



# 2004 Water Quality Report



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**City of Phoenix  
Water Services Department**

Throughout 2004, tap water delivered to more than 1.4 million residents served by the City of Phoenix Water Services Department met or surpassed all federal and state drinking water standards. Phoenix Water Services employees, people who use the same water as you, remained vigilant in our commitment to you, as we tested for more than 100 substances and conducted millions of measurements and tests throughout the treatment and distribution systems to ensure your safety. Additionally, all Phoenix water is safely disinfected with chlorine before it is delivered to consumers. And, we readily submitted hundreds of reports to the Environmental Protection Agency (EPA), the Arizona Department of Environmental Quality (ADEQ), and the Maricopa County Environmental Services Department. Be assured that Phoenix Water Services always will work hard to provide superior water for all of your needs.

***NOTA: Este informe contiene información importante sobre su agua potable. Si usted quiere el informe en español, llame 602-262-6251.***

## Where Does Our Water Come From?

The sources of Phoenix's drinking water include rivers, lakes, streams, springs and wells. In 2004, about 98 percent of Phoenix's water came from surface water that mostly started as snow pack. Phoenix's primary sources of untreated surface water are the Salt, Verde and Colorado rivers. Some water from the Agua Fria River is mixed with water from the Colorado River when stored in Lake Pleasant. The water is then delivered to one of city's five water treatment plants. Colorado River water is delivered to the city via the Central Arizona Project (CAP) aqueduct. Water from the Salt and Verde rivers is delivered via the Salt River Project (SRP) canal network. The remaining two percent of drinking water is supplied by about 30 groundwater wells operated by the city.



## Working on Taste and Odor

Taste, odor and hardness are not regulated under drinking water health standards. However, these are harmless, aesthetic aspects that some consumers may notice.

Algae that grow in the canals during the late summer and fall are a major source of a "musty" odor and taste detected by some consumers. When the algae bloom, they produce a strong odor. Even though the algae are removed from the water during the treatment process, the odor may linger. (The result is similar to removing a bouquet of fresh flowers from a room. Even though the flowers are gone, the aroma remains.)

The City of Phoenix is working to eliminate the aesthetic effects of algae through various programs, including a cooperative effort to remove algae from the SRP canals that feed the water treatment plants, and the strategic use of powder activated carbon to absorb residual odors.

Water hardness indicates the presence of minerals, such as calcium and magnesium, which originate from the soils our source water contacts as it travels to Phoenix's water treatment plants. These minerals are leached into the water. Hard water can cause some types of scaling in pipes and water

heaters, and on plumbing fixtures such as faucets and showerheads. See the chart below for data about hardness and other aesthetic parameters.

<b>2004 Aesthetic Water Quality Analysis from Distribution System and Secondary Drinking Water Guidelines</b>				
<b>Substance</b>	<b>Units</b>	<b>Secondary Guideline *</b>	<b>Lowest Detected Level</b>	<b>Highest Detected Level</b>
Alkalinity	ppm	NA	103	224
pH	NA	6.5 -8.5	7.2	8.5
Sodium	ppm	NA	34	136
Temperature	°C °F	NA	9 48	41 106
Total Dissolved Solids (TDS)	ppm	500	328	702
Total Hardness	ppm grains/gallon	NA	190 11	314 18

\* Non-Enforceable Guidelines Recommended by EPA.

If you choose to install home treatment systems to remove taste and odor or other substances, it is important to note that failure to follow the manufacturer’s instructions concerning operation and maintenance can result in potentially unsafe water. More information about home treatment systems is available from the Arizona Water Quality Association at 480-947-9850 or by writing to 6819 E. Diamond St., Scottsdale, AZ 85257.



## Understanding the Language of Water

The following are definitions of terms used to describe types of limits for substances that may be found in drinking water.

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 Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as feasible using the best available treatment technology.

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 required for control of microbial contaminants.

