Sampling Procedures for Routine Drinking Water Analysis

Both private and public wells that supply drinking water need to be periodically tested to see if the water is safe to drink and to establish a history for the water source. All public wells must be tested for bacteria monthly and annually for chemical water quality parameters. This is not a legal requirement for private wells but UGRA does recommend periodic and routine testing. The frequency that a private well is tested is up to the owner to determine and UGRA cannot determine this for the owner.

Microorganisms can grow rapidly to harmful levels, and they are easier to eradicate when the contamination is low. The chemical parameters tend to change less rapidly than bacteria so less frequent testing is generally needed. Testing will provide sound data to determine the need or desire for additional treatment options like softeners, passive bacteria treatments, and filtration systems. UGRA offers a discount package for these routine bacteria and chemical tests – Standard Water Quality Package.

Below are instructions for collecting a sample for routine water testing. Following these instructions will help ensure that your results accurately reflect the condition of your well.

1 ***Use a pre-sterilized container provided by UGRA.*** You must use an approved pre-sterilized sample container provided by UGRA or another laboratory to collect your Bacteria samples. Bottles can be obtained in-person during normal business hours or shipped to you for the cost of postage. A bottle for Standard Water Quality testing also needs to be obtained if you plan on testing for these parameters.

2 ***Sterilize the Faucet.*** Remove any aerators or hoses and sterilize the opening. Use unscented bleach or alcohol to liberally clean the outside and inside rim of the faucet. If using a hand held torch (for outside faucets only) , wipe off the faucet with a paper towel and then heat the outside and inside of the faucet for 15-30 seconds.

3 ***Flush.*** Turn on the water and let it run in a full steady stream for 2-3 minutes. Cut the flow back to a thin stream to prevent splashing.

4 ***Fill the bottle.*** Exercise care in handling samples! Samples are extremely easy to contaminate.

- Open the lid on the sterile specimen bottle. Do not touch the inside of the container, lip of container or lid. Do not remove the powder pill of Sodium ThioSulfate ($Na_2S_2O_3$). Do not "pre-rinse" the bottles.
- Fill the bottle with 100 milliliters of water. The bottle is marked at 100mL on the bottle. Samples with more or less than 100mL of sample may not be accepted for analysis, and the improper volume will be recorded.
- Replace the lid firmly and begin cooling. Refrigeration on ice to 0-4˚C (39˚F) is preferred. Cooling should be maintained until accepted by UGRA.
- If residual chlorine is to be analyzed (for chlorinated systems only), it should be done now with an additional sample from the running faucet. Do not use the sterile specimen bottle sample.
- If you are also testing for other water quality parameters, fill these containers now. Place the filled containers on ice.

5 ***Fill out the required Chain of Custody form.*** This form is obtained along with the test container from UGRA. Complete as much information as you can. Take special care to note the date and time that the sample was collected. The Chain of Custody document will be reviewed by UGRA prior to sample acceptance. Additional information may be requested at that time.

6 ***Deliver the sample to the Lab.*** Drinking water sample(s) must be returned, on ice, to UGRA within 24 hours from the time the sample was collected. Bacteria count samples (Fecal plate counts & MPNs) must be returned, on ice, within 6 hours from the collection time.

7 ***Review your results.*** UGRA supplies a handout (on back) that supplies ranges and limits for the Standard Water Quality Package. For other parameters and questions, please contact UGRA at 830-896-5445. We will be happy to help.

