## About Us

The Homer Soil and Water Conservation District's mission is to provide education and leadership in the conservation and sustainable use of soil and water-related resources through cooperative programs that protect, restore, and improve our environment.

## **Contact Us**

Phone: 907.235.8177 x5 Email: casey@homerswcd.org Web: homerswcd.org Physical: 432 E Pioneer Ave, Suite C Homer, Alaska 99603

# Drinking Water Testing

# Frequently Asked Questions



What do I need to test for? Analytes will vary based on your unique conditions. See the included diagram to get started. Avoid testing for analytes that aren't relevant to your situation, as this is wasted money.

**How do I collect a sample?** Sample collection may vary by analyte. For example, some need to arrive at the lab within 24 hours of collection, some tests require water run for several minutes prior to collection, and some need to be shipped on ice. Typically, the testing lab will send you collection jars and instructions.

**Can I use at-home test strips or digital meters?** These methods of testing often have a high margin of error. However, they can be useful for:

- Analytes that are prone to changing rapidly and/or volatilizing (changing from liquid to gas state). These include pH (time, temperature, and agitation can affect pH), free chlorine, and bacteria.
- Estimating hardness (a measure of mineral content particularly calcium and magnesium).

More accurate and detailed results, as well as results for all other analytes, should be obtained from a lab. One exception is hydrogen sulfide, which has an obvious rotten egg smell, so it typically isn't tested by at-home methods or a laboratory.

**Can I just filter and boil my water?** Water filters vary (read the product label), but will typically address sediments and some metals, but not kill microorganisms (bacteria, viruses, protozoa). Boiling for at least five minutes can kill microorganisms, but won't remove metals, dissolved or suspended solids, and some other contaminants. Using both filtration and boiling may work in some situations. However, nitrates, nitrites, arsenic, and hydrogen sulfide are not removed by either method, and require special filtration or other management strategies.

#### How often do I need to test my water?

- Well water – Test annually for nitrates, total coliform, total dissolved solids, and pH. Additional analytes are recommended at various intervals based on local conditions. See the EPA's "Home Water Testing" flyer for recommendations.

- City or delivered water – these entities are held to federal water quality safety standards and regular testing. Contact your water provider for annual water quality reports.

 Plumbing matters – Even if your water source is clean, bacteria build up in pipes, filtration systems, and cisterns and can causes contamination. Lead pipes can leach lead into water. Household systems should be bleached on a regular basis, and lead pipes should be removed wherever possible.

What's up with arsenic in Alaska? Alaska has high levels of naturally occurring arsenic and other metals in soil and groundwater. Heavy metals will be a drinking water concern in nearly every groundwater well. Some metals require special filtration systems.

What is the slimy material stuck to my plumbing and pumps? Iron bacteria naturally occur in soil, surface water, and shallow groundwater. They combine oxygen with iron – or manganese – to form rust-like deposits and slime. It's more apparent when plumbing hasn't been used for a while and can present as odd taste and odor; yellow, orange, red, brown, or grey slime and staining; rainbow sheen; and feathery growths in standing water. Iron bacteria are not a direct health concern but may create conditions to help other disease-causing organism

thrive and may clog pumps and pipes.

What is coliform? Coliform are bacteria that are used as a proxy for the likelihood of contamination of harmful bacteria, viruses, and protozoa. Sources of contamination are human waste (for example, a septic tank or outhouse located too close to drinking water well) and animal waste (pets, livestock, wildlife). Wells less than 30 ft deep and/or less than 100 feet from surface water (creek, lake) have a higher risk of microorganism contamination due to active exchange between surface and subsurface water. This type of water source will require additional disinfection and filtration. Domestic wastewater treatment and disposal is regulated by 18 AAC 72, which requires minimum horizontal separation distances between wastewater and

- Private well: 100 ft
- Public well: 200 ft
- Surface water: 100 ft
- Steep slope: 50 ft

Why does my water smell like rotten eggs? The odor comes from hydrogen sulfide produced by a bacterial reaction and/or the absence of oxygen in a saturated environment (for example, in a wetland). An excess of hydrogen sulfide can be corrected with specific types of filters and/or oxygenation. If the smell is originating from plumbing or a cistern rather than a groundwater source, then the water system can be bleached to remove bacteria causing the odor.

