



City of  
Golden

PUBLIC WORKS DEPARTMENT  
ENVIRONMENTAL SERVICES DIVISION

# What's on Tap?



*The City of Golden's Environmental Services Division has a State of Colorado Certified Water Quality Laboratory. Under the Safe Drinking Water Act, Golden is required to collect and conduct extensive laboratory tests on the City's drinking water. The lab regularly tests for the presence of metals, disinfection byproducts, inorganic and organic chemicals and microbiological organisms in the raw source water, through the plant, and within the drinking water system. Other tests monitor the treatment process and ensure Golden's water is esthetically pleasing to drink. If any regulatory level is exceeded the state and your water utility must notify you immediately.*

## Other common water tests conducted throughout the distribution system include:

**pH** is an expression of the intensity of the basic or acidic condition of a liquid that affects many chemical and biological processes. Raw water acidity increases due to mine drainage/seepage of water through mines, industrial waste and acidic precipitation. pH is measured on a scale of 0 to 14, with a neutral pH at 7. A pH less than 7 is acidic, and contains more hydrogen ions; and a pH greater than 7 is basic and has more hydroxide ions. Most natural water has a pH value between 5.0 and 8.5. The EPA sets the drinking water standards of pH to between 6.5 and 9.0. pH is a good indicator as to how well the water treatment plant is operating. The typical pH for finished water for the City of Golden is about 8.0 to 8.4.

**TURBIDITY** is a measure of the cloudiness of water; the cloudier the water, the greater the turbidity. Some sources that contribute to turbidity include: small particles suspended in water, such as algae, soil particles, microorganisms, organic chemicals, decaying vegetation or chemical wastes. All of these sources interfere with the passage of light through the water. Turbidity itself is not a major health concern, but high turbidity can interfere with the disinfection process and provide a place for microbial growth. One of the main functions of the water plant is to remove particulate turbidity. Turbid water in the home is often the result of a dirty hot water heater. Turbidity in drinking water can be no greater than 0.3 NTU's (Nephelometric Turbidity Units). The normal turbidity measurement for finished water at the City is about 0.01 to 0.10 NTU's.

**ALKALINITY** measures the ability of the water to neutralize (or buffer) acids and keep the pH from changing. Some sources of these minerals in raw water include rocks, soils, salts, and decaying vegetation. Low alkalinity indicates that the water's ability to buffer acids is poor. Higher alkalinity values indicate a greater buffering and stabilization capacity. If there are drastic changes in alkalinity, many chemical and biological processes will be affected. Normal levels in tap water range from 20 to 200 mg/L. Levels below 10 mg/L indicate that water is susceptible to changes in pH. The normal range for alkalinity leaving the water plant is about 15-30 mg/L.

**HARDNESS** is the concentration of calcium carbonate and/or magnesium sulfate in the water. In Colorado, most water hardness comes from calcium carbonate. Hardness can be easily seen in any white build-up in showers or on faucets, for example. Hardness levels from 0 to 60 mg/L are soft, from 60 to 120 mg/L are moderately hard, and 120 to 180 mg/L are hard, and 180 mg/L or more are very hard. The normal range for hardness leaving the water plant is about 70-120 mg/L depending upon the season.

## Common Water Quality Terms

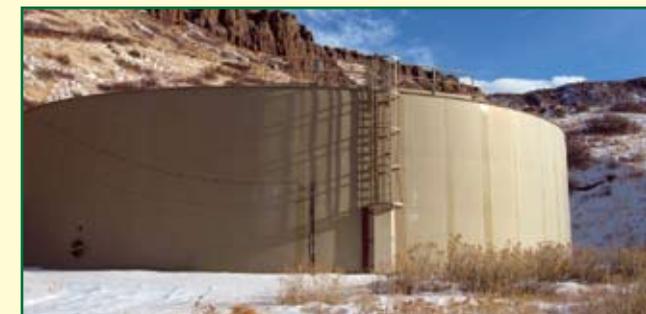
**CHLORINE** is a disinfectant added to drinking water to eliminate microorganisms, such as bacteria and viruses, that can be present in water supplies. The addition of a disinfectant to drinking water is required by the EPA to reduce the risk of waterborne diseases. The EPA requires the chlorine levels in drinking water to be no less than 0.2 mg/L and no greater than 4.0 mg/L. The typical range for The City of Golden's finished water is 0.5 to 1.5 mg/L.

