

KUB

Straight From the Tap:
Safe Drinking Water

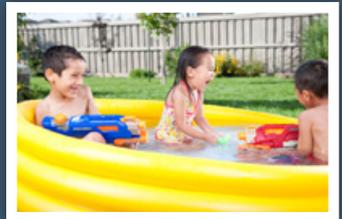




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Straight From the Tap: Safe Drinking Water

At KUB, we are proud of our high-quality water and the system that delivers it to you, our customer. We work hard every day to provide you with safe, reliable drinking water—and our water has always met or surpassed state and federal standards.

Nothing is more vital to a community's health, safety, and quality of life than safe drinking water. With prices for almost everything skyrocketing nationwide, KUB's tap water is also still a great value at less than one-half cent per gallon.

The water rates you pay fund treatment, frequent testing, and maintenance or replacement of the large system that delivers your water and supports public fire protection. KUB constantly monitors the quality of your tap water and the condition of our water pipes to ensure safe drinking water. We prioritize repair and replacement projects to extend the life of our pipes, pumps, treatment plant, and other infrastructure.

We are committed to maintaining our system and ensuring the quality of your water. With some of our water pipes more than 100 years old, we must step up the pace of replacement work now to continue to provide you with reliable water service.

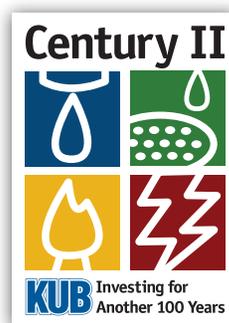
Under Century II, our system replacement and maintenance program, we have initiated a replacement rate of 1 percent a year. That will put us on target with installing newer pipe with an average lifespan of 100 years. Replacement projects are expensive, but the investment in our community's health and future is worth it.

I hope this guide answers any questions you may have about KUB's water quality. We work hard to protect your drinking water and area waterways. On page 11, you can find tips on how you can help, too.

Thank you,



Mintha Roach, KUB Chief Executive Officer



KUB Tap Water Is a Great Value

What does a gallon cost?

Tap water: Less than one-half cent
[KUB: \$0.004/gallon]

Bottled water: More than \$1

Milk: \$3.76
[Average cost,
American Farm Bureau]



KUB's Water Report Card: A+



Like other public water systems, KUB produces an annual Water Quality Report, as required under the Safe Drinking Water Act. The report gives you important information each year, so you can be confident that your drinking water meets all regulatory requirements.

KUB's state-of-the-art Water Quality Laboratory performs more than 100,000 tests a year, many more than required, to provide our customers with safe, high-quality drinking water and help protect area waterways. We check for over 150 contaminants to help protect our drinking water and our waterways. The lab maintains certification from the State of Tennessee through annual performance testing and audits.

For more information, see our Water Quality Report on www.kub.org. Copies of the report are also available at KUB payment centers.

KUB's Water System

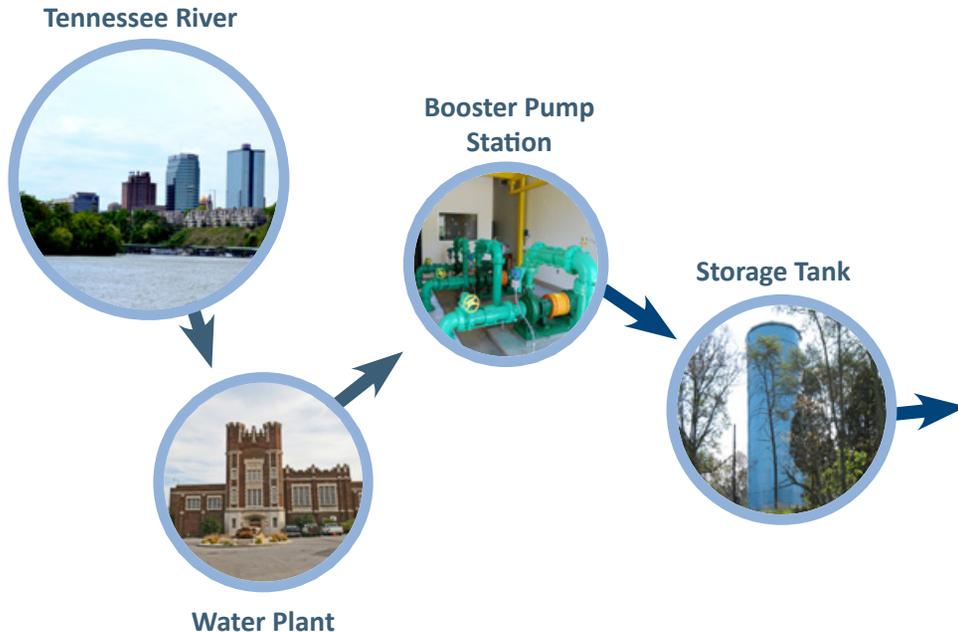
When you turn on your tap, you expect—and get—a safe, steady supply of water from KUB. But do you ever think about where the water comes from or what it takes to deliver it to you?