How do I choose a lab to run my tests? It's generally recommended you use a state-certified lab, as these are verified to meet quality standards. These labs are required where environmental compliance is an issue, but not necessarily required for individuals. For more information about State certified labs visit <a href="https://dec.alaska.gov/eh/lab/">https://dec.alaska.gov/eh/lab/</a>. See the included diagram for recommended labs.

How do I choose a household filtration system? If you need a filtration system, it may be best to contact a local dealer who will both test your water and sell you a filtration system. On the Kenai Peninsula, these are your options:

- Blackwell Pumps, Homer: 907.235.6280
- Kinetico, Anchor Point: 907.235.5116
- Alaska's H2O Pros, Soldotna: 907.262.8711

Drinking water concern	2 <b>5</b>	Analyte	SGS 1	Tauriainen	Blackwell Pumps <sup>2</sup>	Brookside <sup>3</sup>	Home test
		Chloride	x			x	
Lead plumbing		Copper	x				
Pregnant or		Hardness	x		x	x	
baby present		Hydrogen sulfide					x
Gastrointestinal		Iron	x		х	х	
illness		Lead	x				
Bad taste,	$\sim$	Manganese	х			x	
odor, staining		Metals (various)	x		х		
Standard		Nitrate/nitrite	x		х	x	
		рН	x		x	x	
Chemical or fuel		Sulfate	x				
contamination		Total coliform	x	х			
Stained plumbing		TDS (total dissolved solids)	x		х	х	
fixtures or laundry (Footnotes of	n reverse)	VOCs (volatile organic compounds)	x				

## SGS North America Inc.- Anchorage, AK

200 W Potter Dr. Anchorage, AK 99518 Phone: 907-562-2343

Tauriainen Engineering & Testing

35186 Kenai Spur Hwy Soldotna, AK 99669 Phone: 907-262-4624

Blackwell Pump Services

1440 East End Rd Homer, AK 99603 Phone: 907-235-6280

Brookside Labs

200 White Mountain Dr New Bremen, OH 45869 Phone: 419-977-2766 <sup>1</sup> \$175 CAN Kit: total coliform, E. coli, nitrate/nitrite, arsenic
\$450 PIWA Kit: CAN Kit plus minerals and metals, pH, hardness, TDS
VOCs not included in either kit.
The most comprehensive testing available locally.

Bacteria tests need to be collected and delivered the same day, making Tauriainen the best option for Homer, since they are closest. Homeowner needs to deliver—or arrange delivery— of samples to Soldotna.

\$66.00-\$116.60

<sup>2</sup> Not a state-certified lab
\$50 basic test for iron, hardness, pH, TDS
\$50 EACH for additional tests: arsenic, nitrate/nitrite, lead & copper, tannin, manganese

<sup>3</sup> Not an Alaska state-certified lab, but certified in Ohio and with the EPA. Included here because NRCS/Homer SWCD contracts with them for soil testing and irrigation water testing.
\$16 chloride \$25 hardness
\$15 iron \$15 manganese
\$16 nitrate \$11 pH
\$13 TDS \$15 arsenic



Comments and questions, contact: <a href="mailto:casey@homerswcd.org">casey@homerswcd.org</a>, 907.235.8177 x5



# Home Water Testing

#### Should I Have My Water Tested?

The answer to this question depends on several factors. It concerns your health and the health of your family, so you need to know some basic facts.

In addition to illness, a variety of less serious problems such as taste, color, odor and staining of clothes or fixtures are signs of possible water quality problems. Other things to think about include the nearness of your water well to septic systems and the composition of your home's plumbing materials.



This fact sheet provides

information to help you decide whether or not to have your water tested, and if so, suggested tests for your situation.

# Regardless of your water source, here are two situations that may require testing:

Do you suspect lead may be in some of your household plumbing materials and water service lines?

