Phoenix Water Services Department

2002 Water Quality Annual Report

A Publication for the Residents of Phoenix May 2003

Phoenix drinking water safe throughout 2002

(NOTE: This report and those for recent years can be found on the city's web site www.phoenix.gov by clicking on "By Department" and selecting "Water Services.")

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

Throughout 2002, tap water delivered to the 1.3 million residents served by the City of Phoenix Water Services Department met or surpassed all federal and state drinking water standards. The City of Phoenix tested the water for nearly 200 substances to ensure that it met these standards.

This report provides information about your drinking water, sources of your drinking water, how it is treated and the results of water quality tests for drinking water delivered during the 2002 calendar year.

PHOENIX GETS MOST OF ITS WATER FROM RIVERS AND CANALS

In 2002, about 92 percent of Phoenix's water came from rivers. The primary sources of raw (untreated) 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. Generally, Colorado River water is delivered directly to the city via the Central Arizona Project (CAP) Canal.

The Salt and Verde rivers drain about 13,000 square miles of Arizona ranging from parts of the White Mountains near the New Mexico border to Big Chino Valley just south and east of Seligman. Water from these rivers is delivered to the city via the canal systems operated by Salt River Project (SRP).

Deep wells that pump high quality aquifers produce the remaining eight-to-nine percent of the city's water supply. Wells are used to supplement surface water supplies during times of high demand, and to supply consumers in areas where water mains have not yet been installed to deliver surface water. All Phoenix water, including well water, is disinfected with chlorine before it is delivered to consumers.

Phoenix's five water treatment plants could provide about 630 million gallons per day (MGD) of water for consumers while the wells could add about 50 MGD to the supply. In comparison, the year's greatest demand by consumers was 421 MGD and the average annual daily demand was about 297 MGD. The city's distribution system, with more than 5,900 miles of water mains, carries water from the treatment plants and wells to consumers.

In 2002, all required testing conducted at our water treatment plants and wells showed total compliance with all federal and state standards.

TREATING THE WATER TO DRINKING WATER STANDARDS

Before the treatment process begins, surface water is delivered from canals to one of the city's five water treatment plants. While at those plants, the water goes through the treatment process to provide drinking water that meets all drinking water standards. The first step in the treatment process removes the largest of the particles such as sand, dirt, plant matter and other materials commonly found in river water. Then, a chemical coagulant, such as alum or ferric chloride, is added to the water, which causes the tiny particles to cling together and become heavy enough to settle. The cleaner water then passes through filters to remove the last of the particulate matter.

The filtering process produces water of superior clarity. The standard for turbidity or clarity after water 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 at any time. Turbidity is measured because it is a good indicator that the treatment process is

removing organisms and organic matter effectively. See the chart below regarding turbidity results.

2002 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 at any time and at least 95% of monthly measurements must be less than or equal to 0.3 NTU.	0	0.2744 NTU	100% of monthly measurements met treatment technique	Soil runoff

In the final stage of water treatment, a small quantity of disinfectant (chlorine) is added to kill bacteria and viruses that may be in the water. Chlorine has been used nationally since the early 1900s. Federal law requires a minimum disinfectant level in water leaving a water treatment plant, which is 0.2 parts per million (ppm). In addition, federal law requires there always must be a detectable level of disinfectant throughout the distribution system.

Also a small quantity of fluoride is added during the final stage of treatment to help prevent tooth decay.

NATURALLY-OCCURRING CONTENT OF SOURCE WATER

The sources of drinking 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 the following:

- Microbial contaminants, such as viruses and bacteria, that may be from sewage 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 by-products of industrial processes, and 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.

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. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential heath effects can be obtained by calling the U.S. Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

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.

Although the city treats the 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 chemo-therapy, 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/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 (800-426-4791).

