

ADEQ Approves Tucson Water's Innovative Ground Water Rule Monitoring Plan

In 2006 the U.S. EPA established the Ground Water Rule (GWR) which provides increased health protection for consumers of public water systems that use ground water. The GWR's intent is to protect the public from coliforms, organisms that are indicators of harmful bacteria in water. The Rule has two key elements:

- **Identifying and monitoring public ground water** that is susceptible to *Escherichia coli* or *E. coli*, a type of coliform bacteria from fecal contamination of warm-blooded animals.
- **Ensuring that water utilities take corrective actions** to eliminate the source of contamination or to remove or inactivate pathogens in public drinking water.

The EPA established December 1, 2009 as the date

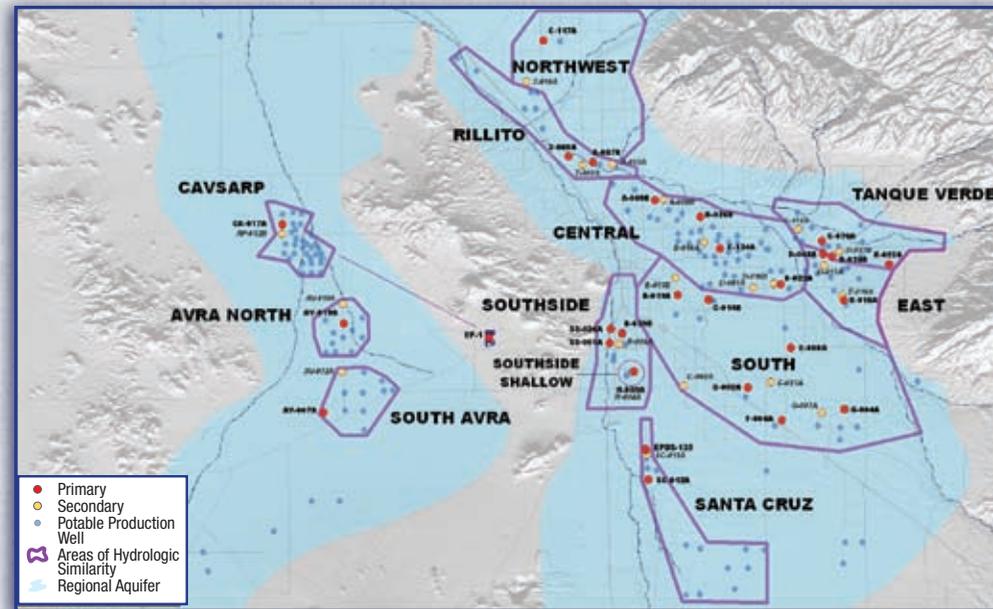
that all public water systems needed to comply with the GWR. Tucson Water staff immediately began to examine the impact of the GWR and to work with Arizona Department of Environmental Quality (ADEQ), the regulatory agency for Arizona's public water systems.

With 216 source wells located in 28 water service areas, Tucson Water is one of the largest ground water systems in the nation. Ground water is a source of all drinking water for our community, whether used 'alone' or within a recharged and recovered blend. Without an innovative and responsive plan, Tucson Water could not comply with the GWR monitoring requirements. For example, should total coliform or *E. coli* be found in the system, then potentially 176 drinking water wells must be tested within 24 hours – an impossible task.

similarities: well distances, construction, basic water chemistry, hydrological management and aquifer characteristics.

ADEQ granted approval of the Triggered Representative Source Monitoring Plan in late November 2009, praising Tucson Water staff for their ability to collaborate and to create an innovative GWR plan for a public water system with such an extensive number of active and inactive sources and large geographical area. Tucson Water's TRSWMP has become a template used by other water systems; the Town of Florence, Arizona recently used the TRSWMP.