PARAMETER	SOURCE OR CAUSE	SIGNIFICANCE	KERR CO RANGES	TREATMENT
Specific Conductivity	Is an indicator of the dissolved mineral content of water; mostly calcium carbonate along with other dissolved salts.	Is a measure of the electrical Conductivity of water and varies with the amount of dissolved solids	0-500 µmhos/cm Good 500-1500 µmhos/cm Normal >1500 µmhos/cm *MC Limit	1. Reverse Osmosis 2. De-ionization
Total Dissolved Solids	Dissolved mineral content from various rock formations	Considered a general indicator of the quality of the water	>1000 ppm *MC Limit	1. Reverse Osmosis 2. De-ionization
Total Hardness	Caused by the presence of calcium and magnesium carbonate. Commonly found in Hill Country formations.	Hard water consumes soap before a lather will form and creates scale In boilers, water heaters and pipes.	0-120 ppm Soft to Moderate 121-180 ppm Hard 181+ ppm Very Hard	1. Water Softener 2. Reverse Osmosis for people sensitive to salt 3. De-ionization
Iron	Dissolved from rocks and soil; may also come from iron pipes, pumps and other equipment. Commonly found in Hill Country formations,	On exposure to air, iron in ground water oxidizes to reddish-brown (red water) which may stain laundry and utensils; large quantities can cause unpleasant taste and encourage the growth of Iron bacteria.	0-0.3 ppm OK >0.3 ppm MC Limit 1.0 ppm Common in some areas	1. Iron Filtration with Greensand Media 2. Reverse Osmosis 3. Softner with “Iron Out” 4. De-ionization
Sulfate	Dissolved from rocks and soil containing gypsum, iron sulfides, and other sulfur compounds. Commonly found in Hill Country formations,	Sulfate in water containing calcium is scale forming in large amounts; sulfate can give a bitter taste and unpleasant smell to water and/or have a laxative effect.	0-100 ppm Good 100-250 ppm Noticeable odors possible >300 ppm *MC Limit	1. Reverse Osmosis 2. De-ionization 3. To remove odors caused by sulfur bacteria, chlorinate
Fluoride	Dissolved in small quantities from rock and soil. Fluoride may in some cases actually be added to drinking water supplies.	May cause mottling of the teeth in children depending on the quantity and temperature average per year. In concentrations of 1 to 2 ppm it may reduce dental cavities and **bone** hardening	0-0.6 ppm Good 0.6–2.0 ppm Optimum 2.0-4.0 ppm Mottling of teeth >4.0 ppm Possible health risk	1. Reverse Osmosis 2. De-ionization
Nitrate-Nitrogen	Prevalent in decaying organic matter, sewage, and fertilizers. Dissolves easily and can readily migrate to shallow aquifers.	Considered a general indicator of the quality of the water.	0-2 ppm Common 2-10 ppm Suspected Contamination >10 ppm *MC Limit	1. Reverse Osmosis 2. De-ionization
pH	pH is lowered by acids; acid-generating salts and free carbon dioxide. pH is raised by carbonates, bicarbonates, hydroxides, phosphates, silicate and borates.	May cause corrosion problems. Extreme pH values may cause physical harm on contact or by ingestion	0-6.5 Acidic (Corrosive) 6.5-8.5 Normal >8.5 Alkaline (Excessively)	1. Chemical Addition 2. De-ionization
Chloride	It is dissolved mainly from rock salt found in sedimentary rocks and soils. Chloride is present in sewage and found in large amounts in oil field brines, seawater and industrial brine effluent.	Excessive chloride may result in decreased alkalinity of the blood which may cause hyperkalemic metabolic acidosis. In large quantities, chloride increases the corrosiveness of water.	0-30 ppm Normal >300 ppm *MC Limit	1. Reverse Osmosis 2. De-ionization
Total Coliform	It is the most common bacteria originating in the colon of all animals indicating contamination. These widespread organisms are typically present on almost any surface not recently disinfected	Indicates water is not disinfected. Will not meet EPA Drinking Water Standards for public drinking water supplies. May be unsafe to drink depending on type of organism and severity of the contamination.	ABSENT: Potable PRESENT: Non-Potable	1. Sterilize well and distribution system. Retest to confirm sterilization complete 2. Chlorination system 3. UV Light System
E. coli Coliform	A type of fecal coliform bacteria which originates in the lower intestine of warm blooded animals. This indicates recent fecal coliform contamination to water supply. This is often caused by farm animals or septic system issues.	Indicates water is not disinfected and it has a high risk of disease causing bacteria being present. Will not meet EPA Drinking Water Standards for public drinking water supplies. Definitely unsuitable for consumption until treated. Source of contamination needs to be found and eliminated if possible.	ABSENT: Potable PRESENT: Non-Potable	1. Sterilize well and distribution system. Retest to confirm sterilization complete 2. Chlorination system 3. UV Light System

*MC Limit – Maximum Contaminant Limit for Public Drinking Water