The Tennessee River provides a safe and abundant supply of source water. KUB draws about 34 million gallons a day from the river into our water treatment plant. [See page 6 for a description of the water treatment process.]

KUB's water system dates from 1883, when it was run by the Knoxville Water Company. The water plant has been in constant service since 1926, with several expansions and upgrades.

On average, the plant sends 34 million gallons a day of treated water (12.4 billion gallons a year) into the distribution system. The water travels through almost 1,500 miles of pipe to reach more than 77,000 KUB customers.

The system also includes 27 booster stations that help the water reach customers in some areas and maintain pressure. Along the way, some water diverts into KUB's 30 water storage facilities, which help maintain water pressure and ensure a continuous supply of water.



System Statistics

Number of Customers	77,602
Service Area	187 square miles
Treatment Plants	1
Booster Pump Stations	27
Storage Facilities	30
Service Mains	1,490 miles
Rated Capacity (mg)	61.2
Reservoir Capacity (mg)	33.5
Total Treated Water (annually)	12.4 billion gallons
Average Flow (mgd)	34

Mg equals million gallons. Mgd equals million gallons per day.

KUB's Typical Residential Water Customer

Annual Usage (Gallons)	44,880
Monthly Bill	\$16.45
Cost per Gallon	\$0.004
Average Daily Cost for Water Usage	\$0.55

A customer can use up to 1,500 gallons of water a month for a bill of \$8.50 (or 28 cents a day).

Average Water Use Nationwide

Toilets	26.7%
Clothes Washers	21.7%
Showers	16.8%
Faucets	15.7%
Leaks	13.7%
Other Domestic Uses	2.2%
Baths	1.7%
Dishwashers	1.4%

American Water Works Association, www.drinktap.org/consumerdnn/Home/WaterInformation/Conservation/WaterUseStatistics/tabid/85/Default.aspx

How We Treat Your Water

Our water plant treats about 34 million gallons of water from the Tennessee River each day to meet the demand in our community. The water comes into our plant just downstream of where the French Broad and Holston rivers come together to form the Tennessee River.

First, we treat the water with chlorine dioxide, an effective disinfectant that kills germs, viruses, and bacteria. Then, we use large screens to remove any debris.

Next, we mix the water with a coagulant, a chemical that helps solid particles cling together and settle out for removal. This settling process occurs in tanks called clarifiers, where most solids settle to the bottom of the tank.

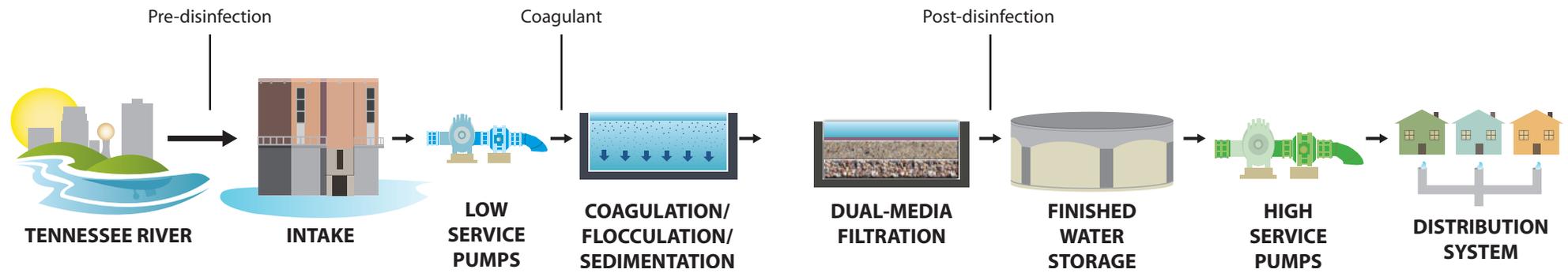
After the clarifiers, the water flows through large filters containing granular materials that trap remaining contaminants. We monitor the turbidity, or cloudiness, of the water closely during and after filtration.