Grouping Trigger Test Sites by Areas of Hydrologic Similarity



Over nearly 18 months, Tucson Water staff collaborated with ADEQ to develop a unique monitoring plan that would both comply with the GWR and respond to Tucson's extensive ground water service area. The result was a Triggered Representative Source Water Monitoring Plan (TRSWMP) that reduces the number of triggered test sources to 10 sites – versus 176 – should the system test positive for total coliform or *E. coli*. To develop the TRSWMP, Tucson Water staff:

- 1) **Identified the source wells** supplying the water service areas as delineated by pressure regulating valves and
- 2) **Grouped wells with similar risks** to microbiological contamination by evaluating key physical and hydrologic

Coliform Test Results at Your Fingertips

To confirm the water supply is protected, Tucson Water tests the drinking water at 266 distribution sampling sites for the presence of total coliforms and *E. coli*, called "indicator organisms." You can easily access information about coliform and other test results a number of ways:

- in *Your Water Connection*, the newsletter inserted into your monthly utilities bill.
- by calling the Customer Support Line: (520) 791-5945.
- by accessing the monthly Water Quality Report, online at www.tucsonaz.gov/water/docs/m201004.pdf.

Salt in Your Tap Water



Technically **salinity** is defined as the saltiness or dissolved

salt content of a body of water. These salts can be sodium chloride, magnesium sulfates, calcium sulfates, and bicarbonates. Salinity reduces how we can use our water resources and has potential negative impacts on the residential, commercial, industrial and agricultural arenas. For example, a high concentration of salt in water:

- ◆ Penetrates the ground water increasing the levels of salt.
- ◆ Builds up in soil affecting crops and vegetation.

- ◆ Increases corrosion and degradation of water system infrastructure, increasing maintenance costs and obsolescence.
- ◆ Increases tap water and wastewater treatment costs.
- ◆ Decreases life of household appliances. Salt build-up reduces hot water heater and swamp cooler efficiency.

In 2005, Tucson Water began conducting technical analyses as part of the state-wide Central Arizona Salinity Study (CASS). This study modeled the effects of the increasing salt levels associated with recharging Central Arizona Project (CAP) water delivered

in the Tucson Active Management Water Area (TAMA). The study predicted potential estimates of salt accumulation in soil and ground water within the TAMA. Based on the modeling results, approximately **202,000 to 248,000 tons of salt a year** will accumulate in TAMA's soil and ground water once we recharge our full allocation of 144,000 acre-ft or 46,922,606,390 gallons of CAP water. In general, where the salt will accumulate includes:

- ◆ Approximately 99,000 to 120,000 tons/year of salt accumulation in non-agricultural soils.

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Synthetic Organic Chemical Waivers Eliminate Unnecessary Testing and Save Money

Because the products that we use above ground have the potential to impact the safety of our drinking water wells, Tucson Water performs rigorous field and lab tests and works cooperatively with state and federal regulatory agencies.

Tucson Water tests for 36 regulated man-made chemicals called synthetic organic chemicals (SOCs), common ingredients in pesticides. The U.S. Environmental Protection Agency ensures public safety by establishing measurable standards for SOC in our drinking water; the Arizona Department of Environmental Quality (ADEQ) works with Tucson Water and some 1,700 public water systems statewide to regulate and enforce EPA standards for SOC levels.