**COLIFORM** is a type of bacteria used as an indicator for bacterial contamination and is monitored in the distribution system. The EPA requires there be no coliform bacteria present in drinking water.

**THMs (Trihalomethanes)/HAA5's (Haloacetic Acids)** are compounds that can form as by-products after the addition of a disinfectant such as chlorine. An effective treatment process will reduce the potential for THM or HAA formation. The EPA requires THM and HAA levels to be no more than 80 µg/L for THM's and 60 µg/L for HAA5's. The City of Golden has to sample quarterly for both THM's & HAA5's. Golden's overall averages since 2000 are 35 µg/L for total THM and 16 µg/L for total HAA5.

**TOTAL ORGANIC CARBON (TOC)** is any organic carbon-containing compound in the water. The greater the TOC removal, the fewer disinfection byproducts will be formed. The typical range of TOC in the City of Golden's drinking water is from about 0.6 mg/L to 2.7 mg/L.

**FLUORIDE** is not added to The City of Golden's drinking water, as it is naturally present in the source water. The EPA has set strict guidelines that fluoride levels should be no more than 4.0 mg/L. Typical ranges for the City of Golden's fluoride levels range from about 0.60 mg/L to 1.20 mg/L depending on the season.

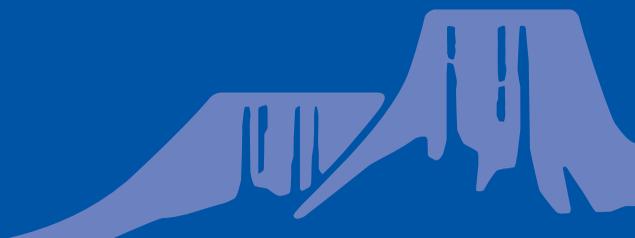


## The Environmental Services Division:

- The Certified Water Quality Laboratory
- performs water quality tests and regulatory reports required by the EPA Safe Drinking Water Act,
- provides monitoring support for the Drinking Water Treatment Plant, and
- monitors Clear Creek — our drinking water source.

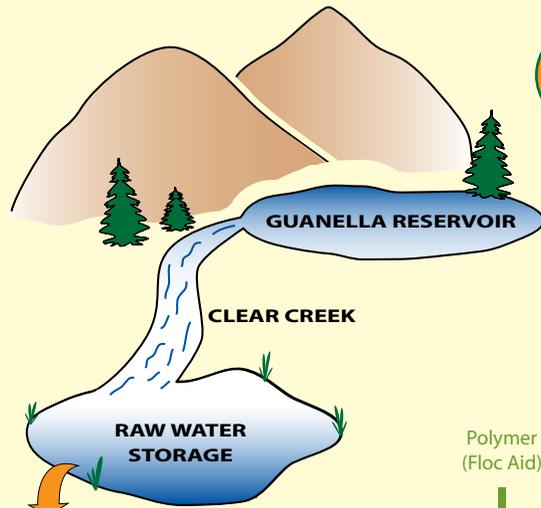
The Environmental Services Division is also responsible for stormwater management, industrial pretreatment, backflow prevention and recycling.