Most water systems test for lead as a regular part of water monitoring. These tests give a system-wide picture, but do not reflect conditions at a specific household faucet.

If you want to know if your home's drinking water contains unsafe levels of lead, have your water tested. Testing is the only way to confirm if lead is present or absent.

Some faucet and pitcher filters can remove lead from drinking water. If you use a filter to remove lead, be sure you get one that is certified to remove lead by NSF International.

For more information, visit www.epa.gov/safewater/ lead, or call the Safe Drinking Water Hotline at 1-800-426-4791.

#### Are you considering a home water treatment unit?

Find out what is in your water and what you might want to remove before contacting potential dealers. Be informed so you can make the right decisions. To help you, please visit: www.epa.gov/safewater/faq/faq.html#hwtu and www.epa.gov/safewater/wot.

#### **Public Water Systems**

When you turn on the tap, where does the water come from? If you pay a water bill, you are purchasing water from a public water system, where your water is monitored,

> tested and the results reported to the federal, state or tribal drinking water agencies responsible for making sure it meets the National Primary Drinking Water Standards. Your water company must notify you when contaminants are in the water they provide that may cause illness or other problems.

> Most people in the United States receive water from a community water system that provides its customers with

an annual water quality report, also known as a Consumer Confidence Report. Normally, you will receive it with your water bill once a year in July. The report contains information on contaminants found, possible health effects, and the water's source. If you do not receive a report, contact your water company for this information.

#### **Private Water Supplies**

If your drinking water does not come from a public water system, or you get your drinking water from a household

well, you alone are responsible for assuring that it is safe.

For this reason, routine testing for a few of the most common contaminants



is highly recommended. Even if you currently have a safe, pure water supply, regular testing can be valuable because it establishes a record of water quality. This record is helpful in solving any future problems and in obtaining compensation if someone damages your water supply. The following items will help you determine when to test your private drinking water supply.

#### How frequently should I test?

Test water every year for total coliform bacteria, nitrates, total dissolved solids and pH levels, especially if you have a new well, or have replaced or repaired pipes, pumps or the well casing.

# Do you expect to have a new baby in the household?

Test for nitrate in the early months of a pregnancy, before bringing an infant home, and again during the first six months of the baby's life. It is best to test for nitrate during the spring or summer following a rainy period.

#### Do you have taste, odor and staining issues?

Test for sulfate, chloride, iron, manganese, hardness and corrosion, and every three years. If you suspect other contaminants, test for these also.

# Have you had a chemical or fuel spill or leak near your water supply?

Test your well for chemical contaminants, such as volatile organic compounds. Tests can be expensive; limit them to possible problems specific

to your situation. Local experts can tell you about possible impurities in your area.

Is someone in your household pregnant or nursing an infant? Are there unexplained illnesses in your family? Do you notice a change in water taste, odor, color or clarity? You may need to test more than once a year.



#### Do you know who can test your water?

Often county health departments will help you test for bacteria or nitrates. If not, you can have your water tested by a state certified laboratory. You can find one in your area by calling the Safe Drinking Water Hotline at 800-426-4791 or visiting *www.epa.gov/safewater/labs*.

#### **Collecting Samples**

Most testing laboratories or services supply their own sample containers. Use the containers provided and carefully follow the instructions given for collecting, preserving and handling water samples. Samples for coliform bacteria testing must be collected using sterile containers and under sterile conditions. Some procedures require that water runs from an outside tap for several minutes before filling the sample containers. Laboratories may sometimes send a trained technician to collect the sample or to analyze the sample directly in your home. Ask if this service is available, since you may obtain better samples and more reliable test results.

