidence Report) as required by the Safe Drinking Water Act (SDWA). This report covers all sampling and testing performed by the City of Broken Arrow and the other water provider between January 1 and December 31, 2016. This report also is designed to provide you details about where your water comes from, what it contains, and how it compares to standards set by regulatory agencies. The information presented is a snapshot of the water quality during the reporting period. We believe in providing you the information as an ongoing effort to educate consumers about the sources of water, quality, and delivery of your drinking water and to keep you informed of the needed improvements to the city's water distribution system infrastructure.

The City's top priority is to provide clean and good tasting water to its customers. Broken Arrow water is safe to drink and free of bacteria and harmful substances. Water treatment and distribution system operators continuously monitor the water throughout the treatment and distribution system. When the water leaves the treatment plant and flows towards Broken Arrow homes and businesses, it not only meets, but surpasses all federal and state requirements for purity. We collect and analyze over 1200 samples each year to ensure the water supplied to homes and businesses is of the highest quality. This report is a summary of the test results from samples taken during 2016. The Environmental Protection Agency (EPA) limits how much of a harmful substance is in the public water supply after water treatment. The Food and Drug (FDA) sets similar limits for bottled water.

Our goal is to provide you a safe and dependable supply of drinking water that meets Federal and State requirements. Over the years, we have dedicated ourselves to distributing drinking water that meets all state and federal standards. As new challenges to drinking water emerge, we remain vigilant in meeting the goals of source water protection, water conservation and community education while continuing to serve the needs of all our water users. Please be assured that we are always available to assist you should you have any questions or concerns about your water.

How to Contact Us:

*For water quality, taste and concerns

- During business hours (Monday - Friday) 918-259-8373
- After business hours, weekends and holidays 918-259-8400

*For billing questions: Customer Service (Monday – Friday) 918-259-7000 ext. 8409

*This report can be found on the internet at www.brokenarrowok.gov/2016waterreport

Do I need to take special precautions?

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/Centers 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 Water Drinking Hotline (800-426-4791).

Where does my water come from?

Our primary water supply is the City of Broken Arrow owned and operated Verdigris water treatment plant that came on line in April 2014. The \$62 million state of the art microfiltration plant is now the primary supplier of treated water. The water quality data for the Broken Arrow Verdigris plant is presented in Table I. Our secondary water source is the City of Tulsa connections at East 41st Street and West Albany. Water quality data for City of Tulsa is presented in Table II. Water supplied by both sources are introduced into the same distribution system and mixed together.

Source water assessment and its availability

Protection of drinking water is everyone's responsibility. You can help protect our community's drinking water source in several ways:

- Eliminate excess use of lawn and garden fertilizers and pesticides - they contain hazardous chemicals that can reach our drinking water source.
- Pick up after your pets.
- If you have your own septic system, properly maintain your system to reduce leaching to water sources or consider connecting to a public sewer system.
- Dispose of chemicals properly; take used motor oil to a recycling center. You can recycle motor oil at several sites in Broken Arrow including: Walmart Super Centers and the Metropolitan Environmental Trust (The MET).
- Volunteer in your community. Find a watershed protection organization in the community, such as Blue Thumb, and volunteer to help. You could also consider starting a watershed protection group. Use EPA's Adopt Your Watershed to locate groups in the community, visit the Watershed Information Network's How to Start a Watershed Team, or call the City of Broken Arrow

Stormwater Quality Department at (918) 259-7000 Ext. 5210.

- Organize a storm drain protection project with the City of Broken Arrow Stormwater Quality Team. We can give you decals and adhesive to adhere next to street drains reminding people “NO DUMPING – DRAINS TO RIVER.” We also have flyers available that you could distribute to residents.

Why are there contaminants in my 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 health effects can be obtained by calling the Environmental Protection Agency's (EPA) 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.

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

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, that 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, 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 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.

How can I get involved?

The Broken Arrow Municipal Authority (BAMA) is responsible for the operations of the City's water system. The Utilities Department is charged with the day to day operations of the water utility. If you want to learn more about the Authority and/or the water utility, you may attend any of the regularly scheduled meetings at City Hall (220 South 1st Street) on the first and third Tuesday of each month at 6:30 p.m. Additional information about the City Council and BAMA meetings can be found on the City web page at www.brokenarrow.legistar.com/Calendar.aspx.