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

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

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

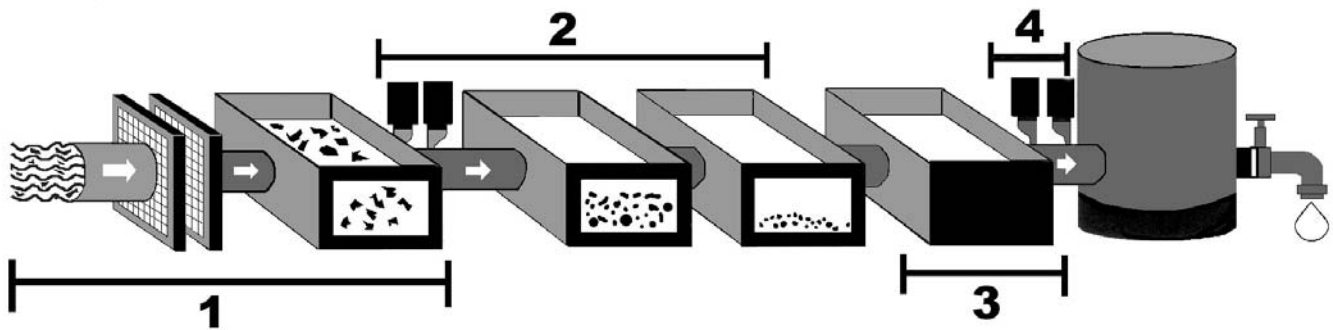
Part per million/part per billion - One part per million (1 ppm) or one milligram per liter (1 mg/L) is approximately equal to one drop of bubble bath in a whole bathtub full of water (about 50 gallons). One part per billion (1 ppb) or one microgram per liter (1 µg/L) is approximately equal to one drop of bubble bath in 1,000 bathtubs full of water (about 50,000 gallons), or is approximately one second of time in 32 years.



## Important Information for People at Risk of Infections

**A**lthough the city treats our water to meet or surpass all drinking water standards, some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as those undergoing chemotherapy, people who have undergone organ transplants, those with HIV/AIDS or other immune system disorders, some elderly people and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA and Centers for Disease Control (CDC) guidelines about appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the EPA Safe Drinking Water Hotline at 800-426-4791.

## How Does Phoenix Produce Superior Drinking Water?



1) Screening and Presedimentation - Large particles such as plant matter debris, and other materials commonly found in river water are removed by screens or settle to the bottom of the presedimentation tank.

2) Coagulation, Flocculation and Sedimentation - A chemical coagulant, such as alum or ferric chloride, is added to the water. This causes the tiny particles to cling together and become heavy enough to settle to the bottom of the basin.

3) Filtration - The cleaner water on the top then passes through filters to remove the last particulate matter.

4) Disinfection - A small quantity of chlorine, a disinfectant, is added to prevent microbial growth. Also a small quantity of fluoride is added to prevent tooth decay.

## Turbidity Results Indicate Effective Treatment Processes

The filters in the water treatment process produce water of superior clarity. Turbidity readings are a measure of that water clarity and a good indicator that the treatment process is removing tiny particles, including micro-organisms. The standard for turbidity or clarity after treatment is 0.3 Nephelometric Turbidity Units (NTU - a measure of clarity) in at least 95 percent of the measurements taken each month, and must not exceed 1 NTU. The corresponding chart shows that Phoenix surpassed that requirement in 2004.

2004 Turbidity Monitoring after Treatment at the Water Treatment Plants					
Substance	Treatment Technique applies instead of MCL	MCLG	Highest Measurement	Lowest Monthly Percentage	Major Source in Drinking Water
Turbidity	No value can exceed 1 NTU and at least 95% of monthly measurements must be less than or equal to 0.3 NTU	N/A	0.9 NTU	99% of monthly measurements met treatment technique	Soil runoff



## Tests Show No Cryptosporidium and Giardia in Our Drinking Water

Phoenix tests both raw untreated and treated water for various microbiological organisms, including Cryptosporidium (often called Crypto, for short) and Giardia. In 2004, Crypto and Giardia were only found in raw untreated water. They were not detected after our water treatment process.

Crypto must be ingested to cause disease and it can be spread through means other than drinking water. There were no cases of the disease caused by either organism attributed to the public water supply in our service area.

For more information about Cryptosporidium, Giardia and other

microbial contaminants, contact the EPA's Safe Drinking Water Hotline at 800-426-4791.