#### WHEN TO TEST YOUR WATER **Conditions or nearby activities Recommended Test** Recurrent gastro-intestinal illness Coliform bacteria Household plumbing pH, lead, copper contains lead Radon in indoor air or region is Radon radon rich Scaly residues, soaps don't lather Hardness Water softener needed to treat Manganese, iron hardness Stained plumbing fixtures, iron, copper, manganese laundry Objectionable taste or smell Hydrogen sulfide, corrosion, metals Water appears cloudy, frothy or Color, detergents colored Corrosion, pH, lead Corrosion of pipes, plumbing Rapid wear of water treatment pH, corrosion equipment Nearby areas of intensive Nitrate, pesticides, coliform agriculture bacteria Metals, pH, corrosion Coal or other mining operation nearby Gas drilling operation nearby Chloride, sodium, barium, strontium Odor of gasoline or fuel oil, and Volatile organic near gas station or buried fuel compounds (VOC) tanks Dump, junkyard, landfill, factory VOC, Total disolved solids (TDS), pH, sulfate, chloride, or dry-cleaning operation nearby metals

Salty taste and seawater, or a heavily salted roadway nearby

Chloride, TDS, sodium

# Water Testing and **Interpreting Your Results**

by Meg Burgett, Natural Resource Program Assistant Revised October 2007 by Fred Sorensen and Lisa Wedin, UAF/CES Water Quality Program

Units of Measure

full of water)

### What is the source of your water?

If you're like many Alaskans, your family's drinking water comes from a private, on-site well-your well. The health and well-being of your family

depends in a large part on the quality of water from that well.

Daily activities of those near your well have a direct impact on the quality of drinking water. To protect that water, your actions should minimize any risk to any surrounding wells.

Periodically checking your water supply will assure you that your efforts have been successful and the water your family is drinking is safe.

Water tests come in a variety of sizes and options. You can test your water for just a few indicators, or for a comprehensive analysis. As with all things,

> the more you ask for, the more it will cost you.

When deciding which tests are appropriate for you, make sure the most important indicators for your situation are selected, and that costs are kept reasonable. Frequently, labs will group the most common household tests

into a "package" for convenience. For an accurate assessment of the quality of your water, have it tested by a certified testing lab.

# Surface Water Surface Water Surface Water

The most commonly used unit of measure for

water tests is milligrams per liter (mg/l). Gener-

ally speaking, this is equal to one part per million

(ppm)—one part contaminant to one million parts

water. Some toxins are reported in even smaller units, parts per billion (ppb). (For a little perspec-

tive, one ppm would be approximately equal to

one or two grains of sugar dissolved in a bath tub

A few Alaskans, especially in rural areas, use surface water for their family's source of water. If you use surface water, you need to have a good water treatment system that includes disinfection and filtration, to be sure your water is safe to drink. Check with your local water treatment companies for different kinds of surface water systems, or contact the U.S. EPA for a copy of their publication, "Manual of Individual and Non-Public Water Supply Systems," for a description of surface water treatment methods.

Sometimes, a well can also have surface water influence. This means that the water on the surface is in direct contact with the groundwater supply. There are no hard and fast guidelines for determining when a well is surface water influenced. However, shallow wells (less than 30 feet) and wells close to surface water sources (less than 100 feet to the lake or creek) are more at risk of contamination by disease-causing micro-organisms frequently found in surface water. The quality of surface water supplies fluctuates much more than that of groundwater (well water) supplies. It is affected by changes in temperature, algal blooms, amount of rainfall and runoff, and the activities in the watershed. If your well is shallow or close to a surface water source, you should have it tested by a certified laboratory to determine if it is surface water influenced, or install a water treatment system that includes disinfection and filtration.







The following three tests address the most common and serious health concerns, and indicate the possibility of a contaminated water supply.

## BACTERIA

What is it? Bacteria occur naturally in the environment. While some are not harmful to human health, others such as fecal bacteria present a very serious health risk. Fecal bacteria belong to a group of bacteria called coliform bacteria. Labs routinely test for coliform bacteria to determine if your drinking water has been contaminated with surface runoff wastewater. Wastewater not only contains bacteria, but may also contain other microorganisms such as viruses and protozoa that are associated with severe illnesses.

Since not every bacteria can be reasonably tested, labs routinely test for coliform bacteria as an indicator of the presence of this type of contamination. This test is used to indicate the "potability" of drinking water. Coliform bacteria enter the environment through the discharge of untreated waste or runoff containing animal and/or human wastes.

