

2006

## Annual Water Quality Report



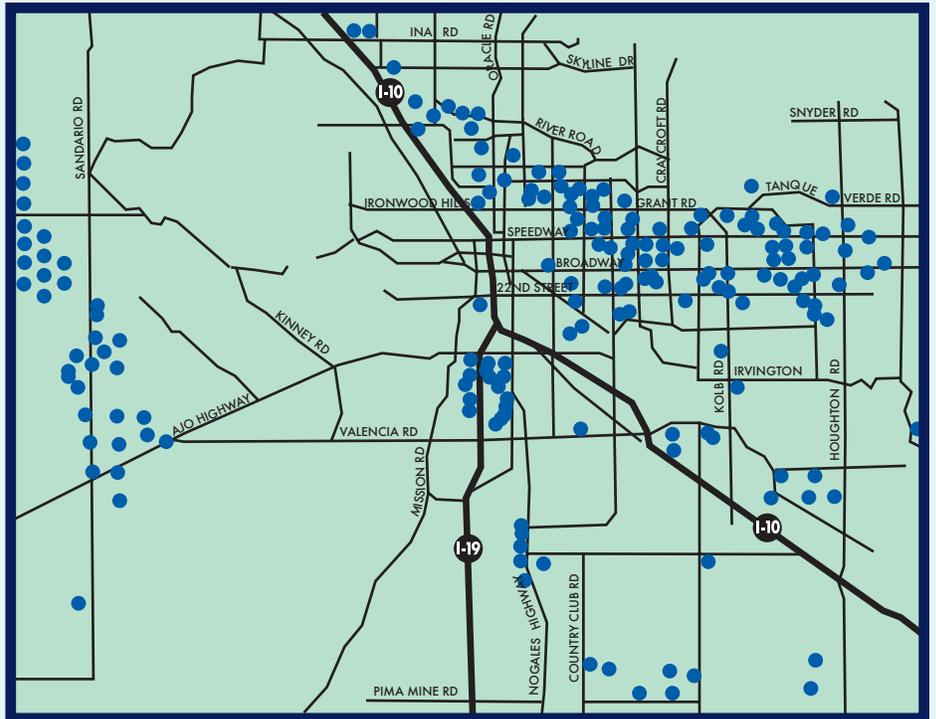
Tucson Water  
Water Quality Management Division



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 containing important information on the quality of water and contacts and phone numbers you may need from time to time.

If you are a non-English speaking resident, we recommend that you speak with someone who understands the report. You may also obtain a copy in Spanish by calling 791-4331.

Este informe contiene informacion muy importante sobre la calidad de su agua beber. Traduscalo o hable con alguien que lo entienda bien. Para obtener una copia de este reporte en Espanol, llame al (520) 791-4331.



## Where does my water come from?

Tucson Water serves about 705,000 people in the Tucson area. The water supply comes from approximately 200 groundwater wells located in and around the Tucson metropolitan area (see map). In urban Tucson, most of the wells (also known as Entry Points To the Distribution System or EPTDS) serve the neighborhood in which they are located, with excess supply routed to reservoirs for use elsewhere in the system. Wells located outside the urban core often deliver water to a single “collector” main prior to delivery to customers. In these cases, the collector main is termed a “combined Entry Point to the Distribution System”.

The Tucson Water system has four combined EPTDS:

- The Clearwater well field (which delivers a blend of recharged Colorado River water and groundwater)
- The Southern Avra Valley well field
- The Santa Cruz well field
- The South Side well field, which contains treated water from the Tucson Airport Area Remediation Project (TARP)

## 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.

## 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, we perform a great deal of discretionary monitoring

in order to provide both Tucson Water staff and customers with additional information. Tests performed in 2006 indicated that we met all standards set by the USEPA.

Three inorganic contaminants of special interest are arsenic, fluoride, and nitrate. Fluoride and arsenic are naturally occurring and tend to increase as water is drawn from greater depths. Nitrate, on the other hand, is typically found in higher concentrations near the

surface of the groundwater table because it is frequently associated with fertilizer use, septic tanks and other human activities. For more information, please see the Detected Contaminants Table on page 4 and the detailed information, which follows the table.