A summary of  
your drinking water  
from the City of Golden

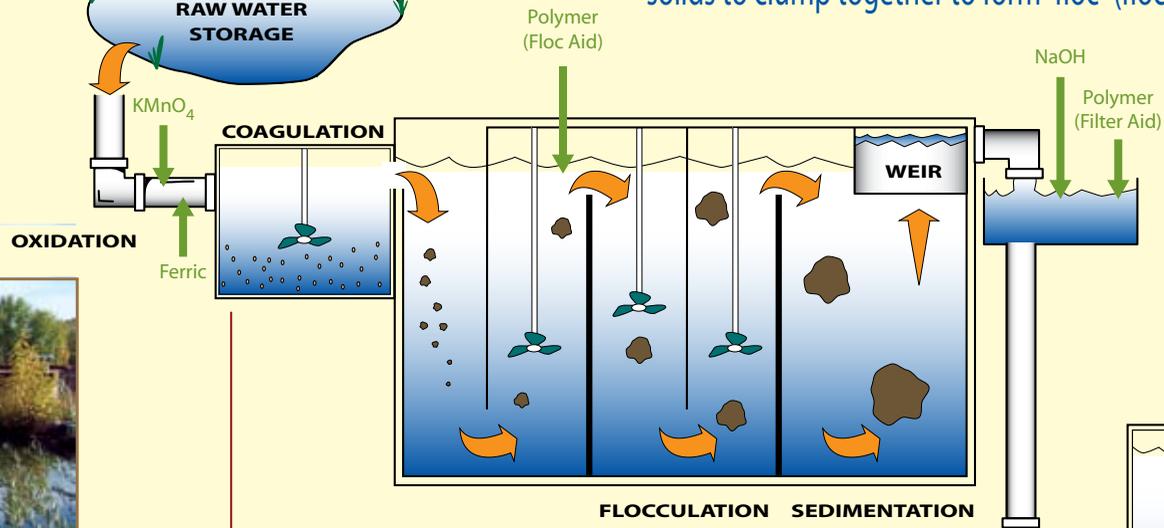


# City of Golden's Drinking Water Treatment Process

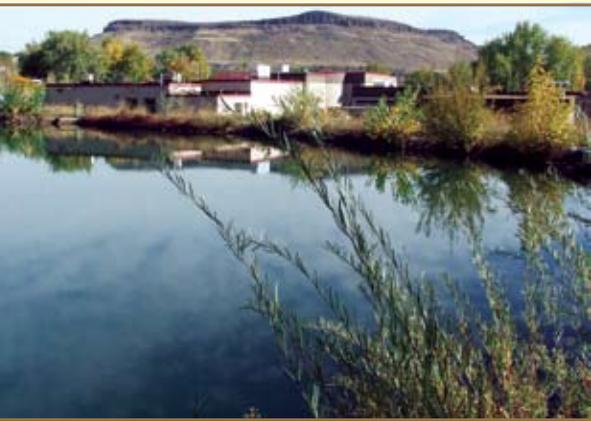
**1.** The City of Golden's drinking water comes from the Rocky Mountains. The water flows into Clear Creek from melting snow or rainfall. The Water Treatment Plant diverts water directly from the Creek through a controllable gate where it flows into two holding ponds. This short-term storage promotes settling of solids before the water is pumped into the treatment basin.



**2.** Treatment begins in the rapid mix when coagulants and oxidants are added and mixed into the water (coagulation). This causes dirt and other solids to clump together to form "floc" (flocculation).



**3.** As the particles get larger and heavier, they settle to the bottom of the basin (sedimentation) where they are continuously removed. This portion of the treatment process takes approximately 3 to 12 hours, depending on the flow amount.



**4.** The clarified water then flows to the filtration gallery where chlorine is added to destroy any harmful bacteria that may be left from the previous treatment. Six large filter basins trap all remaining particles, leaving the water clear and pathogen free. Each filter can process up to 2.5 MGD (million gallons per day) for a total of 15 MGD if needed.

**5.** Treated water stored in the clearwell is pumped directly to nine tanks and two reservoirs throughout the City (distribution) before it is used by you, the consumer.

Water usage varies depending on the season. In the summer, when water usage peaks, the demand on the system is about 7.0 MGD. In the winter months, when water usage is low, the City demands about 2.0 MGD.

