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Is my water safe?

Answering that question is not always as straightforward as it might seem. This discussion is designed to help you answer some commonly-asked questions concerning your drinking water quality.

Generally speaking, drinking water in the State of Utah has been shown to be of exceptional quality. Some localized areas of Utah (desert areas, mining districts) have particular problems associated with geological or man-made contamination but, overall, decades of water testing have shown Utah's drinking water to be safe.

If your drinking water comes from a public source, then the municipality or water system is required, by law, to test the water frequently for chemicals or bacteria that may be harmful to you. All water systems are also required to publish annually a Consumer Confidence Report which lists the results of the analytical testing performed during the previous year.

If your drinking water comes from a well or other non-public source, then any analytical testing is generally your responsibility. It may be a good idea to test your water on a regular basis (for example, in the summer and in the winter) to make certain that your water is safe to drink.

Your source water is one area of concern. The other major area of concern lies within your own house. This means that your in-house piping, faucets, and hot water heater may cause or contribute to a water problem. Please see subsequent questions for discussions about these sources.

Testing for contaminants in drinking water can be an expensive process if you don't know what to test for. Below are some suggestions for testing your water.

Bacterial Testing

Unless your drinking water source lies next to a huge industry or any other obvious source of specific chemical pollution, the bacterial content of your water is the most likely health hazard. Testing for coliform bacteria is probably the most prudent and the first contaminant to test for in an unknown water source.

The State of Utah uses the testing of coliform bacteria as its sole criterion for determining whether water is bacterially contaminated. The coliform group contains many kinds of common bacteria, including those naturally occurring in soil. Although many groups of coliforms are nonhazardous to human health, their presence in drinking water generally indicates that contamination has occurred in some way. Fecal coliforms, which are a subset of coliform bacteria, occur naturally only in the gut of warm-blooded animals. E. coli is a well-known fecal coliform.

A water sample which tests positive for total coliform may or may not be hazardous to your health, but it fails the state standard. A sample which tests positive for fecal coliform or E. coli is an indication that the water has come in contact with fecal matter and is a serious health hazard.

Chemistry Testing

Chemical contamination of drinking water is not common, but there are some chemical constituents that you may want to consider testing. For example, high amounts of calcium and magnesium cause hard water. Soil which has been sprayed for pesticides or herbicides has the potential to contaminate groundwater. Older homes may have piping which deteriorates over time leaching metals such as zinc, copper, and lead into the drinking water. Excessive use of fertilizer may cause large amounts of nutrients (such as nitrogen and phosphorus compounds) to appear in groundwater. Fuel spills have also been known to generate groundwater contaminants.

Because the above cases are unusual, chemical testing of water on a routine basis by individuals is not done very frequently. However, specific qualities of your water which you find disagreeable may warrant chemical testing.

So, what is safe water?

Complaints about water quality usually fall into two categories.

First, and the most important, is contamination by chemical or bacterial constituents which may cause human health problems: things which would cause the water to be unsafe to drink.

Second, there is contamination caused by chemical or bacterial sources which results in aesthetic problems: the water smelling or tasting funny, or water causing stains on bathroom fixtures. The water may not necessarily be unsafe for your health, but the drinking water quality and taste is sufficiently poor that you don’t want to drink it.

The distinction between the two is important.

So, in the State of Utah, safe water is defined as water which meets the standards of the National Primary Drinking Water Regulations. These regulations protect public health by limiting the levels of contaminants in drinking water. A list of these regulated compounds and the Maximum Contaminant Levels (MCLs) is available at www.epa.gov/safewater/mcl.

Why does my water occasionally smell or taste funny?

Because of several possible environmental conditions, the quality of your drinking water may occasionally change. This may stem from drought or seasonal changes or algae blooms, or a number of other factors – and the effects may be short or long-lasting. In any case, you may find the changes objectionable.

Many things cause odor and taste in water. They may be associated with the water as it comes into your house or may be the result of something inside your home. Below are a few of the most common culprits.