In most cases, the minimum detectable level of a contaminant is well below the USEPA regulatory limit for that contaminant. The table on page 4 lists the contaminants that were detected in the required drinking water monitoring. 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. Those 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 Webster at [www.epa.gov/safewater/mcl.html#mcls](http://www.epa.gov/safewater/mcl.html#mcls)

## 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 the rock, sediments, and plant materials 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, our groundwater may contain contaminants resulting from industrial or domestic activities. For this reason, water utilities must 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 Tucson 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	Maximum Result	Range	MCL	MCLG	Major Sources of Contaminant	
<b>Disinfection By-Products (DPB)</b>						
<i>Haloacetic Acids (HAA)</i>						
Dibromoacetic Acid	1.6 ppb	<1 – 1.6 ppb		None	By-product of chlorination	
Total Haloacetic Acids (5)	1.6 ppb	<1 – 1.6 ppb		None	By-product of chlorination	
<i>Running Annual Average for HAA5 &lt; 2 ppb</i>			<i>60 ppb</i>			
<i>Trihalomethanes (THM)</i>						
Bromodichloromethane	1.6 ppb	<0.5 – 1.6 ppb		0 ppb	By-product of chlorination	
Bromoform	5.8 ppb	<0.5 – 5.8 ppb		0 ppb	By-product of chlorination	
Chlorodibromomethane	4.6 ppb	<0.5 – 4.6 ppb		0.06 ppb	By-product of chlorination	
Total Trihalomethanes	12 ppb	<0.5 - 12 ppb		0 ppb	By-product of chlorination	
<i>Running Annual Average for TTHMS 5.7 ppb</i>			<i>80 ppb</i>			
<b>Inorganics</b>						
Arsenic	6.8 ppb	4.9 – 6.8 ppb	10 ppb	0 ppb	Natural deposits	
Barium	0.09 ppm	0.08 - 0.09 ppm	2 ppm	2 ppm	Natural deposits; Industrial uses	
Fluoride	0.95 ppm	0.1 – 0.95 ppm	4 ppm	4 ppm	Natural deposits	
Nitrate (as N)	8.3 ppm	0.26 – 8.3 ppm	10 ppm	10 ppm	Natural deposits; septic tanks; agriculture; sewage	
<b>Radiochemical</b>						
Adjusted Gross Alpha	4.1 pCi/L	0.3 – 4.1 pCi/L	15 pCi/L	0 pCi/L	Natural Deposits	
Radium 226 & 228, combined	0.4 pCi/L	<0.3 – 0.4 pCi/L	5 pCi/L	0 pCi/L	Natural Deposits	
Uranium	9.7 ppb	1.8 – 9.7 ppb	30 ppb	0 ppb	Natural Deposits	
<b>Synthetic Organics</b>						
Atrazine (2004 Data)	0.08 ppb	<0.05 - 0.08 ppb	3 ppb	3 ppb	Herbicide	
<b>Volatile Organics</b>						
Trichloroethylene	4.1 ppb	< 0.5 – 4.1 ppb	5 ppb	0 ppb	(TCE) Solvent used in degreasing metal parts	
<b>Contaminant</b>	<b>No. of Samples Above the Action Level</b>	<b>90<sup>th</sup> Percentile Value</b>	<b>Action Level</b>	<b>MCLG</b>	<b>Major Sources</b>	
<b>Lead and Copper in Standing Water Samples - 2005</b>						
Lead	none	3.0 ppb	15 ppb	0	Corrosion of household plumbing systems	
Copper	none	0.16 ppm	1.3 ppm	1.3 ppm	Corrosion of household plumbing systems	
<b>Contaminant</b>	<b>Months with Coliform Detections</b>	<b>% of Positive Samples for the Month</b>	<b>Total # of Samples Collected for the Month</b>	<b>MCL<sup>1</sup></b>	<b>MCLG</b>	<b>Major Sources</b>
<b>Microbiological<sup>1</sup></b>						
Total Coliform	August	0.8	253	≤ 5%	0	Naturally present in environment
Total Coliform	September	0.4	250	≤ 5%	0	Naturally present in environment
Total Coliform	November	0.4	250	≤ 5%	0	Naturally present in environment
<sup>1</sup> The MCL for microbiological contaminants is 5% of the total number of samples collected in the month.						
<b>Maximum Residual Disinfection Level (MRDL)</b>						
<b>Contaminant</b>	<b>Maximum Monthly Average</b>	<b>Range</b>	<b>MRDL</b>	<b>MCLG</b>	<b>Major Sources of Contaminant</b>	
Chlorine	0.85 ppm	0.71 – 0.85 ppm	4 ppm	4 ppm	Disinfection additive used to control microbes	
<i>Running Annual Average for MRDL 0.77 ppm</i>						

## Drinking Water Terms and Definitions:

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

**Entry Point To the Distribution System (EPTDS)** All water sources are monitored at the entry point to the distribution system before the first customer but after any required treatment.