Water Conservation Tips

Did you know that the average U.S. household uses approximately 400 gallons of water per day or 100 gallons per person per day? Luckily, there are many low-cost and no-cost ways to conserve water. Small changes can make a big difference - try one today and soon it will become second nature.

- Take short showers – it is estimated that a 5-minute shower uses 4 to 5 gallons of water compared to up to 50 gallons for a bath.
- Shut off water while brushing your teeth, washing your hair and shaving and you could save up to an estimated 500 gallons per month.
- Use a water-efficient showerhead. They're inexpensive, easy to install, and are estimated to save you up to 750 gallons a month.
- Run your clothes washer and dishwasher only when they are full. You can save up to an estimated 1,000 gallons per month.
- Water plants only when necessary.
- Fix leaky toilets and faucets. Faucet washers are inexpensive and take only a few minutes to replace. To check your toilet for a leak, place a few drops of food coloring in the tank and wait. If it seeps into the toilet bowl without flushing, you have a leak. It is estimated that fixing it or replacing it with a new, more efficient model can save up to 1,000 gallons a month.
- Adjust sprinklers so only your lawn is watered. Apply water only as fast as the soil can absorb it and during the cooler parts of the day to reduce evaporation.
- Teach your kids about water conservation to ensure a future generation that uses water wisely. Make it a family effort to reduce next month's water bill!
- Visit www.epa.gov/watersense for more information.

About Our Water Distribution System

The water treated at the Verdigris treatment Plant is blended with water purchased from City of Tulsa on an as needed basis. The finished water is distributed through a network of pipes; pipes sizes range from 1" to 48" diameter. Total length of buried pipes is about 670 miles and comprise of an assortment of pipe materials.

Distribution system operators are tasked in the operation and maintenance of various appurtenances scattered throughout the distribution system. The most visible component is the 10,000 (estimated) fire hydrants that are needed for both firefighting and also for line flushing for maintaining water quality. An annual project is being undertaken by City crews to test and refurbish about 1000 hydrants each year. We are in the fourth year of the fire hydrant maintenance program.

The water distribution system has six offsite storage facilities located throughout the system. The total storage capacity is estimated to be 11 million gallons (MG) and combined with the 6 MG tank at the water plant provides a total capacity of 17 MG. The stored water enables the system to meet peak daily demands and intermittent demands imposed on the system.

Several much-needed improvement projects are in the planning stage and shall be implemented as funding becomes available. Some of the projects in the works are:

- The construction of a new elevated storage tank to meet growth related increase in the south side
- The phased refurbishment of six steel storage tanks; the three tanks on Tiger Hill were constructed in 1964, 1976 and 1980. The 101st Street tank has been refurbished and the other five were cleaned.
- Looping of dead end water lines to improve water quality and meet fire flow demands
- Replacement of deteriorated and aging water lines throughout the distribution system.
- Phase I of the drive by Automated Meter Reading Project is about to be finished and Phase II is scheduled to begin in the fall of 2017.

Results of Cryptosporidium monitoring

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. Our monitoring indicates the presence of these organisms in our source water. 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 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. The following table lists results for monitoring performed on source water from Broken Arrow’s Verdigris Water Treatment Plant:

Cryptosporidium in Source Water

Sampling Month	Results in oocysts/L
Jan-16	<0.093
Feb-16	0.273
Mar-16	<0.091
Apr-16	<0.089
May-16	<0.105
Jun-16	0.093
Jul-16	<0.1
Aug-16	0.091
Sep-16	<0.087
Oct-16	<0.089
Nov-16	<0.089
Dec-16	<0.1

Information for Lead

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. Broken Arrow Municipal Authority 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 following table lists results for monitoring from City of Broken Arrow's Tap Water Lead and Copper Monitoring Program. These samples are taken from DEQ approved sites within the Broken Arrow Municipal Authority Water Distribution System:

Water Quality Data Table I Broken Arrow Municipal Authority

In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of contaminants in water provided by public water systems. The table below lists all of the drinking water contaminants that we detected during the calendar year of this report. Although many more contaminants were tested, only those substances listed below were found in your water. All sources of drinking water contain some naturally occurring contaminants. At low levels, these substances are generally not harmful in our drinking water. Removing all contaminants would be extremely expensive, and in most cases, would not provide increased protection of public health. A few naturally occurring minerals may actually improve the taste of drinking water and have nutritional value at low levels. Unless otherwise noted, the data presented in this table is from testing done in the calendar year of the report. The EPA or the State requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not vary significantly from year to year, or the system is not considered vulnerable to this type of contamination. As such, some of our data, though representative, may be more than one year old. In this table you will find terms and abbreviations that might not be familiar to you. To help you better understand these terms, we have provided the definitions below the table.

