



Tucson Water
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THUNDERHEAD RANCH SYSTEM 10-179

2008 Annual Water Quality Report

City of Tucson Water Department
 Water Quality Management Division



During 2008, Tucson Water ensured that your drinking water met all drinking water standards

This Annual Water Quality Report provides information on your drinking water. The United States Environmental Protection Agency

(USEPA) requires that all drinking water suppliers provide a water quality report to their customers on an annual basis. This report also serves as a reference with important information on the quality of water and with contacts and phone numbers you may need from time to time.

Source Water Assessment Program (SWAP)

Arizona Department of Environmental Quality has completed a source water assessment of this System, which evaluates the risk of contamination from human activities. The water sources for this system are categorized as "low risk of contamination from human activities".

Thunderhead Ranch is a small subdivision west of Old Spanish Trail and about one and a half miles south of Irvington Road. It has about 57 services supplying about 170 persons with water from two wells, G-006A and G-009A. G-009A is the primary well and has been operational since 2003. This system was acquired by Tucson Water in 1997. An aeration system to elevate pH and thus control corrosion was designed, installed, and has been in operation since June of 2005.

WERE THERE ANY CONTAMINANTS DETECTED IN MY DRINKING WATER?

Tucson Water regularly samples the drinking water that is delivered to you. Much of this testing is required by drinking water regulations. In addition to this required monitoring, Tucson Water conducts discretionary monitoring in order to provide both Tucson Water staff and customers with additional Water quality information.

The Detected Contaminants Table on page 3 lists all contaminants that were detected in the required drinking water monitoring. For more information, please see the table and the specific explanations, which follow the table.

In most cases, the minimum detectable level of a contaminant is well below the USEPA regulatory limit for that contaminant. To compare the detected amount with the amount allowed by the USEPA, refer to the Maximum Contaminant Level (MCL) column in the table. The vast majority of regulated contaminants were not detectable in drinking water delivered by Tucson Water. The non-detected results were not included in the table. For a complete list of all USEPA regulated contaminants contact the USEPA at 1-800-426-4791 or visit the USEPA website at www.epa.gov/safewater/mcl.html#mcls.

How is my drinking water treated?

The groundwater delivered by Tucson Water meets all drinking water standards without treatment. However, approximately 0.8 to 1.2 ppm of chlorine residual is maintained in the drinking water supply to provide assurance that water delivered to customers will remain free of microbiological contamination. This also ensures that the water meets microbiological drinking water standards from the time it is pumped from the ground until it reaches the customer's tap.

Do I need to take special precautions?

While the Safe Drinking Water Act regulations are intended to protect consumers throughout their lifetime, some people may be more vulnerable to infections from drinking water than the general population. These "at-risk" populations include: immuno-compromised persons such as persons with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and in some cases, elderly people and infants. These people should seek advice about drinking water from their health care providers. USEPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the USEPA's Safe Drinking Water hotline.

WHY ARE THERE CONTAMINANTS IN MY DRINKING WATER?

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. Tucson's groundwater contains dissolved minerals and organic compounds, which have been leached from rocks, sediments, and plant minerals through which the water travels. One would expect to find beneficial minerals such as calcium and magnesium, harmless minerals such as chloride, bicarbonate, and sulfate, and metals such as iron, copper, arsenic, and lead, which may be either beneficial or harmless at low concentrations, but harmful at high concentrations. In addition to these naturally occurring contaminants, groundwater may contain contaminants resulting from human, industrial, or domestic activities. For this reason, water utilities must currently monitor for approximately 90 regulated and 25 unregulated contaminants.

The following language is required by the USEPA to appear in this report, some of which may not be applicable to deep groundwater wells, the source of the this Water supply:

Contaminants that may be present in a source water can include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage, agricultural livestock, 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 byproducts 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, USEPA regulations 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 that must provide the same protection for public health. Bottled water may come from either a surface water source or groundwater source, and may be treated minimally or extensively. For information on the quality of your bottled water, contact the water bottling company.