**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. One ppb equals one microgram per liter. For example, one part per billion equals: 2 drops of water in a 15,000 gallon backyard swimming pool, one second of time in 31.7 years, or the first 16 inches of a trip to the moon.

**Parts Per Million (ppm)** One ppm equals one milligram per liter or 1000 times more than a ppb. One part per million equals: 1/4 cup 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.

## Detailed Information on Detected Contaminants

**Haloacetic Acids (HAA)** are a group of chemicals that are formed along with other disinfection byproducts 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 acids, known as HAA5, are monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid. EPA has recently published the Stage 2 Disinfectants/Disinfection Byproducts Rule to regulate HAA5 at 60 parts per billion running annual average. The running annual average in 2006 for HAA5 was detected at below 2 ppb concentration (the MCL is 60 ppb).

**Total Trihalomethanes (TTHMs)** are formed when chlorine combines with naturally occurring organic material in water. Since the level of organic matter in our groundwater is extremely low, these compounds are found at very low concentrations. The compounds which make up the TTHMs include bromodichloromethane, bromoform, chlorodibromomethane, and chloroform. The highest result for Total THM during 2006 was 12 ppb and the highest concentration for any of the four compounds was 5.8 ppb for bromoform. Compliance with the TTHM standard is based on the running annual average concentration. The running annual average for 2006 was 5.7 ppb (the MCL is 80 ppb).

**Arsenic** EPA has finalized a reduction in the arsenic drinking water standard from 50 ppb down to 10 ppb. All water utilities were required to have met this reduced standard by January 2006. While your drinking water meets USEPA's reduced standard for arsenic, it does contain low levels of arsenic. USEPA's new standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. USEPA continues to research the health effect of low levels of arsenic which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. The highest arsenic concentration detected during 2006 was 6.8 ppb (the MCL is 10 ppb).

**Barium** occurs naturally at very low concentrations in our groundwater. The highest barium value in 2006 was 0.09 ppm (the MCL is 2 ppm).

**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. The highest level of fluoride detected during 2006 was 0.95 ppm (the MCL is 4 ppm).

**Nitrate** is a form of nitrogen and an important plant nutrient. Tucson Water performs more frequent monitoring of wells high in nitrate for extra assurance that action can be taken when approaching the MCL. 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. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider. The highest level for nitrate during 2006 was 8.3 ppm (the MCL is 10 ppm).

**Adjusted Gross Alpha** is a measure of radioactivity due to naturally occurring minerals in groundwater. This excludes the radioactivity contributed by either radon or uranium. In 2006, six EPTDS were sampled for adjusted gross alpha. The highest level for adjusted gross alpha during 2006 was 4.1 picocuries per liter or pCi/L (the MCL for gross alpha radioactivity is 15 pCi/L).

**Radium 226 and 228** are two of the most common radium isotopes. Radium is a naturally occurring radionuclide, formed by the decay of uranium or thorium in the environment. It occurs at low concentrations in virtually all rock, soil, water, plants, and animals. During 2003, an extensive sampling of these two isotopes was performed at our wells. The highest concentration found during 2006 for combined radium 226 and 228 was 0.4 pCi/l (the MCL for combined radium 226 and 228 is 5 pCi/l).

**Uranium** is a metallic element, which is highly toxic and radioactive. The highest level for uranium during 2006 was 9.7 ppb (the MCL is 30 ppb).

**Synthetic Organic Compounds (SOCs)** Unlike VOCs (see below), which have been repeatedly shown to readily migrate through soils to groundwater, SOC's are generally less mobile. Atrazine, a herbicide and possible carcinogen at high doses was detected at concentration of 0.08 ppb during 2004 (the MCL is 3 ppb).

**Volatile Organic Compounds (VOCs)** include such compounds as trichloroethylene (TCE) and tetrachloroethylene (PCE). VOCs are volatile, like alcohol or gasoline, and are made up of relatively small molecules, which allows them to migrate readily through soils. Solvents such as TCE and PCE have been

## Detailed Information on Detected Contaminants (continued)

commonly used for cleaning machine parts, and for dry cleaning. These contaminants are often associated with industrial operations and landfills. The highest concentration of TCE during 2006 was 4.1 ppb, detected at only one well with a limited use which is no longer in service (the MCL is 5 ppb).