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Disinfectants & Disinfection By-Products								
(There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants)								
Chlorine (as Cl ₂) (ppm)	4	4	3.9	2.9	3.9	2016	No	Water additive used to control microbes
Haloacetic Acids (HAA5) (ppb)	NA	60	38.86	11.19	38.86	2016	No	By-product of drinking water chlorination
TTHMs [Total Trihalomethanes] (ppb)	NA	80	59.86	28.2	59.86	2016	No	By-product of drinking water disinfection
Inorganic Contaminants								
Barium (ppm)	2	2	.056	NA	NA	2016	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Fluoride (ppm)	4	4	.46	NA	NA	2016	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Nitrate [measured as Nitrogen] (ppm)	10	10	.27	NA	.27	2016	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits

Contaminants	MCLG or MRDLG	MCL, TT, or MRDL	Detect In Your Water	Range		Sample Date	Violation	Typical Source
				Low	High			
Microbiological Contaminants								
E. coli (RTCR) - in the distribution system (positive samples)	0	NA	0	NA	NA	2016	No	Human and animal fecal waste
Total Coliform (RTCR) (% positive samples/month)	NA	TT	NA	NA	NA	2016	No	Naturally present in the environment
Total Coliform (TCR) (% positive samples/month)	0	5	0	NA	NA	2016	No	Naturally present in the environment
Turbidity (NTU)	NA	TT	0.341	NA	NA	2016	No	Soil runoff
Radioactive Contaminants								
Alpha emitters (pCi/L)	0	15	1.06	.017	1.06	2015	No	Erosion of natural deposits
Beta/photon emitters (pCi/L)	0	50	7.9	2.05	7.9	2015	No	Decay of natural and man-made deposits.
Contaminants	MCLG	AL	Your Water	Sample Date	# Samples Exceeding AL	Exceeds AL	Typical Source	
Inorganic Contaminants								
Copper - action level at consumer taps (ppm)	1.3	1.3	.482	2016	0	No	Corrosion of household plumbing systems; Erosion of natural deposits	
Inorganic Contaminants								
Lead - action level at consumer taps (ppb)	0	15	.002	2016	0	No	Corrosion of household plumbing systems; Erosion of natural deposits	

Unit Descriptions	
Term	Definition
ppm	ppm: parts per million, or milligrams per liter (mg/L)
ppb	ppb: parts per billion, or micrograms per liter (µg/L)
pCi/L	pCi/L: picocuries per liter (a measure of radioactivity)
NTU	NTU: Nephelometric Turbidity Units. 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.
% positive samples/month	% positive samples/month: Percent of samples taken monthly that were positive
NA	NA: not applicable

Unit Descriptions	
ND	ND: Not detected
NR	NR: Monitoring not required, but recommended.
positive samples	positive samples/yr: The number of positive samples taken that year

Important Drinking Water Definitions	
Term	Definition
MCLG	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.
MCL	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.
TT	TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.
AL	AL: Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Variances and Exemptions	Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.
MRDLG	MRDLG: Maximum residual disinfection 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.
MRDL	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.
MNR	MNR: Monitored Not Regulated
MPL	MPL: State Assigned Maximum Permissible Level

Water Quality Data Table II

City of Tulsa

This table shows data for samples collected during 2016 (unless otherwise noted). Analyses made by professionals after water treatment showed that the levels of all contaminants found were much less than the levels that are cause for concern.

***Definitions:**

AL = Action Level: The concentration of a contaminant which, if exceeded, triggers a treatment or other requirement 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 contaminant in drinking water below which there is no known or expected health risk.

MRDL = Maximum Residual Disinfectant Level: The highest level of disinfectant allowed in drinking water.