We use very sensitive instruments to ensure we meet strict turbidity requirements. The instruments are necessary because the limits are set so low that the human eye cannot determine if drinking water meets the required standards.

The last step in the treatment process involves final disinfection with chlorine, and we add fluoride along with a zinc compound to protect pipes from corrosion. High pressure pumps then send the water into the distribution system that delivers it to homes and businesses. We continuously monitor our water as it leaves the plant and at various points in the system.



From top: Water plant, water storage tank, clarifier at plant, high service pumps.





Water Quality: What's in My Water?

Each year we summarize the water quality testing our laboratory performs in the KUB Water Quality Report. The report is available online and includes information on any substances detected in our drinking water in addition to other reference information.

Our laboratory performs many more tests than required on our drinking water to ensure your water is safe. In addition to testing at the water plant, we test water from homes and businesses throughout our system. We routinely look for about 150 potential chemical and bacteriological contaminants.



We collect drinking water at various points in our system and test it at our state-certified laboratory.

Your Water Quality Report lists any contaminants found and shows how they compare to regulatory limits. Although some contaminants may be listed, KUB's drinking water has always met or surpassed regulatory standards.

Part of our monitoring includes testing our drinking water for over 100 potential compounds associated with industrial chemicals and man-made compounds that could enter our source water. Our monitoring has not detected the presence of any of those substances in our drinking water, so you won't see them listed in the Water Quality Report.

The substances we monitor for include various metals, pesticides, herbicides, solvents, petroleum byproducts, fertilizer components, and other chemicals commonly used in products or processes.

KUB works hard to provide safe drinking water and help protect area waterways. See the tips on page 11 to learn how you can help keep pollutants out of waterways and our source water.

Why Does KUB Add Chlorine and Fluoride to My Water?



KUB adds the disinfectant chlorine to remove germs, viruses, and bacteria from tap water. Although the level of disinfectant is very low, it still keeps the water safe as it travels through the distribution system to you.

Some people notice the taste or smell of chlorine even at a low dose. To fix that, just put a pitcher of water in the refrigerator so the chlorine can dissipate.

KUB also adds fluoride to your water. Fluoride is a naturally occurring substance proven to prevent tooth decay. We test our finished water each day to maintain the fluoride level public health experts recommend for dental health benefits.

Many respected agencies and organizations recommend fluoridation. They include the Department of Health and Human Services, the Centers for Disease Control and Prevention, the American Dental Association, the American Academy of Pediatrics, and the Environmental Protection Agency (EPA). If you have concerns about fluoride, talk with your dentist or doctor.

Some home treatment systems remove fluoride. Ask the manufacturer for more information or documentation on what its system removes.

What Are Some Things That Occur Naturally in My Water?

The source of our drinking water is the Tennessee River. We can detect trace levels of substances that occur naturally in the soil and environment in East Tennessee after source water treatment.

They include minerals like calcium, magnesium, iron, and manganese. Most of those minerals are essential to human health and occur at low levels, so we are not required to remove them to meet drinking water quality standards.

When those minerals, especially calcium and magnesium are abundant, they can cause “hard” water. That means it is “hard” for soap to produce a foam or lather, and mineral deposits can occur over time. Those deposits are not a problem and can actually protect against corrosion in some situations.

Many people prefer drinking hard water for its health benefits and flavor, but it does require more soap and detergents for washing. The hardness of KUB’s water ranges from 60–120 parts per million, so it is moderately hard.

Substances like sodium, barium, aluminum, chloride, sulfate, and carbon can also enter the source water from the erosion of natural deposits or the breakdown of plants. Although we can detect traces after water treatment, many of those substances are commonly found in much higher amounts in foods and beverages we consume. Some of those substances may also come from the treatment process, and KUB routinely monitors for them because they can affect the taste of drinking water.

What Are Some Things That Can Come From Pipes or Plumbing?



Lead and copper can come from service connections and home plumbing. Homes with older fixtures or service lines can have traces of lead or copper in the tap. Those homes were built before standards were established for low lead plumbing components.

KUB uses corrosion control measures to minimize the risk for our customers. And KUB monitors homes in our system that could potentially have lead and copper in their water. Tests show the water collected from those homes continues to meet the lead and copper drinking water standards for safety.



Tips to Help Protect Our Source Water

Each of us can add to source water pollution without even knowing it. For example, do you know that a seemingly harmless chore like washing your car in your driveway adds to waterway pollution?