DETECTED CONTAMINANTS TABLE

Contaminant	Analysis Date	Maximum Result	Range	MCL	MCLG	Major Sources
INORGANICS						
Barium	2007	0.037 ppm	0.029 - 0.037 ppm	2 ppm	2 ppm	Natural deposits
Fluoride	2008	0.19 ppm	0.17 - 0.19 ppm	4 ppm	4 ppm	Natural deposits
Nitrate (as N)	2008	2.0 ppm	1.4 - 2.0 ppm	10 ppm	10 ppm	Natural deposits; septic tanks; agriculture; sewage
Sodium	2007	12 ppm	11 - 12 ppm	None	None	Natural deposits
RADIOCHEMICALS						
Adjusted Gross Alpha	2007	0.8 pCi/L	<1 - 0.8 pCi/L	15 pCi/L	0 pCi/L	Natural Deposits
Total Organic Carbon (TOC)						
Total Organic Carbon	2007	1.1 ppm	1.07 - 1.1 ppm	N/A	N/A	Naturally present in the environment
HALOACETIC ACIDS (HAA)						
Bromoacetic Acid	2007	1.0 ppb	1.0 - 1.0 ppb		0 ppb	By-product of chlorination
Dichloroacetic Acid	2007	1.2 ppb	1.2 - 1.2 ppb		0 ppb	By-product of chlorination
Dibromoacetic Acid	2007	1.6 ppb	1.3 - 1.6 ppb		0 ppb	By-product of chlorination
Total Haloacetic Acids (5)	2007	2.8 ppb	1.3 - 2.8 ppb	60 ppb	None	By-product of chlorination
TRIHALOMETHANES (THMs)						
Bromodichloromethane	2007	2.1 ppb	<0.5 - 2.1 ppb		0 ppb	By-product of chlorination
Bromoform	2007	1.7 ppb	<0.5 - 1.7 ppb		0 ppb	By-product of chlorination
Chloroform	2007	1.0 ppb	<0.5 - 1.0 ppb		0 ppb	By-product of chlorination
Chlorodibromomethane	2007	3.4 ppb	<0.5 - 3.4 ppb		0.06 ppb	By-product of chlorination
Total Trihalomethanes (TTHMs)	2007	8.2 ppb	<0.5 - 8.2 ppb	80 ppb	0 ppb	By-product of chlorination
LEAD AND COPPER IN STANDING WATER SAMPLES						
Contaminant	Analysis Date	# of Samples Above the Action Level	90 th Percentile Value	Action Level	MCLG	Major Sources
Lead	2008	None	2.2 ppb	15 ppb	0	Corrosion of household plumbing systems
Copper	2008	None	0.14 ppm	1.3 ppm	1.3 ppm	Corrosion of household plumbing systems
MAXIMUM RESIDUAL DISINFECTANT LEVEL (MRDL) 2008						
Contaminant	Annual Chlorine Running Average	Monthly Average Range	MRDL	MCLG	Major Sources of Contaminant	
Chlorine	1.00 ppm	0.69 - 1.76 ppm	4 ppm	4 ppm	Disinfection additive used to control microbes	

DRINKING WATER TERMS AND DEFINITIONS

Action level. The concentration of a contaminant that if exceeded, triggers a treatment or other requirement which a water system must follow.

Maximum Contaminant Level (MCL). The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. If a contaminant is believed to cause health concerns in humans, then the MCL is set as close as practical to zero and at an acceptable level of risk. Generally, the maximum acceptable risk of cancer is 1 in 10,000 with 70 years of exposure.

Maximum Contaminant Level Goal (MCLG). The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL). The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG). The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Parts Per Billion (ppb). Some constituents in water are measured in very small units. Organic compounds such as trihalomethanes are monitored by Tucson Water in terms of parts per billion (or micrograms per liter). To help you visualize how very small this unit is, we offer the following illustrations. One part per billion equals: One second of time in 31.7 years or the first 16 inches of a trip to the moon.

Parts Per Million (ppm). Many dissolved minerals such as sodium and calcium are monitored by Tucson Water in terms of parts per million (or milligrams per liter). To help you visualize how very small this unit is, we offer the following illustrations. One part per million equals: 2 ounces of water in a typical 15,000 gallon backyard swimming pool or one second of time in 11.6 days.

Picocurie Per Liter (pCi/l). The quantity of radioactive material in one liter which produces 2.22 nuclear disintegrations per minute.

WHOM DO I CONTACT FOR MORE INFORMATION?

For more information on this Tucson Water report contact Mohsen Belyani with the Water Quality Management Division. Call 791-2544 or e-mail your questions to mohsen.belyani@tucsonaz.gov.

Tucson Water Telephone Numbers:

Public Information Office	791-4331	Quality Management Division	791-2554
Customer Service/Billing	791-3242	24 hour Emergency	791-4133

Additional information is also available from: the Tucson Water Website	www.tucsonaz.gov/water/
United States Environmental Protection Agency Safe Drinking Water Hotline	1-800-426-4791
USEPA Website	www.epa.gov/safewater/
City of Tucson TTY#	791-2639

Si usted desea este documento escrito en español, por favor, llame al 791-4331.