Drains and Filters

A very common source of odor is the drain, or filters used prior to the faucet. Over time, organic matter can accumulate in the drains and filters and bacteria subsequently grow on these deposits. These bacteria can produce a gas that smells like rotten eggs or sewage or mildew. To make sure that the problem is not in the tap water, fill a glass with some water and move it to a location away from the sink where the smell or taste has been noted. If the problem is in the drain or filter, the tap water in the glass should not have an odor or taste.

Iron and Sulfur Bacteria

Because iron is abundant in groundwater, it is not unusual to find **iron bacteria** there also. Iron bacteria are oxidizing agents. This means that during metabolism, the bacteria combine iron or manganese in water with oxygen. A side effect of this process is a foul-smelling brown slime which can coat wells, pipes, and plumbing fixtures. The slime isn't a health hazard, but it can cause unpleasant odors, corrosion of plumbing equipment, and clogged pipes. Iron bacteria grow better in slow- or non-moving water, so any dead-end pipe arrangements in a house can contribute to the growth of iron bacteria.

Water containing iron bacteria may have a yellow, red, or orange color. Rusty slime deposits may form in toilet tanks and leave a brown or black color.

The **sulfur bacteria** include groups of both sulfur oxidizers and sulfur reducers. Of the two types, sulfur-reducing bacteria are more common. They break down any sulfur compounds in your water, producing hydrogen sulfide gas in the process. Hydrogen sulfide gas is foul-smelling ("rotten egg smell") and highly corrosive.

Blackening of water or a dark slime coating the inside of the toilet tank may indicate a sulfur bacteria problem. Often, iron and sulfur bacteria live together symbiotically and the resulting effects are accelerated and difficult to distinguish.

Hydrogen sulfide gas may be present in the source water, especially in deep wells, but its source is more frequently inside your home. You may notice that the "rotten egg" smell is more prevalent when you first turn water on after a long period of non-use. Or, you may notice it especially from your hot water taps only. This is not unusual because the gas accumulates and wants to escape your piping system as soon as the tap is opened.

One environment which frequently affects the quality of your water is your water heater. Sulfur bacteria love water heaters because they contain a "sacrificial anode." This anode is a magnesium rod that helps protect water heaters by corroding instead of the tank lining. However, sulfur bacteria are nourished by electrons released from the anode as is deteriorates. In addition, the water temperature of the water heater may not be kept high enough to kill the sulfur bacteria (usually around 160 Deg. F).

Metals

Sometimes drinking water has a slight metallic taste – a sign that dissolved metals are present. They may be present in the original groundwater (i.e. iron), or they may be present as a result of the

deterioration of piping. This is a serious problem if the pipes are older and are partially made of lead. Copper, although less toxic than lead, may also be a problem if pipes are being corroded.

Iron is usually the main culprit behind metallic-tasting water. It is not particularly harmful to health, but it can cause significant staining of plumbing fixtures, clothes, and basins.

Saltiness

High levels of dissolved solids can cause a general salty taste to the water. The most common ions associated with saltiness are sodium, potassium, calcium, and magnesium. Although not generally a health hazard, some of these ions may affect those with low tolerances to salt (such as sodium).

Chlorine

Chlorine (and sometimes bromine) is routinely used to disinfect the water supply. A small amount of residual chlorine is left in the water exiting the treatment facilities to make certain bacteria do not grow in the piping distribution system. However, sometimes additional chlorine is added by water systems to solve a particular problem and its taste is more noticeable at your tap. The effects of this additional chlorine are usually short-term.

Geosmin and 2-MIB

Sometimes drinking water exhibits an earthy, muddy, or musty odor. These compounds are routinely produced as certain types of algae die and are readily detectable – even at very low concentrations. Typically only a problem in lakes, reservoirs, and streams, geosmin and 2-MIB are most noticeable in late summer and fall when surface water algae blooms are most prevalent.

Why does my water look different than normal?

Sometimes the drinking water from the tap may look physically different. This may because of color, air, or suspended material. The following are comments regarding these effects.

Milky or White Water

This effect is almost always due to air in your water. To test this, fill a clear glass with water and let it sit for a minute or two. As the entrapped air is suddenly liberated from the tap, the water will start to clear from the bottom – and will eventually clear all the way to the top. There are no health concerns associated with this effect.

