

Blanco-Pedernales Groundwater Conservation District

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A Guide to Understanding your Water Quality Report

The Blanco Pedernales Groundwater Conservation District appreciates your participation in the water quality sampling program. As part of our commitment to well owners, we have prepared this guide to help you examine and understand the results of the water quality analysis of your well water. Water quality standards are divided into two groups, Primary and Secondary. Primary standards apply to constituents that have maximum contaminant levels (MCL) designated to protect human health. Secondary standards are recommended maximum contaminant levels which are generally associated with taste, odor, appearance, staining, and other annoyance-type problems. Below is an explanation of each constituent tested and its maximum contaminant level when applicable.

Coliform Bacteria

Total coliforms are a group of closely related bacteria that are (with few exceptions) not harmful to humans and do not usually cause disease. They are commonly found throughout the environment, even on our own bodies. Because of this, water samples must be taken using sterile containers and precise sampling methods. In areas of fractured bedrock or coarse sand and gravel aquifers, coliform bacteria may contaminate groundwater. Because total coliforms may be injured by environmental stresses (e.g., lack of nutrients) and water treatment (e.g., chlorine disinfection) in a manner similar to most bacterial and viral pathogens, they are a useful indicator of the possible presence of more harmful pathogens. Total coliforms may be used to help determine the condition and integrity of the well and water distribution system. The District conducts a simple presence/absence test for total coliforms. The absence of total coliforms in the water sample means that harmful pathogens are probably not present in the well and plumbing system. The presence of total coliforms indicates that pathogenic (disease-causing) organisms could be present in the water supply system. Some waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis and hepatitis. The District recommends a shock chlorination treatment for wells testing positive for total coliform bacteria and can provide details to well owners interested in chlorinating their well.

Fecal Coliform

Coliform bacteria are a collection of relatively harmless microorganisms that live in large numbers in the intestines of man and most animals. They aid in the digestion of food. A subgroup of this collection is the fecal coliform bacteria, the most common member being *Escherichia coli* (E. coli). These organisms may be separated from the total coliform

group by their ability to grow at elevated temperatures and are associated only with the fecal material of warm-blooded animals. The District conducts a simple presence/absence test for E. coli. The absence of E. coli in the water sample means that fecal pathogens are probably not present. The presence of E. coli in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. The presence of E. coli indicates that the source water may also have been contaminated by other, potentially more harmful pathogens or disease producing bacteria or viruses which can also exist in fecal material. Some waterborne pathogenic diseases include typhoid fever, viral and bacterial gastroenteritis and hepatitis. The presence of E. coli is an indicator that a potential health risk exists for individuals exposed to this water. E. coli contamination may occur as a result of the overflow, failure, or improper construction of domestic septic systems. Wells located close to concentrated sources of human and animal waste may also be susceptible to E. coli contamination. The District recommends a shock chlorination treatment for wells testing positive for E. coli and can provide details to well owners interested in chlorinating their well.

pH

pH is the concentration of hydrogen ions and represents the acid qualities of the water. Acids and free carbon dioxide lower the pH. Carbonates, bicarbonates, hydroxides, phosphates, silicates, and borates raise the pH. A pH of 7.00 is neutral and a pH range of 6.5-8.5 is generally acceptable for drinking water. A lower pH can dissolve iron in plumbing and produce a “red water” problem, and a higher pH can result in a slippery feel to the touch, a soda taste, and mineral deposition on faucets.

Alkalinity (Total)

Alkalinity of water is its acid-neutralizing capacity or the sum of all the titratable bases. Because the alkalinity of many surface waters and ground waters is primarily a function of carbonate, bicarbonate, and hydroxide content, it is taken as an indication of the concentration of these constituents. No standards have been set. Alkalinity of well water in Blanco County generally ranges between 200-450 milligrams per liter (mg/L).

Conductivity

Conductivity is a measurement of the ability of water to carry an electrical current. The dissolved mineral content present in all water facilitates electrical conductance (interesting side note: completely pure water will not conduct electricity!). Conductivity can be used as a measure of total dissolved solids (TDS). These solids are usually composed of sulfates, bicarbonates, and chlorides of calcium, magnesium, and sodium that are commonly found in our limestone aquifers. Conductivity varies greatly in Blanco County groundwater. Readings of 550-1300 microSiemens per centimeter (uS/cm) are common, with some wells as much as 4600. The TDS in parts per million (ppm) can be approximated by multiplying the conductivity in uS/cm by 0.5. No standards have been set for conductivity, but TDS has a secondary standard MCL of 1000 mg/L, primarily based on taste, feel, odor, salinity, and other undesirable characteristics.