**Lead and Copper** are naturally occurring metals, which are generally found at very low levels in source waters. However, these levels can increase when water contacts plumbing materials that contains lead or copper or brass. Infants and young children are more vulnerable to lead in drinking water than the general population. While Tucson Water is well within the standards, concerned customers can take an extra precaution to protect children from lead leached from new brass faucets by running the water for a few seconds and using the water for something other than drinking. This is especially important if the water has been sitting in the pipes for a few hours or more. These same precautions also help to give you a better tasting water. The required lead and copper monitoring was performed in 2005. The 90<sup>th</sup> percentile value was 3 ppb for lead and 0.16 ppm for copper. No sample was above the action level of 15 ppb for lead or 1.3 ppm for copper.

**Coliform Bacteria** are commonly found in the environment and in the digestive tract of animals. While rarely harmful, Coliform bacteria in drinking water are indicators that the water may also contain harmful microorganisms. In 2006, there were four positive total coliform samples for the entire year. The highest monthly percentage positive was 0.8 % or 2 positive samples which occurred in August. (The MCL is 5% per month or not more than 12 positives in the 247 samples collected each month.)

**Chlorine Disinfection** Approximately 0.8 ppm of chlorine is added to the drinking water supply at well sites, reservoirs and other facilities 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. Chlorine Residual Disinfection is measured from 247 sample stations where the bacteriological samples are collected monthly. The annual chlorine residual is calculated using the monthly chlorine averages for the past 12 months. The annual average for twelve months of 2006 was 0.77 ppm. (The Maximum Residual Disinfection Limit or MRDL is 4 ppm)

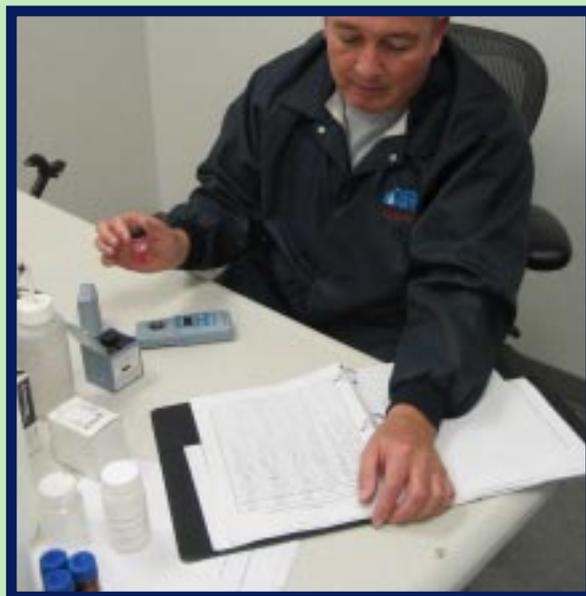
## Source Water Assessment Program (SWAP)

The Arizona Department of Environmental Quality (ADEQ) has completed a source water assessment for Tucson Water drinking water wells. This assessment reviewed the adjacent land uses that may pose a potential risk to the water sources. These risks include, but are not limited to gas stations, landfills, dry cleaning, agricultural fields, wastewater treatment plants, and mining activities. The assessment classified approximately 1/3 of our wells as high risks.

Tucson Water ensures the safety of our drinking water by conducting regular monitoring of all sources. If any contamination approaches the drinking water MCL, the source is removed from service.

Residents can help protect our water sources by practicing good septic system maintenance, limiting pesticide and fertilizer use, and by taking hazardous household chemicals to the Household Hazardous Waste Program (visit [www.deq.co.pima.az.us/waste/househol.htm](http://www.deq.co.pima.az.us/waste/househol.htm), or call 791-4502).

The complete SWAP report is available for review at ADEQ, 1110 W. Washington, Phoenix, Arizona or by requesting an electronic copy by contacting ADEQ at 800-234-5677.



## Monitoring Waivers

The Arizona Department of Environmental Quality, the regulatory agency for all public water suppliers in Arizona, grants waivers for certain monitoring requirements. Waivers are granted for specific contaminants if previous monitoring results, and/or the land uses within a half-mile radius of the well, allows ADEQ to conclude that the risk of contamination by a specific substance is very low.

## Any Monitoring Failures or Violations?

At the end of each quarter, Tucson Water conducts an internal audit of compliance monitoring records to verify that all required monitoring has been completed and reported to the State. There have been no monitoring failures or violations during 2006.