Watch *WATERways* on Phoenix Channel 11 to learn more about how Phoenix keeps your water flowing.  
[www.phoenix.gov/11](http://www.phoenix.gov/11)

## Water Quality and Substances Contained in Source Water

To ensure that tap water is safe to drink, the EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. The U.S. Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water.

It is reasonable to expect drinking water, including bottled water or water that passed through home treatment systems, to contain at least small amounts of some contaminants. 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. However, the presence of contaminants does not necessarily indicate that water poses a health risk.

Contaminants that may be present in source water include the following:

- Microbial contaminants, such as viruses and bacteria, that may be from wastewater treatment plants, septic systems, agricultural livestock operations, or wildlife;
- Inorganic contaminants, such as salts and metals, that 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, that 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, that are byproducts of industrial processes, petroleum production, and can also come from gas stations, urban storm water runoff, septic systems; and

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

More information about contaminants and potential health effects can be obtained by calling the U.S. Environmental Protection Agency's Safe Drinking Water Hotline, 800-426-4791.




## Phoenix Monitors for Unregulated Contaminants

Unregulated substances are those for which EPA has not established drinking water standards. Phoenix monitors for these substances to assist the EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted.

In 2002, the City of Phoenix monitored for a group of twelve unregulated substances at its drinking water wells and water treatment plants. Phoenix did not detect any of these unregulated contaminants in the water except for perchlorate. Of the 73 samples collected for perchlorate, two samples had perchlorate levels above the detection limit of 4.0 parts per billion (ppb). These samples had perchlorate levels of 5.1 and 5.2 ppb with an average level of 0.1 ppb.

In addition, Phoenix collected samples in 2004 to gather more current information on the occurrence of perchlorate in the city's distribution system. Ninety percent of the 392 samples collected throughout the year showed no detectable levels of perchlorate. The highest level found in the water was 5.4 ppb similar to the previous sampling. However, the State of Arizona has established a recommended health-based guidance level at 14 parts per billion. The city's monitoring shows that our perchlorate level is well below that recommended guidance level.

Perchlorate is the primary ingredient in solid propellant used in the manufacturing of rockets, missiles, and fireworks. Also, perchlorate salts are used on a large scale as a component of air bag inflators. In the body, perchlorate interferes with iodide uptake into the thyroid gland. Such an effect decreases production of thyroid hormones, which are needed for prenatal and postnatal growth and development, as well as for normal body metabolism.



# Disinfectants and Disinfection Byproducts Are Controlled

Phoenix's entire water supply (well water and treated surface water) is safely disinfected with chlorine before being delivered to consumers. Federal law requires a minimum chlorine disinfectant level of 0.2 parts per million (ppm) in the water leaving a water treatment plant. There also is a Maximum Residual Disinfectant Level (MRDL) allowed in the water in the distribution system as it travels to your tap.

While it is essential to disinfect the water to prevent widespread outbreaks of serious diseases and comply with EPA standards, the use of disinfectants can create disinfection byproducts (DBPs), which are formed when natural organic matter such as total organic carbon (TOC) in water reacts with chemicals used for disinfection.

To control those disinfection byproducts TOC is measured in the surface water before and after treatment. TOC is reduced during the water treatment process at the plant, therefore, reducing formation of DBPs in the distribution system. Compliance for TOC is based on the removal ratio of TOC on a running annual average. A value of 1 or greater indicates the water treatment plant is in compliance with the TOC removal requirements. Again, Phoenix surpasses the requirement, as shown in the corresponding chart.

To determine formation of DBPs in the distribution system, the city monitors for Trihalomethanes (THMs) and Haloacetic Acids (HAAs) which are DBPs that may cause long-term health effects at certain concentrations. THMs and HAAs are sampled throughout the distribution system every quarter. Then, a running annual average of all samples is calculated to determine compliance with the Maximum Contaminant Level (MCL). Based on those sampling criterion, the city's running annual average was well below the MCL.