DETAILED INFORMATION ON DETECTED CONTAMINANTS

Barium occurs naturally at very low concentrations in our groundwater.

Fluoride is an important naturally-occurring mineral that helps to form healthy teeth and bones. A concentration of 1 ppm is considered optimum. At concentrations above 2 ppm, fluoride can cause mild discoloration of teeth, and exposure at above the MCL of 4 ppm can cause both severe discoloration of teeth and over many years of exposure, bone disease.

Nitrate is a form of nitrogen and an important plant nutrient. Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Tucson Water performs extra monitoring on wells high in nitrate for extra assurance that action can be taken when approaching the MCL.

Sodium is the sixth most abundant element on Earth and is widely distributed in soils, plants, water, and food. A goal of 2400 mg/day dietary sodium has been proposed by several government and health agencies. Drinking water containing between 30 and 60 ppm would contribute only 2.5 % to 5% of the dietary goal if tap water consumption is 2 L/day. Currently, there is no MCL for sodium in drinking water. The recommended EPA guidance level for individuals on a very low sodium diet (500 mg/day) is 20 ppm in drinking water.

Adjusted Gross Alpha is a measure of radioactivity due to naturally occurring minerals in groundwater. The MCL for gross alpha radioactivity is set at 15 picocuries per liter (pCi/L). This excludes the radioactivity contributed by either radon or uranium.

Total Organic Carbon (TOC)s have no health effects. However, TOCs provide a medium for the formation of disinfectant-by-products such as HAAs and TTHMs.

Haloacetic Acids (HAA5)s are a group of chemicals that are formed when chlorine or other disinfectants used to control microbial contaminants in drinking water react with naturally occurring organic and inorganic matter in water. The regulated haloacetic acid compounds, known as HAA5, are monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. (the MCL for Total HAAs is 60ppb).

Total Trihalomethanes (TTHMs) are formed when chlorine combines with naturally-occurring material in water. Because the level of organic matter in our groundwater is extremely low, these compounds are found at very low concentrations. (the MCL for Total THMs is 80ppb).

Lead and Copper are naturally occurring metals, which are generally found at very low levels in source waters. 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. Tucson Water is responsible for providing high quality drinking water, but can not 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 at <http://www.epa.gov/safewater/lead>.

An expanded lead and copper monitoring program was conducted in 2004. The results showed that 2 samples out of 55 collected exceeded the 15 ppb action level for lead and 2 out of the 55 samples exceeded the 1.3 ppm action level for copper. These monitoring results were reported to the Thunderhead Ranch customers in a letter dated September 24, 2004.

The expanded monitoring results showed that the water supplied by the Thunderhead Ranch System wells increased the risk of excessive lead and copper found in water that is in contact with some household pipes for six hours or more. Tucson Water decided that this risk could be reduced significantly by aerating the water to remove excess carbon dioxide from the water. Aeration increases the pH of the water and reduces the potential for corrosion. This plan to reduce lead and copper uptake was approved by Arizona Department of Environmental Quality and the aeration system was designed, installed, and began operation in June 2005.

Tucson Water conducted lead and copper monitoring during August of 2005. The results were substantially lower than the pre-treatment period, with the 90th percentile of 3.6 ppb, considerably lower than 15 ppb Action Level. Monthly pH during 2006 has been at least 7.5 and higher, except in two occasions when the pH dropped to 6.8 due to equipment malfunction. The problem was immediately resolved and the aeration system returned to normal operating conditions.

Lead and copper sampling was again conducted in 2008. The lead 90th percentile was 2.2 ppb, considerably lower than 15 ppb Action Level. The copper 90th percentile was 0.14 ppm, considerably lower than 1.3 ppm Action Level and much lower than 2007 results. Monthly pH readings ranged from 7.07 to 7.93 during 2008.

Total Chlorine Residual Approximately 0.8 to 1.2 ppm of chlorine is maintained in the drinking water supply to provide assurance that water delivered to customers will remain free of microbiological contamination. This also ensures that the water meets microbiological drinking water standards from the time it is pumped from the ground until it reaches the customer's tap. Total Chlorine Residual is measured from sample stations where the bacteriological samples are collected monthly. The Total Annual Chlorine Residual is calculated using the monthly average chlorine for the past 12 months.