DISINFECTANTS AND DISINFECTION BYPRODUCTS

Use of disinfectants presents a paradox: it is essential to disinfect the water to prevent widespread outbreaks of serious diseases and comply with EPA standards. However, the use of disinfectants can create disinfection by-products (DBPs), which are formed when natural organic matter in water reacts with chemicals used for disinfection. Some DBPs, such as Trihalomethanes (THMs) and Haloacetic Acids (HAAs), may cause long-term health effects at certain concentrations.

The prescribed method of sampling and reporting DBP's is to collect samples throughout the year and then a running annual average of all samples are calculated to determine compliance with the Maximum Contaminant Level (MCL). Based on that sampling criteria,

the city's running annual average was well below the MCL. The following chart shows the levels tested and detected in 2002.

2002 Disinfection By-product Monitoring in the Distribution System							
Substance	**Units**	**MCL**	**MCLG**	**Lowest Level**	**Highest Level**	**Running Annual Average**	**Major Source in Drinking Water**
Total Trihalomethane (TTHM)	ppb	80 Running Annual Average	NA	**ND**	114	45	By-product of drinking water disinfection.
Haloacetic Acids (HAA)	ppb	60 Running Annual Average	NA	**ND**	44.3	22	By-product of drinking water disinfection.

CRYPTOSPORIDIUM AND YOUR DRINKING WATER

Phoenix tests both the raw untreated and treated water for various microbiological organisms, including Cryptosporidium (often called Crypto, for short) and Giardia. In 2002, tests showed a presence of Crypto and Giardia in the raw untreated water. However, no Crypto or Giardia was detected after the stringent 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 (800-426-4791).

MISSED MONITORING EVENTS

At all water treatment plants, the City of Phoenix is required to continuously monitor your drinking water for turbidity and chlorine residual through a combination of electronic and manual methods. If the continuous turbidity and chlorine residual monitoring is not recorded electronically, the city must collect manual samples every four hours for no more than five days. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. On four separate occasions in 2002, the city had to take additional steps to correct monitoring events that were outside the above mentioned established monitoring criteria. At all times during these events, the public health was not at risk. As part of EPA regulations, a detailed explanation about these monitoring events was published in The *Arizona Republic* on August 26, 2002.

The events were as follows:

- At the city's Squaw Peak Water Treatment Plant, on April 4, 2002, turbidity at one of the plant's many filters was monitored after six-and-a-half hours instead of within the four-hour standard. Monitoring of turbidity before and after that six-and-a-half hour timeframe showed the city was in compliance within drinking water standards. In addition, during this time continuous turbidity monitoring of the water as it enters the drinking water distribution system also met the standards.
- At the Val Vista Water Treatment Plant, from April 4 through April 24, 2002, chlorine readings were not continuously monitored. Employees manually collected the chlorine readings for more than the five-day required limit. Manual samples collected during the interrupted electronic monitoring period indicate that the water met established water quality standards.
- At the Deer Valley Water Treatment Plant, from May 1 through May 7, 2002, and June 7 through June 13, 2002, chlorine readings were not continuously monitored. Employees manually collected the chlorine readings for more than the five-day required limit. Manual samples collected during the interrupted electronic monitoring period indicate that the water met established water quality standards.

PHOENIX'S WATER MET STANDARDS FOR LEAD AND COPPER

The EPA requires water suppliers do periodic tests for lead and copper in household tap water. Tests show quantities of the metals in Phoenix tap water were much less than the maximum allowed. However, some consumers' homes have elevated quantities of lead that can leach into the water from either lead solder used to connect the homes' copper plumbing or fixtures that have lead in them. See the chart on the next page for the results of lead and copper sampling.

Infants and young children typically are more vulnerable to lead in drinking water than the general population. Consumers should be aware that lead levels in their homes could be greater than in the city's supply due to materials used in the home's plumbing. Those concerned about elevated lead levels in their home's water may wish to have a private laboratory test their water. If a home has lead in the water, it may be able to be flushed from the pipes. If no water has flowed through the pipes for eight or more hours, run the tap for 30 seconds to two minutes to flush the line. (Because water is so precious, catch the flush water in a container and use it to water plants inside and outside the home.) In addition, use only cold water for drinking, cooking or preparing beverages because hot water dissolves lead more quickly than cold water.