## What About CAP Water?

The City of Tucson has rights to approximately 144,000 acre-feet of Colorado River water per year, delivered through the Central Arizona Project (CAP). In 2006, the City of Tucson's Colorado River allocation was not used directly, but a portion of this allocation was recharged. At the end of 2006, Tucson Water was using approximately 46% of its available allocation. At the Clearwater Renewable Resource Facility located in Avra Valley, Tucson Water is recharging a portion of the City's available CAP supply by delivering the river water to shallow basins and allowing the water to percolate (or recharge) naturally through the earth to reach and blend with the groundwater below. Tucson Water began delivery of this blend of recharged Colorado River water and groundwater in 2001. At the end of 2006, the blend was about 65% native groundwater and 35% recharged Colorado River water. Over time, it will contain an increasing percentage of recharged Colorado River water. Information on the quality of this blend is contained in the detected contaminant table, and more information is available on Tucson Water's web site.

## How is Our Drinking Water Treated?

The groundwater delivered by Tucson Water meets all drinking water standards without treatment, with the exception of the water supplied from the Tucson Airport

Area Remediation Project (TARP). However, approximately 0.8 ppm of chlorine is added to the drinking water supply at well sites, reservoirs and other facilities 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.

## More About TARP

The Tucson Airport Area Remediation Project (TARP) was developed in order to clean and make beneficial use of water contaminated with the industrial solvent trichloroethylene (TCE). Tucson Water operates TARP under an agreement with the USEPA and other industrial and governmental agencies, which pay for operation of the TARP program.

Nine wells extract the contaminated water and deliver it through a pipeline to a treatment plant that removes the TCE from the water. The TARP treatment plant uses an "air stripping" process which forces volatile contaminants such as TCE to evaporate from the water into air. The air is then passed through activated carbon filters, which removes the airborne TCE. The TARP plant is designed to treat approximately 8.4 million gallons of water per day (or 5,800 gallon per minute). During 2006, this plant treated a total of approximately 2.079 billion gallons of water. The treatment system removed 292 pounds of combined VOCs from the ground water.

## How Can I Have Better Tasting Water?

It may be stating the obvious, but water drawn from the tap may have chlorinous odors. It may have also been in contact with pipes for hours or even longer. It may contain dissolved air, and it may be warmer than you desire. You can improve the taste of your drinking water by simply drawing it after other water uses, which brings fresh water to the tap, then allowing it to stand several hours or longer in a clean odor-free pitcher or bottle. You can store your water either on the kitchen counter or in the refrigerator, depending on which temperature you prefer. If you store the water in the refrigerator, you may want to be sure it is capped to help prevent picking up refrigerator odors.

## 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 791-5252 or e-mail your questions to [mohsen.belyani@tucsonaz.gov](mailto:mohsen.belyani@tucsonaz.gov).

The Water Quality Management Division also publishes the following reports:

- Annual Microbiological Report detailing the results of monthly distribution system monitoring.
- Annual Turbidity Report, evaluating the clarity of the water throughout the year.

In 2006, Tucson Water also collected a large amount of additional monthly water quality data. The results of these additional monitoring are also available on the Tucson Water web page, [www.tucsonaz.gov/water/](http://www.tucsonaz.gov/water/).

Tucson's Mayor and Council set policy and direction for Tucson Water, including those policies that may impact water quality. Mayor and Council meetings are normally held each Tuesday and are open to the public. Mayor and Council meeting agendas and other opportunities for public comment are published at [www.tucsonaz.gov/mcc](http://www.tucsonaz.gov/mcc). Customers of Tucson Water may leave a recorded message on the Mayor and Council Comment Line at (520) 791-4700.

Tucson Water in collaboration with ten community partners and the USEPA has established the Environmental Monitoring for Public Access and Community Tracking Program (EMPACT) which is designed to provide the community with more information about your drinking water. For more information please call 791-2666 or visit our web site at [www.tucsonaz.gov/water/](http://www.tucsonaz.gov/water/)

### Telephone Numbers:

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

Tucson Water Public Information Office	<b>791-4331</b>
Tucson Water Quality Management Division	<b>791-5252</b>
Tucson Water Customer Service/Billing	<b>791-3242</b>
Tucson Water 24 Hour Emergency	<b>791-4133</b>
United States Environmental Protection Agency	
Safe Drinking Water Hotline	<b>1-800-426-4791</b>
USEPA Website:	<b><a href="http://www.epa.gov/safewater/">www.epa.gov/safewater/</a></b>
City of Tucson TTY#	<b>791-2639</b>



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