LRAA = Locational Running Annual Average: average calculated at each monitoring location

NTU = Nephelometric Turbidity Unit

s.u. = Standard Units

TT = Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

****Data collected quarterly 2014 in conjunction with UCMR3 sampling. Monitoring frequency is in compliance with regulation.**

*****Current round of testing is ongoing, data calculated over 21 months, testing will complete in 2017; oocysts found in source water only; 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. Our monitoring indicates the presence of these organisms in our source water and/or finished water. 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 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.**

Regulated Contaminants	Level Found	Minimum	Maximum	Maximum Contaminant Level (MCL*)	MCLG*	Violation	Likely Source of Contaminants
Turbidity Level found			0.26	TT*=less than 0.3 NTU 95 percent of the time.	n/a	No	Soil runoff.
Lowest monthly % meeting regs	100.0%						
Total Coliform bacteria within distribution system			0.47% (monthly)	Presence of coliform bacteria in more than 5 percent of monthly samples.	0	No	Naturally present in the environment.
<i>E. coli</i>			1 (routine)	Routine sample with positive <i>E. coli</i> followed by repeat sample with positive Total Coliform or <i>E. coli</i> .	0	No	Human and animal fecal waste.
Cryptosporidium***	0.008	0.000	0.100	TT*=Presence of cryptosporidia >0.075 oocysts/L over 48 month sampling period	0	No	Human and animal fecal waste.

Barium	0.041	0.030	0.058	2 parts per million	2	No	Naturally present in the environment, drilling waste, metal refineries.
Total Chlorine	2.5	1.6	3.1	MRDL* = 4.0 parts per million annual average	4	No	Water additive to control microbes.
Chlorite	0.23	0.05	0.36	1 part per million	0.8	No	By-product of drinking water disinfection.
Total Chromium**	0.14	0	0.28	100 parts per billion	100	No	Discharge from steel and pulp mills; erosion of natural deposits
Copper	0.28 ppm at the 90th percentile; 0 sites above AL			AL* = 1.3 parts per million (ppm) at 90th percentile	1.3	No	Corrosion of household plumbing systems, erosion of natural deposits, leaching from wood preservatives.
Fluoride	0.67	0.24	0.84	4 parts per million	4	No	Erosion of natural deposits, water additive which promotes strong teeth, discharge from fertilizer and aluminum factories.
Lead	0.002 ppb at the 90th percentile; 0 sites above AL			AL* = 15 parts per billion (ppb) at 90th percentile	0	No	Corrosion of household plumbing systems, erosion of natural deposits.
Nitrate	0.35	0	1.1	10 parts per million;	10	No	Naturally occurring, fertilizers, sewage treatment plants, leaching from septic tanks, erosion of natural deposits
Total Organic Carbon	1.9	1.10	3.1	Results are parts per million. MCL is TT*=percent removal	n/a	No	Naturally found in the environment.
Haloacetic Acids	17	6	27	highest LRAA; Minimum and Maximum are from individual readings.	n/a	No	By-product of drinking water disinfection.
Total Trihalomethanes	36	24	51	80 parts per billion LRAA*. Level found is highest LRAA; Minimum and Maximum are from individual readings.	n/a	No	By-product of drinking water disinfection.

Secondary Contaminants	Average	Minimum	Maximum	Recommended Level			Likely Source of Contaminants
pH	n/a	7.1	8.5	Aesthetic level 6.5-8.5 s.u.*			Measure of acidity. Naturally present, adjusted in drinking water treatment.
Chloride	13	8	20	Aesthetic level 250 parts per million			Naturally present, brine from oilfield operations
Sodium	10	5.9	14	Standard has not been established			Naturally occurring, urban stormwater runoff or discharge from sewage treatment plants.
Sulfate	21	4.1	58	Aesthetic level 250 parts per million			Naturally present in the environment.

ADDITIONAL MONITORING:

Tulsa was required to participate in Unregulated Contaminant Monitoring (UCMR3) in 2014. 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 the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted. The following are those contaminants that were detected during UCMR3 monitoring.

Unregulated Contaminants	Average (parts per billion)	Minimum (parts per billion)		Maximum (parts per billion)
Bromochloromethane	0.020	0		0.092
Chlorate	79.3	0		244
Hexavalent Chromium	0.011	0		0.055
Molybdenum	0.14	0		1.1
Strontium	157	44.8		362
Vanadium	0.57	0		1.2
For more information please contact:				

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