2002 Results of Lead and Copper Sampling from Residential Water Taps					
Substance	Action Level (AL) applies instead of MCL	MCLG	90% of taps were less than or equal to this value	Number of sites above the AL	Major Source in Drinking Water
Lead	90% of taps tested must not exceed 15 ppb	0	2.7 ppb	1 tap out of 81 taps sampled	Corrosion of household plumbing systems
Copper	90% of taps tested must not exceed 1.3 ppm	0	0.54 ppm	2 taps out of 81 taps sampled	Corrosion of household plumbing systems

HARDNESS, TASTE AND ODOR ARE AESTHETIC PROPERTIES OF WATER

Aesthetics are an aspect of water quality that is not regulated under drinking water standards. However, consumers sometimes comment that our drinking water has a poor taste or has an odor.

Many of the contents of the city's water stem from the soils that form the watershed, streams, rivers and canals. Some of these cause the city's water to be considered "hard."

Water hardness indicates the presence of minerals, such as calcium and magnesium. 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.

There are several causes for the fluctuations in taste and odor of the city's drinking water.

Algae that grow in the canals during the late summer and fall is a major source of a "musty" odor and taste detected by some consumers. When the algae blooms, it produces a stronger odor. Even though the algae are completely 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.)

Although it does not affect the safety of the water, some consumers dislike the odor. People with sensitive noses can detect that odor in quantities as tiny as five parts per trillion. As with water hardness, taste and odor is not regulated under drinking water standards. However, the city has taken measures to reduce taste and odor occurrences by adding powdered activated carbon at the treatment plants, and working with the Salt River Project to arrange for the removal of algae from the canal system during periods of formation.

2002 Aesthetic Water Quality Analysis from the Distribution System					
Substance	Units	MCL	MCLG	Lowest Detected Level	Highest Detected Level
Alkalinity	ppm	NA	NA	138	218
pH	NA	NA	NA	6.3	8.2
Sodium	ppm	NA	NA	37	212
Temperature	°C °F	NA	NA	8 46	43 107
Total Dissolved Solids (TDS)	ppm	NA	NA	98	856
Total Hardness	ppm grains/gallon	NA	NA	189 11	369 21

Some consumers may choose to install home treatment systems to remove taste and odor or other substances.

Consumers with a home use filter should be certain to follow the manufacturer's instructions for cleaning and/or replacing the filtering material. It is important to note that failure to follow the manufacturer's instructions concerning cleaning and/or changing the filter can result in potentially unsafe water. More information about filters is available from the Arizona Water Quality Association at (480) 947-9850 or by writing to 6819 E. Diamond St., Scottsdale, AZ 85257.

UNREGULATED CONTAMINANT MONITORING

In 2002, the City of Phoenix monitored for a group of twelve unregulated substances at its drinking water wells and water treatment plants. Unregulated substances are those for which EPA has not established drinking water standards. One of the purposes of monitoring for these substances is to assist the EPA in determining the occurrence of unregulated contaminants in drinking water and whether future regulation is warranted.

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. 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. 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.

TESTING SHOWS PHOENIX'S WATER SUPERIOR TO STANDARDS

Substances detected in the water and the Maximum Contaminant Level allowed in drinking water according to federal and state regulations are shown in the following tables.

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 Customer Services Division at (602) 262-6251. **Please note, the simple presence of a substance or contaminant in drinking water does NOT necessarily indicate the drinking water poses a health risk.**

DEFINITIONS OF TERMS

The following are definitions of terms used to describe types of limits for substances that may be found in drinking water and the circumstances under which compliance with the limits may be excused.

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.

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 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 mg/L) is equal to one drop of bubble bath in 1,000 bathtubs full of water (about 50,000 gallons).