The water you use runs into ditches or storm drains, which discharge directly to waterways. The water can carry gasoline, antifreeze, oil, detergent, and other things it picks up along the way. Some of those things can affect aquatic life and the ecosystem. [See next page for “green” car washing tips.]

Runoff from rain and snow also picks up fertilizers, insecticides, and other chemicals and carries them to wetlands and waterways. The EPA says pollution carried by runoff is the biggest problem facing our nation's waterways.

It’s a big problem, but even small changes you make can help. Use the tips on the following pages to help keep pollutants out of waterways. (Continued on page 12.)

Dispose of Unwanted Medications Properly

Properly disposing of drugs helps protect our environment and keeps medications out of the hands of children. Never flush unused medications down the drain or toilet; take them to collection sites or events. You can also take drugs to the permanent drop box at the Knoxville Police Department Safety Building, 800 Howard Baker Jr. Avenue. For more information, visit www.kub.org and follow the Water Quality link under Hot Topics Index.



Tips to Help Protect Our Source Water (Continued)

- Don't wash your car in your driveway. Wash it in the grass and use environmentally friendly cleaning products. Or, go to a car wash that treats wash water.
- Don't put automotive fluids down drains, toilets, or storm drains.
- Repair vehicles that are leaking fluids and clean up spills.
- Dispose of automotive and cleaning products, pesticides, chemicals, paint, etc., properly. Residents of Knoxville and Knox County can take waste to the Household Hazardous Waste Facility at 1033 Elm Street. For information, call 215-6711 or visit <http://www.cityofknoxville.org/solidwaste/hazwaste.asp>.
- Use environmentally friendly cleaning products.
- Apply lawn and garden chemicals and pesticides according to directions and use sparingly.
- Choose native plants that require less fertilizer and pesticides to maintain.
- Landscape to reduce runoff and prevent erosion, especially near streams or drainage ditches.
- Use a rain garden or grassy swale with native plants to allow rainwater to collect and soak into the ground. Divert roof drains there.
- For more tips, visit Be a Part of the Pollution Solution on www.kub.org.

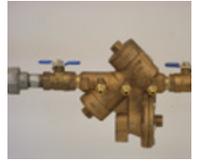
Help Protect Our Drinking Water: Prevent Cross Contamination

KUB needs your help to protect the public water supply. You may accidentally introduce contaminants if you attach things that use chemicals, fertilizers, etc., to water pipes, fixtures, or a hose. Those things include pools, spas, and irrigation systems.

Here's how you can help:

- Keep at least a two-inch air gap between the water source and the substances you use. Leave space between your garden hose and the water in a pool you're filling, for example, or between a spigot and the water in a bucket with fertilizer.

- Install a backflow preventer (if you can't leave an air gap) to prevent any altered water from entering the public water system.
- Call KUB at 524-2911 if you have questions about whether you need a backflow device.



H₂O Info: Answers to Common Water Questions

Why is my water milky looking? Is it safe to drink?

Your water may look milky if air trapped in water lines disperses and creates fine air bubbles. That sometimes happens after a water main repair or home plumbing work, but the water is still safe to drink.

To find out if air in the lines is the problem, simply pour a glass of water, let it sit, and see if it clears up. If it does, run the water for a few minutes to flush your lines and remove the air.

If it doesn't clear up and you did not have any internal plumbing work recently, call KUB at 524-2911.

My water is discolored and there appear to be particles in it. Is that coming from KUB's system?

Common causes of discoloration include hot water systems and internal plumbing problems. Check for discoloration or particles in the hot water inside, then run cold water from an outside spigot. If the problem occurs with both hot and cold water, check several faucets in your home. If the issue is limited to one floor or room, it is likely an internal plumbing problem, and you should call your plumber. Otherwise, call KUB at 524-2911 to report your concern. One of our water quality inspectors will contact you.

What if I don't like the taste or smell of my water?

If the taste or odor of the chlorine used for disinfection bothers you, keep a pitcher of tap water in the refrigerator so the chlorine will dissipate.

Water that sits in pipes a long time can sometimes develop a stagnant odor or flat taste. Running cold water for a couple of minutes to flush out the old water will help. It can also reduce the metallic taste that can occur with corrosion of certain types of home plumbing components. If the taste or odor of your water changes and these suggestions don't help, please call KUB at 524-2911 to talk to one of our inspectors.

