Consumer Confidence Report
City of Broken Arrow's
2014 Annual Water Quality Report [OK 1021508]

We're very pleased to provide you our 2014 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 two water providers and the City of Broken Arrow between January 1 and December 31, 2014. 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 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 2014. 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/2014waterreport

Where Does My Water Come From?

Our primary water supply up to April 10, 2014 was the Oklahoma Ordnance Works Authority (OOWA) water treatment plant, Pryor, Oklahoma. This plant draws its raw water from Grand River below Lake Hudson, and water quality data is presented in Table 1. The City of Broken Arrow owned and operated Verdigris water treatment plant came on line on the 10th of April 2014. The $62 million state of the art plant is now the primary water supply and water quality data is presented in Table III. Our secondary water source is the City of Tulsa connection at East 41st Street. Water quality data for City of Tulsa is presented in Table II. Water supplied by all sources are introduced into the same distribution system and mixed together.

TABLE 1 – 2014 WATER QUALITY DATA – OKLAHOMA ORDNANCE WORKS AUTHORITY

Microbiological Contaminants						
Contaminant	**Violation (Y / N)**	**Highest Level Detected**	**Range Detected**	**MCL**	**MCLG**	**Likely Source of Contaminant**
Total Coliform Bacteria (System <40 monthly samples)	N	0 positive	0 positive	1 positive	0 positive	Naturally present in the environment.
Fecal coliform & E. coli	N	0 positive	0 positive	A routine sample and repeat sample are total coliform positive, and one is also fecal coliform or E. coli	0	Human and animal fecal wastes.
Turbidity (NTU)	N	0.13	0.02 – 0.13	TT = 1 NTU	N/A	Soil runoff.
Turbidity (NTU)	Y	< 0.3 NTU 100% of monthly samples		TT < 0.3 NTU in 95% of monthly samples	N/A	Soil runoff.
Total Organic Carbon	N	1.67 RAA	1.25 – 1.93	> 1.0 Removal ratio running annual average (4Q)	N/A	Naturally present in the environment.

Radiochemical Contaminants						
Contaminant	**Violation (Y / N)**	**Highest Level Detected**	**Range Detected**	**MCL**	**MCLG**	**Likely Source of Contaminant**
Gross Beta (pCi/L) - 2012	N	2.485	2.485 – 2.485	50	0	Decay of natural and man-made deposits.
Gross Alpha (pCi/L) - 2012	N	0.919	0.919 – 0.919	15	0	Erosion of natural deposits.
Combined radium 226/228 (pCi/L) - 2012	N	0.762	0.762 – 0.762	5	0	Erosion of natural deposits.
Uranium (ug/L) - 2012	N	1.0	1.0 – 1.0	30 ug/L	0	Erosion of natural deposits.

Inorganic Contaminants						
Contaminant	**Violation (Y / N)**	**Highest Level Detected**	**Range Detected**	**MCL**	**MCLG**	**Likely Source of Contaminant**
Barium (ppb)	N	69	45 – 69	2000	2000	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits.
Fluoride (ppm)	N	1.00	0.80 – 1.00	4	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories.
Nitrate – NO_3 (ppm)	N	0.32	0.10 – 0.32	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage, erosion of natural deposits.
Lead (ppb) - 2012	N	9.3 @ 90th percentile		AL = 15 90% of samples below this level	0	Corrosion of household plumbing systems, erosion of natural deposits.
Copper (ppm) - 2012	N	0.39 @ 90th percentile		AL = 1.3 90% of samples below this level	1.3	Corrosion of household plumbing systems, erosion of natural deposits; leaching from wood preservatives.
Disinfection By-Products						
Contaminant	**Violation (Y / N)**	**Highest Level Detected**	**Range Detected**	**MCL**	**MCLG**	**Likely Source of Contaminant**
TTHM [Total trihalomethanes] (ppb)	N	48 LRAA	24 – 70	80 locational running annual average (4Q)	N/A	By-product of drinking water disinfection.
HAA5 [Haloacetic acids] (ppb)	N	32 LRAA	23 – 40	60 locational running annual average (4Q)	N/A	By-product of drinking water chlorination.
Chlorite (ppm)	N	0.97	0.41 – 0.97	1.0	0.8	Water additive used to control microbes.
Chlorine (ppm)	N	2.1	0.3 – 2.1	MRDL = 4	MRDLG = 4	Water additive used to control microbes.
Chlorine Dioxide (ppb)	N	190	0 – 190	MRDL = 800	MRDLG = 800	Water additive used to control microbes.
Synthetic Organic Contaminants						
Contaminants	**Violation (Y / N)**	**Highest Level Detected**	**Range Detected**	**MCL**	**MCLG**	**Likely Source of Contaminant**
Atrazine (ppb)	N	0.46	0.20 – 0.46	3	3	Runoff from herbicide used on row crops.