WHERE TO LEARN MORE ABOUT THE QUALITY OF YOUR WATER

Policies and procedures concerning the city's water supply, treatment and delivery are the responsibility of the Director of the Water Services Department and his staff, as authorized by the Phoenix City Council. Consumers with questions about this report, concerns about water quality, or input about the city's water supply, treatment and delivery may call our Customer Services Division 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, 9th Floor, Phoenix, AZ 85003-1611.

City Council meetings 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 and click "Public Meeting Notices/Agendas."

Citizens who wish to address the City Council about water issues or other non-agenda items may do so at the Citizen Request Sessions.

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 for more information.

Or, you may call the EPA's Safe Drinking Water Hotline (800-426-4791) for information about the Safe Drinking Water Act or EPA's other drinking water programs.

World Wide Web sites that provide information about drinking water include:

- American Water Works Association – www.awwa.org
- Arizona Department of Health Services – www.hs.state.az.us
- Maricopa County Environmental Services – www.maricopa.gov/envsvc
- U.S. EPA – www.epa.gov/ogwdw
- Centers for Disease Control – www.cdc.gov
- Arizona Department of Environmental Quality – www.adeq.state.az.us
- Tap Into Quality – www.tapintoquality.com

2002 DETECTED Inorganic Substances at Points where Water Enters the Distribution System						
Substance	**Units**	**MCL**	**MCLG**	**Lowest Level**	**Highest Level**	**Major Sources in Drinking Water**
1. Antimony	ppb	6	6	ND	1.6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
2. Arsenic *	ppb	50	NA	ND	16.5	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronic production wastes.
3. Barium	ppm	2	2	0.0042	0.112	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
4. Chromium	ppb	100	100	ND	76.2	Discharge from steel and pulp mills; Erosion of natural deposits.
5. Cyanide	ppb	200	200	ND	83	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.
6. Fluoride	ppm	4	4	ND	1.0	Erosion of natural deposits; Water additive, which promotes strong teeth; Discharge from fertilizer and aluminum factories.
7. Nitrate ** (as N)	ppm	10	10	ND	7.8	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
8. Selenium	ppb	50	50	ND	3.4	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.

NOTE: * *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 activity. If you are caring for an infant, you should ask for advice from your health care provider.*

2002 DETECTED Radioactive Substances at Points where Water Enters the Distribution System						
Substance	**Units**	**MCL**	**MCLG**	**Lowest Level**	**Highest Level**	**Major Sources in Drinking Water**
10. Adjusted Gross Alpha	pCi/l	15	0	0.8	4.9	Erosion of natural deposits

2002 Microbiological Monitoring in the Distribution System				
Substance	**MCL**	**MCLG**	**Highest monthly percentage of of positive samples**	**Major Source in Drinking Drinking Water**
Total Coloform Bacteria	Presence in no more than 5% of monthly samples	0	0.87%	Naturally present in the environment.

NA - Not Applicable; **ND -** Not detected (Substance was analyzed but not detected); **pCi/L -** Picocurries per liter (a measure of radioactivity)

100 Ways to Save Water

For 100 ideas to help you save water,
check out the website:
http://www.wateruseitwisely.com/100tips.html

Here are some tips you can use now:

#4. Adjust your irrigation controller with the seasons.

#14. Use a layer of organic mulch around plants to reduce evaporation, promote plant growth, and reduce weeds.

#15. Use a broom instead of a hose to clean your driveway.

#23. Keep your shower less than 5 minutes and save up to 1,000 gallons per week.

#28. Check to see if your toilet is leaking by putting food coloring in the tank.

#37. Fix that leaky faucet and save up to 140 gallons a week.

#78. Use a hose nozzle when you wash your car and save more than 100 gallons.

#100. There are a number of ways to save water and they all start with YOU.

WATER USE IT WISELY

For additional information on conservation, check out:
www.phoenix.gov/WATER/conserv.html
or call 602-256-3370.