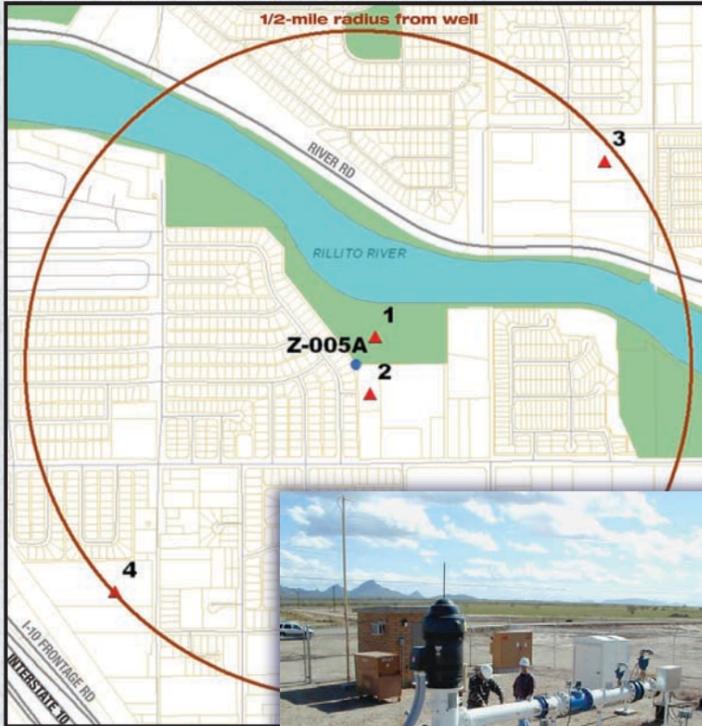
ADEQ issues a waiver when a system is not considered vulnerable to a type of contamination. When a waiver is granted, the effect is a reduction in the monitoring frequency, and this in turn allows systems to save on monitoring costs without affecting public health.

In 2009, ADEQ introduced the Susceptibility Waiver, a new application process, in addition to the Use Waiver. This new type of waiver application is used when sources

of pesticide use - schools, home and gardens, golf courses, waste handling and landfill facilities, etc. - are identified within a half-mile radius of a drinking well and then carefully examining the well's potential for SOC contamination. Any well that contains SOC within the most recent monitoring period or has incomplete monitoring data is not eligible for a waiver.

Any Arizona community and non-transient water system can apply for ADEQ's SOC waivers. Tucson Water quickly acted to leverage its resources to apply for SOC waivers for its 216 water wells by:

- **Creating an inventory** of sources that previously used - including manufacturing, transporting, storing, or disposing - SOC near each drinking well by examining aerial photographs, topographic maps, on-line sources, address listings, Superfund listings, Department of Defense data, municipal waste landfill and underground storage tank information, and other Water Quality discharge reports.
- **Examining well integrity** to determine its susceptibility to SOC contamination, asking: What is the proximity of the well to a potential source of SOC contamination? How is the water protected against SOC contamination due to factors such as the depth of the well, the type of soil and well casing integrity?
- **Providing historical SOC monitoring** data for each well. ADEQ granted SOC waivers for 212 of Tucson Water's 216 drinking water wells for this year. The majority of the wells were granted Susceptibility Waivers, meaning that even though adjacent land uses reflected SOC activity, those activities did not affect the water as the data demonstrated by the absence of SOC. By taking advantage of SOC waivers and eliminating unnecessary environmental testing, Tucson Water saved \$200,000.



Identifying pesticide sources within a half-mile radius of a drinking well is part of the ADEQ's Susceptibility Waiver Application.

What are Pesticides?

Pesticides prevent, destroy, and control unwanted pests that cause damage to crops, humans or other animals. Pests come in all shapes and sizes, and all are living organisms. Types of pests include:

- mold and fungi (fungicides)
- bacteria and viruses
- mosquitoes, flies, and other insects (insecticides)
- packrats, scorpions, snakes, and other animals
- brush, weeds and other unwelcome plant life (herbicides)

Locations where pesticides are commonly found include golf courses, cemeteries, schools, lawn and ground maintenance areas, transportation corridors, and agricultural areas.

Reference: www.epa.gov/pesticides/about/index.htm#what_pesticide.

Salt in Your Tap Water

Continued from Front

Approximately 50,000 tons/year of salt accumulation in soil is associated with agricultural water use.

Approximately 50 to 75 percent of the ground water salt accumulation is associated with the wastewater effluent discharge to the Santa Cruz River.

Mitigating rising salinity levels in our ground water will be a challenge for Tucson Water as we move toward recharging our full annual allocation of CAP water. Our current wastewater and reclaimed water treatment processes are not

reducing salinity levels. If salinity levels continue to increase and are unmitigated, the negative impacts to turf irrigation users of reclaimed water may dissuade the continued use of this resource.