TABLE II – 2014 WATER QUALITY DATA – CITY OF TULSA

This table shows data for samples collected during 2014. 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.

Regulated Contaminants	Level Found	Minimum	Maximum	Maximum Contaminant Level (MCL*)	MCLG *	Likely Source of Contaminants
Turbidity Level found			0.37	TT*=less than 0.3 NTU 95 percent of the time.	n/a	Soil runoff.
Lowest monthly % meeting regs	99.4%					
Total Coliform Bacteria within distribution system			0.45% (monthly)	Presence of coliform bacteria in more than 5 percent of monthly samples.	0	Naturally present in the environment.
Barium	0.048	0.034	0.068	2 parts per million	2	Naturally present in the environment, drilling waste, metal refineries.
Beta Particles**	2.42	2.17	2.66	50 pCi/L* (4 mrem/yr*)	0	Decay of natural and man-made mineral deposits.
Total Chlorine	2.4	1.4	3.0	MRDL* - 4.0 parts per million annual average	4	Water additive to control microbes.
Chlorite	0.13	0	0.23	1 part per million	0.8	By-product of drinking water disinfection.
Total Chromium	0.14	0	0.28	100 parts per billion	100	Discharge from steel and pulp mills; erosion of natural deposits
Copper***	0.19 ppm at the 90th percentile; 0 sites above AL			AL* = 1.3 parts per million (ppm) at 90th percentile	1.3	Corrosion of household plumbing systems, erosion of natural deposits, leaching from wood preservatives.
Fluoride	0.71	0.40	1.0	4 parts per million	4	Erosion of natural deposits, water additive which promotes strong teeth, discharge from fertilizer and aluminum factories.
Lead***	0 ppb at the 90th percentile; 0 sites above AL			AL* = 15 parts per billion (ppb) at 90th percentile	0	Corrosion of household plumbing systems, erosion of natural deposits.
Nitrate - Nitrite	0.06	0	0.27	Nitrate=10 parts per million; Nitrite=1 part per million	10; 1	Naturally occurring, fertilizers, sewage treatment plants, leaching from septic tanks.
Total Organic Carbon	1.9	0.90	2.9	Results are parts per million. MCL is TT*=percent removal	n/a	Naturally found in the environment.
Haloacetic Acids	19	0	17	60 parts per billion LRAA* Level found is highest LRAA; Minimum and Maximum are from individual readings.	n/a	By-product of drinking water disinfection.
Total Trihalomethanes	36	17	43	80 parts per billion LRAA* Level found is highest LRAA; Minimum and Maximum are from individual readings.	n/a	By-product of drinking water disinfection.
Secondary Contaminants	**Average**	**Minimum**	**Maximum**	**Recommended Level**		**Likely Source of Contaminants**
pH	n/a	7.7	8.0	Aesthetic level 6.5-8.5 s.u.*		Measure of acidity. Naturally present, adjusted in drinking water treatment.
Chloride	14	9.1	19	Aesthetic level 250 parts per million		Naturally present, brine from oilfield operations
Sodium	10	6.9	16	Standard has not been established		Naturally occurring, urban stormwater runoff or discharge from sewage treatment plants.
Sulfate	19	4.3	42	Aesthetic level 250 parts per million		Naturally present in the environment.

*Please refer to definitions ** Data collected September 2010, monitoring frequency is in compliance with regulation ***Data collected August 2013. Monitoring frequency is in compliance with regulation

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

Water Quality Data Table – Sampling Results of the Distribution System

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 Tables below lists all 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 the tables are from testing done in the calendar year of the report. The EPA and 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 the tables 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 in this report.

