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**TUCSON WATER**

**1998 ANNUAL WATER QUALITY REPORT**

# Your Drinking Water is Safe

Tucson Water is pleased to provide you with this Annual Water Quality Report, which contains information about the quality of the drinking water we deliver to you. The format for this report follows the guidelines set by the United States Environmental Protection Agency (USEPA)

as part of the Safe Drinking Water Act. The USEPA requires all public water providers to deliver this information to all customers on an annual basis in a single report that provides water quality data to the public in an understandable manner.

## WHERE DOES OUR DRINKING WATER COME FROM?

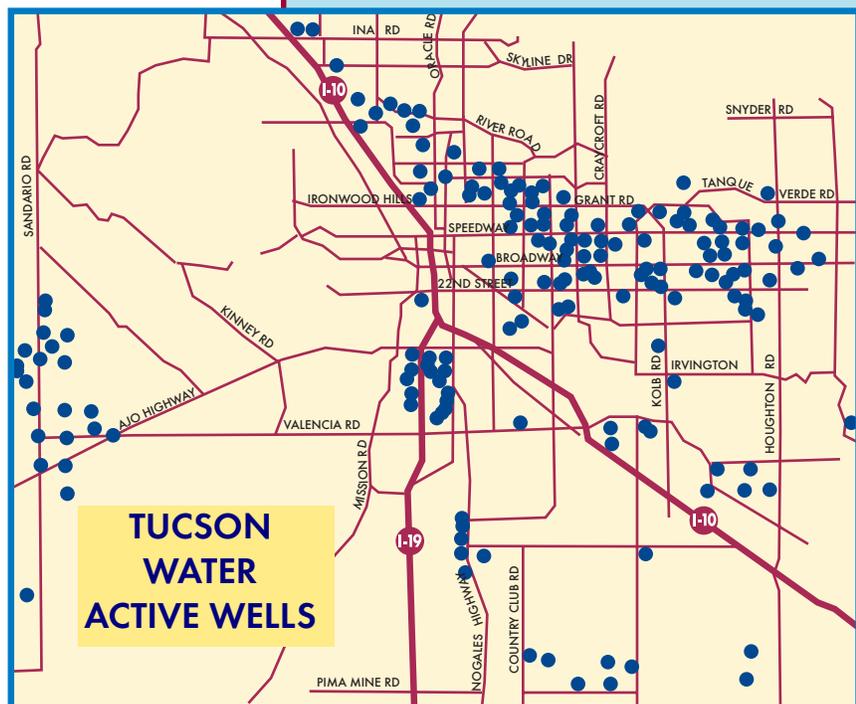
In 1998, Tucson Water served about 600,000 people in the Tucson area. The water supply came from 180 groundwater wells located in and around the Tucson metropolitan area (see map). In urban Tucson, most of the wells (also known as Points of Entry) serve the

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 Point of Entry (POE)" to the drinking water system. The Tucson Water system has four combined POEs: the Southern Avra Valley well field, the Santa Cruz well field, the South Side well field, and the Tucson Airport Area Remediation Project (TARP) well field.

During 1998, the water delivered by Tucson Water met all federal and state drinking water standards.

This Report contains the following information:

- Where does our drinking water come from?
- How is our drinking water treated?
- What, if any, contaminants have been detected in our drinking water?
- Detailed information on detected contaminants.
- Were there any violations of drinking water regulations?
- Definitions of technical and regulatory terms used in the report.
- Who can I contact for more information?



## WHAT CONTAMINANTS HAVE BEEN DETECTED IN OUR DRINKING WATER?

Tucson Water regularly samples the drinking water we deliver to you. The water is tested as it enters the system and at hundreds of locations throughout the Tucson Water service area.

The Detected Contaminants Chart (at right) lists all contaminants that were detected in any drinking water delivered to customers by Tucson Water. It is important to remember that the detection of a contaminant in drinking water does not necessarily represent a threat to public health. Current technology allows water utilities to detect extremely low levels of contaminants in drinking water. A detected result means a concentration that is above the minimum value that can be measured by the laboratory. 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 amounts allowed by the USEPA, refer to the MCL column in the table. (Because the vast majority of regulated contaminants were not detectable in drinking water delivered by Tucson Water, the non-detected results were not included in this table. For a complete list of all USEPA regulated contaminants, contact the USEPA using the address at the end of this report.)