Tucson Water is developing a salinity management strategy that evaluates water treatment technologies for salinity control, salt mass accumulations, and salt reuse and disposal options. To learn more about the CASS Modeling Study, go to the United States Department of Interior Bureau of Reclamation web site: www.usbr.gov/lc/phoenix/programs/cass/cass.html.



Tucson Water's Sweetwater Wetlands is both a wildlife habitat and a critical step in cleaning reclaimed water for turf irrigation.

For More Information, Contact:

Tucson Water
 Customer Support Unit (520) 791-5945
 Water Quality & Operations Division (520) 791-2544
 Public Information Office (520) 791-4331

United States Environmental Protection Agency
 Safe Drinking Water Hotline 1-800-426-4791
 USEPA website www.epa.gov/safewater/

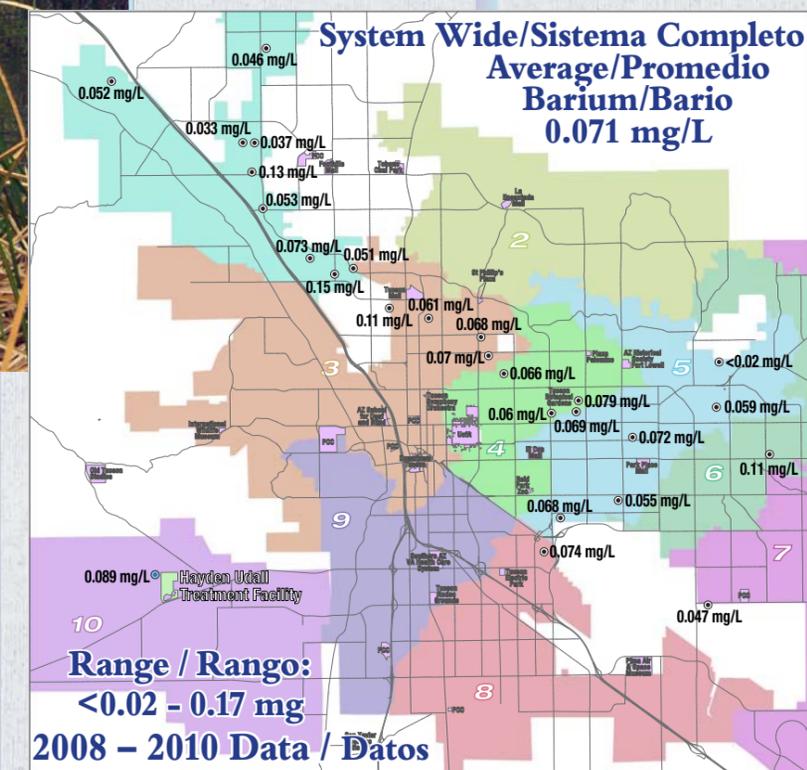
Arizona Department of Environmental Quality (ADEQ)
 Phone 1-800-234-5677
 Website www.azdeq.gov

Barium Levels at Wells

Barium is a lustrous metal, which exists in nature only in ores containing mixtures of elements. The major sources of barium in drinking water are discharges of well drilling wastes, discharges from metal refineries, and natural deposits. The Tucson Water system-wide average for barium in 2008 was 0.071 mg/L. The barium maximum contaminant level (MCL) established by the USEPA is 2 mg/L.

Niveles de bario en los pozos

El bario es un metal lustroso, que en la naturaleza existe únicamente en minerales que contienen mezclas de elementos. Las principales fuentes de bario en el agua potable son las descargas de desechos de perforación de pozos, descargas de refineries de metales y depósitos naturales. El promedio de bario en todo el sistema de Tucson Water en 2008 fue 0.071 mg/L. El nivel máximo de contaminante (MCL) para bario establecido por la USEPA es 2 mg/L.



Range / Rango: <0.02 - 0.17 mg
 2008 - 2010 Data / Datos

mg/L = milligrams per liter; 1 mg/L = 1 teaspoon in 1,302 gallons.
 mg/L = miligramos por litro; 1 mg/L = 1 cucharadita en 1,302 galones.