SUBSTANCES THAT COULD BE IN WATER

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

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 EPA's Safe Drinking Water Hotline at (800) 426-4791.

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.

Health Information

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 systems 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 Hotline (800-426-4791) or website http://water.epa.gov/drink/hotline.

Lead in Home Plumbing

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. We cannot control the variety of materials used in plumbing components. When your water has been sitting 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.

TABLE III CITY OF BROKEN ARROW 2014 WATER QUALITY DATA [PWSID No. 1021508]

Regulated Contaminants

Disinfectants and Disinfection By Products	Collection Date	Highest Level Detected	Range of Levels Detected	MCLG	MCL	Units	VIOLATION	Likely Source of Contamination
Chlorine	2014	2	0-2	MRDLG = 4	MRDL = 4	ppm	N	Water additive used to control microbes
Halocetic Acids (HAA5)*	2014	50	24.82 – 42.4	No goal for the total	60	ppb	N	By product of drinking water disinfection
Total Trihalomethanes (TTHM)	2014	57	24.9 – 55.29	No goal for the total	80	ppb	N	By product of drinking water disinfection
Inorganic Contaminants	**Collection Date**	**Highest level detected**	**Range of levels detected**	**MCLG**	**MCL**	**Units**	**VIOLATION**	**Likely source of contamination**
Barium	2014	0.048	0.048 – 0.048	2	2	ppm	N	Discharge of drilling wastes; Discharge from metal refineries; erosion of natural deposits.
Fluoride	2014	0.2	0.22 – 0.22	4	4.0	ppm	N	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Nitrate [measured as Nitrogen]	2014	0.38	0.06 – 0.38	10	10	ppm	N	Runoff from fertilizer use, Leaching from septic tanks, sewage; Erosion of natural deposits.
Radioactive Contaminants	**Collection date**	**Highest Level Detected**	**Range of levels detected**	**MCLG**	**MCL**	**Units**	**VIOLATION**	**Likely source of contamination**
Beta/photon emitters	2014	3.24	3.24 – 3.24	0	4	mrem/yr	N	Decay of natural and man-made deposits
Gross alpha excluding radon and uranium	2014	0.181	0 – 0.181	0	15	pCi/L	N	Erosion of natural deposits

* We were required by EPA to conduct an evaluation of our distribution system. This is known as an Initial Distribution System Evaluation (IDSE) and is intended to identify locations in our water distribution system that have elevated disinfection by-product concentrations. Disinfection by-products (eg HAA5s and TTHMs) result from continuous disinfection of drinking water and form when disinfectants combine with organic matter that naturally occurs in the source water.

Table III CITY OF BROKEN ARROW 2014 WATER QUALITY DATA [PWSID No. 1021508] (continued)

Inorganic Chemicals Monitored [BPQL – Below Practical Quantitation Limit]

Name of Contaminant	Result mg/l	Practical Quantitation Limit (PQL) mg/l
Antimony	BPQL	0.005
Arsenic	BPQL	0.005
Beryllium	BPQL	0.001
Cadmium	BPQL	0.0010
Chromium	BPQL	0.025
Mercury	BPQL	0.0002
Nickel	BPQL	0.010
Selenium	BPQL	0.0050
Sodium	25.2	0.25
Thallium	BPQL	0.0010

Table III CITY OF BROKEN ARROW 2014 WATER QUALITY DATA [PWSID No. 1021508] (continued)

Turbidity

	Minimum Level Detected	Maximum Level Detected	Likely Source of Contaminant
Turbidity Level Found	0.013 NTU	1.0 NTU	Soil runoff

Information Statement: Turbidity is a measurement of the cloudiness of the water caused by suspended particles. We monitor it because it is a good indicator of water quality and the effectiveness of our filtration system.

TT***=** less than 0.3 NTU 99.5% of the time.