## EXPECTED CONTAMINANTS

In 1998, groundwater was the source of all of the drinking water delivered by Tucson Water. All groundwater is expected to contain contaminants, but not all contaminants are harmful. As water from rainfall and snowmelt filters through soil to become groundwater, it dissolves naturally occurring minerals, and in some cases, naturally radioactive materials, and can pick up substances resulting from the presence of organic matter, animals, or from human activities.

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. Groundwater in the Tucson area also



contains very small amounts of naturally occurring organic compounds, which were originally formed by decaying vegetable and animal matter. Finally, groundwater may pick up pollutants from human industrial or domestic activities. For this reason, water utilities must monitor for some 80 man-made organic contaminants.

## BOTTLED WATER

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.

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## A SPECIAL NOTE TO AT-RISK POPULATIONS

While the Safe Drinking Water Act regulations are intended to protect consumers throughout their lifetime, some people may be more vulnerable to contaminants in drinking water than the general population. These "at-risk" populations include: immuno-compromised persons such as persons with cancer undergoing chemotherapy, organ transplant recipients who are taking immune system suppressants, 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.

## DETECTED CONTAMINANTS

| <i>Inorganic Contaminants</i>                    | <i>Range</i>                      | <i>MCL</i>     | <i>MCLG</i> | <i>Major Sources</i>                                 |                             |
|--|-----------------------------------|----------------|-------------|--|-----------------------------|
| Arsenic  | < 2.5 - 10 ppb                    | 50 ppb         | NA          | Natural deposits.                                    |                             |
| Barium   | < 0.02 - 0.17 ppm                 | 2 ppm          | 2 ppm       | Natural deposits.                                    |                             |
| Fluoride   | < 0.1 - 1.1 ppm                   | 4 ppm          | 4 ppm       | Natural deposits.                                    |                             |
| Nitrate (as N)                                   | < 0.25 - 6.6 ppm                  | 10 ppm         | 10 ppm      | Natural deposits; septic tanks; agriculture; sewage. |                             |
| Lead   | see narrative on lead and copper. |                |             |  |                             |
| Copper   | see narrative on lead and copper. |                |             |  |                             |
| <i>Radioactive Contaminants</i>                  | <i>Range</i>                      | <i>MCL</i>     | <i>MCLG</i> | <i>Major Sources</i>                                 |                             |
| Radium (isotopes 226 & 228)                      | < 1 - 1 pCi/L                     | 5 pCi/L        | 0 pCi/L     | Natural deposits.                                    |                             |
| Gross Alpha                                      | < 1 - 5 pCi/L                     | 15 pCi/L       | 0 pCi/L     | Natural deposits.                                    |                             |
| <i>Synthetic Organic Contaminants</i>            | <i>Range</i>                      | <i>MCL</i>     | <i>MCLG</i> | <i>Major Sources</i>                                 |                             |
| 2,4-Dichlorophenoxy acetic acid                  | < 0.1 - 0.19 ppb                  | 70 ppb         | 70 ppb      | Used for weed control.                               |                             |
| Di(2-ethylhexyl)phthalate                        | < 0.6 - 2.9 ppb                   | 6 ppb          | 0 ppb       | Used in rubber and plastics.                         |                             |
| Pentachlorophenol                                | < 0.04 - 0.12 ppb                 | 1 ppb          | 0 ppb       | Wood preservative.                                   |                             |
| <i>Volatile Organic Contaminants</i>             | <i>Range</i>                      | <i>MCL</i>     | <i>MCLG</i> | <i>Major Sources</i>                                 |                             |
| Ethylbenzene                                     | < 0.5 - 8.3 ppb                   | 700 ppb        | 700 ppb     | Solvent used in paint coatings.                      |                             |
| Tetrachloroethylene (PCE)                        | < 0.5 - 2.1 ppb                   | 5 ppb          | 0 ppb       | Dry cleaners; Landfills.                             |                             |
| Toluene  | < 0.0005 - 0.0012 ppm             | 1 ppm          | 1 ppm       | Solvent; Gasoline.                                   |                             |
| Trichloroethylene (TCE)                          | < 0.5 - 0.8 ppb                   | 5 ppb          | 0 ppb       | Industrial solvent; Landfills.                       |                             |
| Xylenes, total                                   | < 0.0005 - 0.049 ppm              | 10 ppm         | 10 ppm      | Solvent used in paint coatings.                      |                             |
| <i>Unregulated Volatile Organic Contaminants</i> | <i>Range</i>                      | <i>MCL</i>     | <i>MCLG</i> | <i>Major Sources</i>                                 |                             |
| Bromoform  | < 0.5 - 8 ppb                     | NA             | NA          | By-product of chlorination.                          |                             |
| Bromodichloromethane                             | < 0.5 - 4.2 ppb                   | NA             | NA          | By-product of chlorination.                          |                             |
| Chlorodibromomethane                             | < 0.5 - 8.3 ppb                   | NA             | NA          | By-product of chlorination.                          |                             |
| Chloroform                                       | < 0.5 - 11.4 ppb                  | NA             | NA          | By-product of chlorination.                          |                             |
| <i>Disinfection By-products</i>                  | <i>Range</i>                      | <i>Average</i> | <i>MCL</i>  | <i>MCLG</i>  | <i>Major Sources</i>        |
| Total Trihalomethanes (TTHMs)                    | < 0.5 - 7.8 ppb                   | 1.9 ppb        | 100         | NA   | By-product of chlorination. |
| Chlorate (unregulated)                           | < 20 - 150 ppb                    | -              | NA          | NA   | By-product of chlorination. |
| Haloacetonitriles (unregulated)                  | < 0.5 - 0.7 ppb                   | -              | NA          | NA   | By-product of chlorination. |
| Haloacetic acids                                 | < 1 - 1.2 ppb                     | -              | 60          | NA   | By-product of chlorination. |