Particles

Very small particles appearing in your drinking water may result from several sources. Reddish or brown or black particles usually indicate rust. Rusty water occurs from sediment in the pipes and may occur in the water mains or in the pipes inside your home. Sometimes a temporary rusty

sediment will be seen if the fire hydrants in your neighborhood have been recently flushed. Very old piping systems are the other major cause of this observation.

Sometimes black particles also come from the disintegration of rubber faucet gaskets or washers, or flexible hoses used in the supply line or in water heater connections.

Particulate in your water is especially noticeable after long periods of disuse. It may clear after several minutes of flushing.

Colored Water

Drinking water with a tinge of blue, green, brown, black, orange, or yellow color is almost always due to minerals dissolved in the water. Copper, iron, and manganese are usually to blame and may come from the water source, from deteriorating pipes, or a faulty water heater.

What about the deposits I see on my (sink, ice cube trays, tea kettle, etc.)?

If these deposits are white or whitish-gray, they are usually the result of either high hardness in your water or a high amount of dissolved solids (or both). If your water is hard, calcium and magnesium compounds will be deposited as water evaporates. If the total amount of dissolved solids (dissolved salts) is high, you may see similar depositing, although its source may be from sodium and potassium instead.

A side note – water softeners remove the calcium and magnesium (the hardness offenders) and substitutes sodium or potassium for those metal ions (that's why you dump bags of salt into your softener). Though the metal ions have changed, the total amount of dissolved salt in your water remains essentially the same. Reverse osmosis ("R.O.") systems remove much more than the hardness from your water. Soft water generally causes more piping corrosion than hard water, but hard water generates more depositing and clogging than soft water.

Deposits which have a yellow, orange, red, brown, or black coloration are usually due to the presence of iron (and sometimes manganese).

Deposits which have a green or blue appearance are normally due to the presence of copper.

So how do I fix my water quality problems?

The answer to this question is probably beyond the scope of this discussion. However, if you have determined that the source of your problem does not lie in areas that you could directly fix (i.e., by cleaning your drain or replacing a carbon filter), then the next step could be one of the following:

1) Contact your municipality or water system if it is a public source. Find out whether the problem you note has been reported by other consumers or your neighbors. There may be some anomalies in the water lines that you have not been aware of (i.e., water hydrant flushing or algae blooms in a reservoir water supply).

2) Have a plumber research the water lines in your house, including the water heater, for signs of corrosion, dead-end lines, or leaking. This may pinpoint a problem source, or may eliminate some problem sources. Having qualified assistance with water heater issues, particularly because they involve potentially scalding water and high pressures, is usually a good idea.

3) Ask a water treatment specialist about your particular problem (i.e., use the Yellow Pages to seek out a reputable firm that's been in business for many years). In order to narrow down the possible sources, the specialist will probably perform some quick chemical evaluations on your water, or he may ask that you have a qualified laboratory perform such analyses. As a result of this evaluation – and particularly if your water source is your own well – some additional form of water treatment (a filtration system, an R.O. system, a water softener) may improve your water quality.

4) Have your water or deposits analyzed by a reputable analytical laboratory. Doing this on your own will require you to know what kind of testing you need in order to help you solve your problem, and it will put the burden of laboratory costs on you. But working with the lab may give you some concrete information in resolving the difficulty.

5) Sometimes the Utah Department of Health Division of Water Quality can offer suggestions on how to begin treatment of a water source plagued by a bacterial or chemical problem. If you're part of a rural community water system, the Utah Rural Water Association has shown to be of exceptional assistance in tracking down water quality problems.

Final Thoughts

Tracking down a problem with water quality can be a long, frustrating process. Identifying the problem is only the first step.

The preceding comments are offered as guidelines for assistance, and, unfortunately, not as the ultimate solutions to your water quality issues.

Taylorsville-Bennion Improvement District appreciates the above information provided by Chem-Tech Ford Laboratories.

Chem Tech Ford website

https://chemtechford.com/