Temperature

Temperature is used to help ensure that the water being tested is being produced from the well itself and not from a pressure tank or other external storage tank. Typical groundwater temperatures in the Blanco County area range from approximately 20-23 degrees Centigrade or 68-73 degrees Fahrenheit.

Hardness

Hardness of water is caused principally by the presence of dissolved calcium and magnesium, but other minerals can also contribute to hardness. No standards have been set for hardness, but water hardness is generally described as follows:

soft:	0-60 mg/L (0-3.35 grains)
moderately hard:	61-120 mg/L (3.36-6.70 grains)
hard:	121-180 mg/L (6.71-10.06 grains)
very hard:	more than 180 (more than 10.07 grains)

Most of the groundwater in Blanco County comes from limestone aquifers such as the Glen Rose, Trinity, and Ellenberger limestone formations. Limestone is a major source of dissolved calcium and magnesium. It is therefore not surprising that Blanco County groundwater can be generally characterized as hard to very hard. Hard water forms scale deposits in boilers, water heaters, appliances, faucets, and pipes. It also results in excessive use of soap and the deposit of soap curd on bathtubs and sinks. Many people chose to install a water softener in order to reduce hardness to a more acceptable level.

Chloride

Chloride is dissolved from rocks and soils and is usually present in groundwater at levels less than 300 mg/L. Chloride is essential for human metabolic needs. The average daily intake by an adult human from drinking water is less than 84 mg/day and is less than 1 percent of the average daily intake of 8,440 mg/day from food, water and air. The secondary drinking water standard MCL is 300 mg/L. High levels of chloride, in combination with sodium, can result in a salty taste and may increase the corrosiveness of water. Extremely high levels of chloride can make the water undesirable for domestic, livestock, commercial, and other normal uses.

Iron

As groundwater moves down and through rock layers, iron is dissolved from those rocks containing either oxidized iron minerals or organic debris. Under normal geologic conditions, the contamination level is usually very low. Unusually high levels of iron may be due to cast iron and steel well casings, pipes, pumps, storage tanks, and other plumbing or storage equipment. High concentrations in water can result in reddish stains on toilets, sinks, laundry, and kitchen utensils. Under some conditions, high levels of iron can also favor the growth of some bacteria. Iron generally poses little health risk. In fact, iron is an essential for humans and a deficiency may contribute to anemia. Secondary drinking water standard MCL is 0.3 mg/L, primarily due to problems with staining and potential bacterial growth.

Fluoride

Fluoride is dissolved in small amounts from most rocks and soils and is sometimes added to public drinking water supplies. Fluoride in drinking water reduces the incidence of tooth decay when it is consumed during tooth enamel clarification. However, in high concentrations, it may cause mottling of teeth, depending on the concentration, the person's age and susceptibility, and the amount consumed. The primary drinking water standard is MCL of 4mg/L and a secondary standard of 2 mg/L.

Sulfate

Sulfates are found naturally in groundwater and are dissolved from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds. If sulfate in water exceeds 250 mg/L, a bitter or medicinal taste may render the water bitter and unpleasant to drink. High levels of sulfate can also give water a rotten egg smell and, in combination with calcium, form scale deposits in hot water heaters and boilers. People unaccustomed to drinking water with elevated levels of sulfate can experience mild laxative effects or, in more severe cases, diarrhea and dehydration. Infants are often more sensitive to sulfate than adults. As a precaution, water with a sulfate level exceeding 400 mg/L should not be used in the preparation of infant formula. Older children and adults usually become accustomed to high sulfate levels after a few days. High sulfate levels may also corrode plumbing, particularly copper piping. In areas with high sulfate levels, plumbing materials more resistant to corrosion, such as plastic pipe, are commonly used. The secondary drinking water standard MCL is 250mg/L. Some Blanco County wells have sulfate levels above 500mg/L. The District has additional information available to well owners whose wells have tested for high levels of sulfate.

Nitrate

Natural sources of nitrate include mineral deposits, soils, and the atmosphere. High levels can be contributed to fertilizers, sludge, refuse leachate, decaying organic matter, and industrial discharges. Higher values are often found in shallow aquifers easily polluted by sewage and fertilizer use. Water with high levels of nitrate can cause methemoglobinemia (also known as blue-baby syndrome) in infants and should not be used for drinking or feeding. It can also encourage the growth of algae and other organisms, which give water a bad taste and odor. The primary drinking water standard MCL for Nitrate (as N) is 10mg/L.