## DEFINITIONS OF TECHNICAL AND REGULATORY TERMS

**Action level.** The concentration of a contaminant which, 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.

**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: 1/4 ounce of water in a typical 15,000 gallon backyard swimming pool or one second of time in 11.6 days.

**Point of Entry (POE).** All water sources are monitored at the point of entry to the distribution system before the first customer but after any required treatment. For most wells directly feeding the distribution system without treatment, the POE is the well, but in a few cases where the water from a number of wells is collected in a common pipeline before delivery, the POE represents a number of wells in a well field.

**Treatment Technique.** A required process intended to reduce the level of a contaminant in drinking water.



## DETAILED INFORMATION ON DETECTED CONTAMINANTS

Arsenic was detected in forty-four out of 180 wells or combined POEs. More than half of our water supply comes from these forty-four sources. The USEPA is reviewing the drinking water standard for arsenic because of special concerns that it may not be stringent enough. Arsenic is a naturally occurring mineral known to cause cancer in humans at high concentration. The highest level of arsenic in Tucson Water supplies was detected at less than 20% of the current MCL.

Barium occurs naturally at very low concentrations in our groundwater. The maximum concentration is less than 10% of the MCL.

Fluoride is an important naturally occurring mineral that helps to form healthy teeth and bone. At concentrations above 2 ppm fluoride can cause mild discoloration of teeth, and exposure at levels above the MCL of 4 can cause both severe discoloration of teeth and over many years of exposure, bone disease. The average concentration of fluoride in our groundwater is significantly less than the optimum for healthy teeth and most pediatricians and dentists recommend fluoride supplements during the early years when teeth are being formed.

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. By monitoring changes in nitrate concentrations in wells over time, and by increasing monitoring frequency as nitrate concentrations rise, Tucson Water provides additional assurance that nitrate values will not exceed safe limits.