Coliform Bacteria

Maximum Contaminant Level Goal	Total Coliform Maximum Contaminant Level	Highest No. of Positive	Fecal Coliform or E. Coli Maximum Contaminant Level	Total No. of Positive E. Coli or Fecal Coliform Samples	Violation	Likely Source of Contamination
0	5% of monthly samples are positive	1	0	0	N	Naturally present in the environment

Lead and Copper

(Tap water samples were collected for copper from sample sites throughout the community.)

Copper	Date Sampled	MCLG	Action Level (AL)	90th Percentile	# Sites Over AL	Units	Violation	Likely Source of Contamination
Copper	2014	1.3	1.3	0.2794	0	ppm	N	Erosion of natural deposits; Leaching from wood preservatives; Corrosion of household plumbing systems

About Our Violation (as listed in Table IV)

PUBLIC NOTIFICATION RULE VIOLATION EXPLANATION

The City of Broken Arrow collected and tested the water samples from eight EPA approved sites for disinfection byproducts as part of the scheduled Stage 2 Disinfectants and Disinfection By-product Rule Operational Evaluation.

The test results for the 4th quarter of 2012 showed the City's water system exceeded the normal levels of HAA5. Subsequent water samples tested indicated City's water supply tested within normal limits.

A public information notice was mailed out on February 20, 2013, to all City of Broken Arrow water customers informing them of the violation and the corrective action taken.

TABLE IV – VIOLATION TABLE

Public Notification Rule			
The Public Notification Rule helps to ensure that consumers will always know if there is a problem with their drinking water. These notices immediately alert consumers if there is a serious problem with their drinking water (e.g., a boil water emergency)			
Violation Type	**Violation Begin**	**Violation End**	**Violation Explanation**
PUBLIC NOTICE RULE LINKED TO VIOLATION	01/28/2013	05/06/2014	We failed to adequately notify you, our drinking water consumers, about a violation of the drinking water regulations.

ABBREVIATIONS AND DEFINITIONS

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

BPQL (Below Practical Quantitation Limit)

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 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 the drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant 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.

NA (Not applicable)

ND (Not detected)

NTU (Nephelometric Turbidity Units)
Measurement of the clarity, or turbidity, or water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Parts per million (ppm) or milligrams per liter (mgpl)
One part substance per million parts water.

Parts per billion (ppb) or micrograms per liter (UG/L)
One part substance per billion parts water.

pCi/L (pico curies per liter of water)
A measure of radioactivity.

PQL – Practical Quantitation Limit

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

Mrem/yr = Millirems per year: a measure of radiation absorbed by the body

SU (Standard Units)

LRAA (Locational Running Annual Average)
Average

Stage 2 DBPR
Stage 2 Disinfection By-Product Rule

About Broken Arrow's Verdigris Water Treatment Plant

A new state of the art microfiltration treatment plant has been in operation since April 10, 2014, and it replaces the approximately 47 year old conventional plant. The new treatment plant extracts raw water from the Verdigris River and is rated for an average treatment capacity of about 20 million gallons per day. Our backup water supply is the City of Tulsa connection at 41st Street.

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 second year of the fire hydrant refurbishment project.

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.
- 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.

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.brokenarrowok.gov/.

Questions?

For more information about this report or for any questions pertaining to your drinking water, please contact Anthony Daniel, Director of Utilities, City of Broken Arrow, P.O. Box 610, Broken Arrow, OK 74013.
Phone (918) 259-7000, ext. 7375, fax, (918) 259-8453, email, adaniel@brokenarrowok.gov, website www.brokenarrowok.gov.

Electronic Delivery of CCR/Water Quality Report

EPA has advised water system operators that future delivery of CCRs can be accomplished utilizing an electronic delivery method. This approach is to reduce mailing costs and at the same time improve readership of CCRs. This proposed method consumes less of natural resources, including paper for printing about 36,200 paper copies. A URL will be prominently displayed on the water bill and the "Focus newsletter" mailed out in June 2015 to all the City's water customers advising them that the CCR can be viewed by accessing the above direct link. The link is www.brokenarrowok.gov/2014waterreport. Similar message shall be posted on the City of Broken Arrow web page. Customers wishing to receive a paper copy may contact the Utilities Department at (918) 259-7000 extension 7380 or by visiting City Hall during normal business hours.