### 2004 Disinfectant and Disinfection By-product Monitoring

Substance	Units	MCL	MCLG	Lowest Level	Highest Level	Running Annual Average	Major Source in Drinking Water
Chlorine	ppm	MRDL = 4.0	MRDLG = 4.0	0.1	2.2	1.1	Water additive used to control microbes
Total Organic Carbon Removal Ratio	NA	TT = 1 or greater	NA	1.0	3.9	2.1 (lowest running annual average)	Naturally present in the environment
Total Trihalomethane (TTHM)	ppb	80 Running Annual Average	NA	ND	122	55	By-product of drinking water disinfection.
Haloacetic Acids (HAA)	ppb	60 Running Annual Average	NA	ND	40	20	By-product of drinking water disinfection.



## Lead and Copper Standards Met

Lead and copper usually enter our drinking water from corrosion of household plumbing, pipes and fixtures that contain these metals, such as copper piping, lead solder or brass fixtures. The EPA requires water suppliers to perform periodic tests for lead and copper in the tap water from inside consumers' homes. Tests show levels in Phoenix household tap water met the Action Level required by federal drinking water standards for lead and copper.

While Phoenix meets the Action Level, lead and copper levels at some consumer's homes may be elevated due to leaching of the metals into the water from materials used in the household plumbing or fixtures. Infants and young children typically are more vulnerable to lead in drinking water than the general population. Those concerned about elevated lead levels in their home's water may wish to have a private laboratory test their water. To reduce levels in your home's water, run the tap for 30 seconds to two minutes to

flush the house line when the water has not been used for more than eight hours. (Because water is so precious, catch the flush water in a container and use it to water plants). Also, use only cold water for drinking, cooking or preparing beverages because hot water dissolves lead more quickly than cold water.

<b>2004 Results of Lead and Copper Sampling from Residential Water Taps</b>					
<b>Substance</b>	<b>Action Level (AL) applies instead of MCL</b>	<b>MCLG</b>	<b>90% of taps were less than or equal to this value</b>	<b>Number of sites above the AL</b>	<b>Major Source in Drinking Water</b>
Lead	90% of taps tested must not exceed 15 ppb	0	4 ppb	Zero (0) out of 56 taps sampled	Corrosion of household plumbing systems
Copper	90% of taps tested must not exceed 1.3 ppm	1.3 ppm	0.27 ppm	Zero (0) out of 56 taps sampled	Corrosion of household plumbing systems



## Where to Learn More About the Quality of Our Water

If you have questions about this report, concerns about water quality, or input about the city's water supply, treatment and water delivery call Phoenix Water Services' Customer Services at 602-262-6251 during normal business hours (Monday through Friday, except holidays, from 8:00 a.m. to 5:00 p.m.), or write to: "Water Quality Questions," c/o City of Phoenix Water Services Department, 200 W. Washington, 9<sup>th</sup> Floor, Phoenix, AZ 85003-1611.

Citizens who wish to address the City Council about water issues or other non-agenda items may do so at the Citizen Request Sessions at City Council Formal meetings, which are held in the City Council Chambers, 200 W. Jefferson St. For information about specific meeting times and agenda items, please contact the City of Phoenix's City Clerk Department at 602-262-6811, or visit [www.phoenix.gov](http://www.phoenix.gov) and click "Public Meetings."

For alternate formats, contact Customer Services at 602-262-6251/Voice, or 602-534-1113/TTY, or 602-534-1192/FAX. You also can visit the city's web site at [www.phoenix.gov](http://www.phoenix.gov) for more information. An online version of this report is available at [www.phoenix.gov/WATER/qualrept.html](http://www.phoenix.gov/WATER/qualrept.html)

You also may call the EPA's Safe Drinking Water Hotline for

information about the Safe Drinking Water Act or EPA's other drinking water programs at 800-426-4791.

### World Wide Web sites that provide information about drinking water

- Arizona Department of Health Services - [www.azdhs.gov](http://www.azdhs.gov)
- Maricopa County Environmental Services Department - [www.maricopa.gov/envsvc](http://www.maricopa.gov/envsvc)
- U.S. Environmental Protection Agency - [www.epa.gov/ogwdw](http://www.epa.gov/ogwdw)
- Centers for Disease Control - [www.cdc.gov](http://www.cdc.gov)
- Arizona Department of Environmental Quality - [www.azdeq.gov](http://www.azdeq.gov)
- Tap Into Quality - [www.tapintoquality.com](http://www.tapintoquality.com)

Substances detected in the water and the Maximum Contaminant Level (MCL) allowed in drinking water according to federal and state regulations are shown in the tables in this report. This report lists only the substances that were detected in the water. If you would like to receive a list of all the substances tested in city of Phoenix water, please contact the Water Services Department's Compliance and Regulatory Affairs Office at 602-262-4992. Please note, the simple presence of a substance or contaminant in drinking water does NOT necessarily indicate the drinking water poses a health risk.