Lead and Copper are generally less than 2.5 parts per billion (ppb) and 2.0 ppb respectively in source water. However, these metals can increase when water contacts plumbing materials containing lead pipe, lead soldered copper tubing, or brass valves. Because domestic plumbing is the primary source of these metals, drinking water regulations require testing of the water in contact with plumbing for at least 6 hours. Tucson Water has identified a number of representative homes and businesses and takes samples at inside taps where water has been standing for the required amount of time. Instead of an MCL, the USEPA has set an action level. If more than 10% of the first draw samples are greater than 15 ppb for lead or 1300 ppb for copper, the water system is required to optimize treatment to minimize the levels of lead or copper. Tucson Water did not sample for lead and copper during 1998; however, monitoring completed in 1992 showed lead at 5.0 ppb and copper at 560 ppb. These concentrations are well below levels of concern.

Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested by a private firm. You can also minimize exposure by using the first water out of your tap in the morning for something other than drinking. The USEPA recommends running the water for 30 seconds to 2 minutes to fully flush domestic plumbing, but Tucson Water has found that in general most of the lead comes from valves and faucets at the point of use. Flushing for only a few seconds will help assure that new valves and faucets do not increase lead in water drawn for drinking.

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. The USEPA currently has no standards for either radon or uranium.

Radium 226 and 228 are two radioisotopes of radium. The combined amount of both currently cannot exceed an MCL of 5 pCi/l.

Synthetic Organic Contaminants (SOCs) are occasionally detected in a monitoring sample, but the presence of an SOC in the water produced by a potable supply well has never been confirmed. The few occasions when SOC's were detected can be attributed to contamination during sampling, shipping, or in the laboratory.

2,4-D is a herbicide use on crops and turf. It was detected only once in a single well at a very low level.

Di(2-ethylhexyl)phthalate is a compound used to make plastic and rubber products flexible. Because of its use in many of the plastic products used in analytical labs, it is a common laboratory contaminant.

Pentachlorophenol is used as a wood preserver. It was detected in two wells on the same day of monitoring, but no pentachlorophenol was detected in quarterly samples collected either before or after the detection.

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 more readily through soils than SOC's. Solvents such as TCE and PCE have been commonly used for cleaning machine parts, and for dry cleaning. These contaminants are often associated with industrial operations and landfills. Despite the vulnerability of groundwater to such contamination, Tucson Water's potable supplies are virtually free of such contamination.

## DETAILED INFORMATION ON DETECTED CONTAMINANTS (CONTINUED)

Ethylbenzene and Xylenes are residual solvents, typically associated with the coatings used to protect new or refurbished water pressure tanks. The highest concentrations seen for ethylbenzene and Xylenes are about 1% of the MCL. These low concentration releases from pressure tank coatings rapidly decrease as the tank ages.

Tetrachloroethylene (PCE) was detected in two wells. One well located near Wilmot and Speedway was part of the Broadway Landfill wells and as such was part of an intense monitoring effort. The Broadway Landfill wells were used only to meet peak water demands. This well was removed as a potable well when the concentration of PCE reached a value of 3.1 ppb. It is Tucson Water policy to close wells that exceed one half of the MCL for a VOC. The only other well with PCE, located near Country Club and Valencia, averaged 0.7 ppb over four quarters of monitoring.

Trichloroethylene (TCE) was detected in one well, located near Grant and Country Club, averaging 0.7 ppb. TCE is the primary contaminant being removed from groundwater in the Tucson Airport Area Remediation Project (TARP).

Bromoform, Bromodichloromethane, Chlorodibromomethane, and Chloroform are unregulated Volatile Organic Contaminants and make up the contaminant group known as total trihalomethanes.

Disinfection By-Products are a group of contaminants that are formed when water is chlorinated.

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.

Chlorate is an unregulated compound formed in the sodium hypochlorite solutions used to chlorinate water.

Haloacetonitriles are a group of four related compounds that are by-products of chlorination. Only one of the four compounds was detected, dibromoacetonitrile.

Haloacetic acids are a group of five related compounds that are by-products of chlorination. Only one of the five compounds was detected, dibromoacetic acid.