Should I use an aerator on my faucet?

It's not necessary for safety, but some people like the way that the added air bubbles enhance the taste of water, making it taste less flat. Aerators also slow the flow of the water and help conserve water. If you use aerators, remove and clean them periodically, especially after any internal plumbing repairs.

What are PPCPs and are they harmful?

There is no known danger to human health from pharmaceuticals or personal care products (PPCPs) at the extremely low levels sometimes found in drinking water. Studies have detected a limited number of PPCPs in rivers and streams in the U.S. at parts per trillion (ppt) levels because wastewater treatment does not completely remove them. [One ppt is equivalent to a few drops of water in 20 Olympic-sized swimming pools.] PPCPs include, but aren't limited to, pharmaceuticals, over-the-counter medicines, lotions, cosmetics, dietary supplements, and cleaning products.

PPCPs have also been reported at even lower levels in some drinking waters. When pharmaceuticals are detected, their levels are consistently at "trace amounts." At such low amounts, you'd have to drink thousands of gallons of water each day for days to approach the levels commonly found in even a single pill. People regularly consume or expose themselves to products containing the compounds in PPCPs in much higher concentrations through medicines, food, beverages, lotions, and other sources.

Researchers are looking at ways to better detect and measure PPCPs in waterways. Ongoing research also includes validating methods to accurately evaluate PPCPs' potential health and environmental effects at extremely low levels. For more information, visit www.epa.gov/ppcp.

Does KUB monitor for PPCPs?

We don't currently monitor for PPCPs because regulatory agencies have not yet established standardized testing and limits for the literally thousands of chemicals in this category. If the EPA determines that a potential unregulated contaminant poses a health risk, the agency requires utilities to monitor for it to determine if it is detected in drinking waters across the U.S. KUB always participates in that type of assessment.

KUB already routinely monitors for over 100 different contaminants that could result from commercial products and processes, but we have not detected any of them in our drinking water.

Why am I hearing about concern over chromium-6 in drinking water?

Health studies suggest that chromium-6 poses more risk to public health than the other forms of chromium. KUB routinely monitors for total chromium, which includes chromium-6, down to one part per billion. We have not detected that metal in our water supply.

Chromium occurs naturally in the environment, and manufacturers commonly use it in various products. The EPA has established a protective limit for total chromium in drinking water at 100 parts per billion.

Why does KUB require some residential customers to install a backflow prevention device?

Customers who connect a pool, irrigation system, or anything that uses chemicals to their water pipes must have a backflow device to prevent potential contamination from entering the water system. Customers who connect an alternate water source, like a well, to their water pipes also need a backflow device. To learn more, go to the Cross Connection Control page on www.kub.org.

If you have questions about whether you need a backflow device, please call KUB's Cross Connection Control Program at 594-8333.

Do I need a home treatment device or system?

Most people don't need a home system. If you are immune-compromised or have certain other health conditions, ask your healthcare providers about whether you should consider one. Otherwise, it's a personal choice.

KUB and other public water utilities are required to routinely monitor drinking water and meet stringent quality requirements. Home treatment devices or systems are not required to meet all those standards.

Point-of-use (POU) systems also vary in their treatment approach and ability to remove contaminants completely. And they require routine maintenance to work effectively over time.

Check manufacturers' claims and determine if the product has been validated to meet removal standards before you purchase a system. For more information, contact NSF International at www.nsf.org or the EPA's Safe Drinking Water Hotline at 1-800-426-4791.

Is bottled water safer than tap water?



Both tap water and bottled water are healthy choices that must meet equally stringent quality standards set by the EPA and the U.S. Food and Drug Administration, respectively. Both may contain some trace substances, depending on the source and treatment.

People sometimes choose bottled water for convenience or taste [*see the taste and odor question for more*]. But refilling a reusable bottle from the tap is cheaper and more environmentally friendly than buying bottled water. Bottled water costs up to a thousand times more than tap water. (For example, at KUB's water rate, you can fill a 16 fluid ounce bottle for less than \$0.001 at the tap versus spending about \$1 at the store.)

Resources

If you still have questions about KUB's drinking water or would like more information on the topics in this guide, please call KUB at 524-2911 or visit these web sites:

KUB: www.kub.org

U.S. Environmental Protection Agency:
www.epa.gov/ppcp
water.epa.gov/drink/

Centers for Disease Control: www.cdc.gov/healthywater/drinking
NSF International: www.nsf.org/



Let's conserve together.

www.kub.org



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