## Source Water Assessment Summary for the City Drinking Water Sources

In 2005, the Arizona Department of Environmental Quality (ADEQ) conducted a source water assessment for the drinking water wells and the surface water sources for the city of Phoenix water treatment plants. 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 cleaners, agricultural fields, wastewater treatment plants, and mining activities. Once ADEQ identified the adjacent land uses, they were ranked as to their potential to affect the water source.

The assessment has designated water from the CAP aqueduct to have a high risk because the source water is often stored in Lake Pleasant prior to being transported to a city water treatment plant. There have been reportable releases or spills of a substance at a facility near the lake that have not been reported as being remediated. The spill at this facility makes the CAP source water susceptible to potential future contamination.

ADEQ currently plans to re-assess source water from the SRP canals. Since Phoenix uses SRP canal water, the Source Water Assessment ADEQ prepared for the Phoenix water system may be revised.

Phoenix insures the safety of your drinking water by continuously monitoring the treated water and conducting regular monitoring to determine if any land uses have impacted the source water. If any contaminant approaches the drinking water MCL, treatment is installed or wells are removed from service. Residents can help protect our water sources by practicing good septic system maintenance, taking hazardous household chemicals to hazardous material collection days, and limiting pesticide and fertilizer use.

The complete report is available for review at ADEQ, 1110 W. Washington, Phoenix, Arizona, or by requesting an electronic copy from ADEQ at [dml@azdeq.gov](mailto:dml@azdeq.gov). For more information visit the ADEQ website at: [www.azdeq.gov/environ/water/dw/swap.html](http://www.azdeq.gov/environ/water/dw/swap.html), or contact the Phoenix Water Services Department's Compliance and Regulatory Affairs Office at 602-262-4992.

## 2004 DETECTED Substances at Points where Water Enters the Distribution System

Substance	Units	MCL	MCLG	Lowest Level	Highest Level	Major Sources in Drinking water
1. Arsenic *	ppb	50	NA	ND	17.0	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
2. Barium	ppm	2	2	0.0065	0.126	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
3. Fluoride	ppm	4	4	ND	0.71	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
4. Nitrate ** (as N)	ppm	10	10	0.1	8.2	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.

**\* Some people who drink water containing Arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.**

**\*\*Nitrate in drinking water at levels greater than 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 for advice from your health care provider.**

## 2004 DETECTED Radioactive Substances at Points where Water Enters the Distribution System

Substance	Units	MCL	MCLG	Lowest Level	Highest Level	Highest Average	Major Source in Drinking Water
Alpha Emitters	pCi/l	15	0	1.5	5.2	5.2	Erosion of natural deposits
Combined Radium (collected 2003)	pCi/l	5	0	ND	0.4	0.4	Erosion of natural deposits
Uranium (collected 2003)	ppb	30	0	ND	5.0	5.0	Erosion of natural deposits



<b>2004 Microbiological Monitoring in the Distribution System</b>				
<b>Substance</b>	<b>MCL</b>	<b>MCLG</b>	<b>Highest monthly percentage of positive samples</b>	<b>Major Source in Drinking Water</b>
Total Coliform Bacteria	Presence in no more than 5% of monthly samples	0	1.1 %	Naturally present in the environment.

<b>ABBREVIATIONS / FOOTNOTES USED IN TABLES</b>	
<b>NA</b>	Not Applicable
<b>ND</b>	Not detected (Substance was analyzed but not detected )
<b>pCi/L</b>	Picocuries per liter (a measure of radioactivity)

Please conserve water inside and outside of your home.  
Make wise water use part of your lifestyle.  
[www.wateruseitwisely.com](http://www.wateruseitwisely.com)