Radon is a naturally-occurring radioactive gas that may cause cancer, and may be found in drinking water and indoor air. You should test your house and remediate it if you find a level of 4 pCi/l or higher. Some states and water suppliers are now working on programs that will reduce your exposure to radon both in air and drinking water. You can help develop the program for your area. For more information, call EPA's Radon Hotline (800-SOS-RADON) or visit the web site <http://www.epa.gov/iaq/radon/>.

A limited amount of radon monitoring was performed on the Tucson Water system during 1996. Test results indicate that, when compared with other communities across the country, Tucson has fairly typical concentrations for radon in the water supply. The limited testing in 1996 indicated radon concentrations in the distribution system ranging from about 50 to 1,600 pCi/l, and the average radon concentration is estimated to be about 600 pCi/l. Because radon gas evaporates, water from the TARP treatment facility is free of radon gas.

In 1999, extensive radon testing is being performed in response to the EPA's proposed MCL of 300 pCi/l. The EPA does not currently regulate radon in drinking water.

## LATE MONITORING AND REPORTING

On two occasions, Tucson Water failed to report monitoring results to the State within the required time period. In the first quarter of 1998, 2 chemistry reports were reported late, and during July of 1998, 74 of the 244 monthly coliform samples were reported late. In addition, there were two times in which independent laboratories conducting tests for Tucson Water failed to meet quality control standards, but the required resampling was not conducted in a timely manner. This resampling did not detect any contaminants.





# *Your* **Drinking Water** *is Safe*

## **WHAT ABOUT CAP WATER?**

In 1998, the City of Tucson had rights to approximately 139,000 acre-feet of Colorado River Water per year delivered through the Central Arizona Project (CAP). However, no CAP water was delivered to drinking water customers in 1998. 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 the groundwater below. The utility is planning to deliver a blend of recharged Colorado River water and groundwater beginning in the year 2001. In 1999, Tucson Water is delivering this blend on a very limited scale to selected volunteer neighborhoods in Tucson. Information on the quality of this blend is not contained in this report, but 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) wells. However, approximately 0.8 parts per million (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 TARP program 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 treats approximately 7.5 million gallons of water per day. During 1998, this plant treated a total of approximately 2.5 billion gallons of water.

This treated water does not have detectable levels of TCE. The treated water has been tested on a weekly basis since the start of operations in 1994. The cleaned water is then delivered into the Tucson Water system and is delivered to customers as part of the drinking water supply. This water accounts for approximately 6 to 8 % of water served on a daily basis by Tucson Water.

## WHO DO I CONTACT FOR MORE INFORMATION?

For more information on this Tucson Water report contact Tom Jefferson with the Water Quality Division. Call 791-5252 or e-mail your questions to [tjeffer1@ci.tucson.az.us](mailto:tjeffer1@ci.tucson.az.us).

The Water Quality Division also publishes an Annual Microbiological Water Quality report detailing the results of monthly distribution system monitoring. This report provides the monthly coliform results, chlorine residuals, and temperatures measured at each of 250+ distribution sampling points.

Tucson Water also collects additional water quality data in a program known as "At the Tap". The parameters tested and analyzed under this program included: Hardness, sodium, pH, total dissolved solids, temperature, and free chlorine. The results of the "At the Tap" program are available at the Tucson Water web page and the water quality phone line.

### TELEPHONE NUMBERS:

|   |          |
|---|----------|
| Tucson Water Quality Automated phone line | 791-4227 |
| Tucson Water Public Information Office    | 791-4331 |
| Tucson Water Quality Division             | 791-5252 |
| Tucson Water Customer Advocate            | 791-4556 |
| Tucson Water Customer Service/Billing     | 791-3242 |
| Tucson Water 24 hour Emergency            | 791-4133 |

Additional information is also available from the Tucson Water Website: [www.ci.tucson.az.us/water/](http://www.ci.tucson.az.us/water/)

United States Environmental Protection Agency Safe Drinking Water Hotline: 1-800-426-4791

USEPA Website: [www.epa.gov/safewater/](http://www.epa.gov/safewater/)

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

*City of Tucson  
TTY#: 791-2639*

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