Bacteria is most commonly a problem in surface waters. Bacteria, protozoa and viruses can cause severe illness if ingested. Viruses are commonly found in groundwater and the total coliform bacteria test is a good indicator. Their presence could signal a real threat.

Acceptable Level? If your drinking water tests positive for coliform bacteria, other organisms may be present also. You should take immediate steps to treat your water. To prevent illness, drinking water should be completely free of coliform bacteria.

Treatment Options? Bacteria can only be killed by disinfection (such as chlorine, more for cloudy water, less for clear, 8-10 drops/gallon), or boiling the water for several minutes (1-3 minutes) prior to drinking. Filtration can help improve the performance of disinfectants by reducing the numbers of micro-organisms, and by removing sediments that interfere with the disinfection process. Filtration alone cannot generally remove all microorganisms and should not be considered completely effective.

## **N**ITRATES

What is it? Nitrates are a major component of fertilizer and wastewater. They also result from the breakdown of organic matter buried in the soil. Excess nitrates in drinking water could be the result of a number of things: the overuse of fertilizers close to the well; the presence of septic effluent in the groundwater supplies caused by a failed or failing septic system or inadequate dilution or separation between the system and the well; or runoff containing animal wastes close to the well.

> Drinking water that has high levels of nitrate can cause a serious illness in infants under the age of six months. This condition is called methemoglobinemia or "blue baby" syndrome, and can result in death.

Acceptable Levels? Water with nitrate levels above 10 parts per million (ppm) nitrate as nitrogen (mg/l NO3-N), should not be given to children under the age of six months, or pregnant women. If your water has nitrate levels above 10 ppm, consult your physician before using the water for any drinking water purposes including making juice or formula.

Treatment Options? Nitrate is not readily removed by filtration or other common home water treatment systems. The best method for limiting nitrate in well water is by controlling nearby sources of nitrate.

#### **A**RSENIC



What is it? Natural ore deposits of arsenopyrite, a gold bearing mineral, may release arsenic to groundwater under anaerobic (no oxygen) conditions. Some stream sediments have also been found to contain arsenic, particularly those draining through placer mine tailings deposits. Naturally occurring arsenic has been found in groundwater wells in the Fairbanks area, on the Seward and Kenai Peninsulas and Southcentral Alaska around



Your water may contain other substances that while not dangerous to your health, can cause the water to be objectionable in some way.

Wasilla. It is a highly toxic contaminant and listed as a hazardous material. A suspected carcinogen, it is also a teratogen—capable of crossing the placental membrane into the metabolic system of unborn children. The actual toxicity to humans varies. Because it is slow to leave the body, arsenic is a cumulative substance.

Acceptable Levels? The maximum level for arsenic in drinking water is set at 0.01 ppm.

Treatment Options? Arsenic can be removed from drinking water by a number of available technologies, the choice of which depends on the amount of water to be treated, the amount of arsenic present, and the presence of other contaminants.

#### OTHER WATER PROBLEMS

Your water may contain other substances that while not dangerous to your health, can cause objectionable tastes or odors, or staining of appliances and fixtures. If these qualities are not desirable to your family, home treatment systems can eliminate any of these problems. To ensure that

you select the appropriate equipment for your home, the level of a number of minerals needs to be determined.

#### RON

What is it? Excess iron in groundwater supplies comes from the parent material of the soil around the well. It can cause a metallic taste, stain clothing and fixtures, and promote the growth of iron bacteria in the water system.

Iron is not considered toxic, but affects the appearance and palatability of the drinking water.

Acceptable Levels? An upper limit of 0.3 ppm of iron has been set for drinking water.

Treatment Options? Depending upon concentrations, iron can be removed by water softeners, or an iron filter with a greensand media and potassium permanganate as a regenerant.

MANGANESE



What is it? Like iron, manganese originates from the soil around a well. It typically produces black staining and can give water an off-taste. Manganese is not considered toxic but does affect the appearance and palatability of the water. Acceptable Levels? An upper limit of 0.05 ppm manganese has been set for drinking water supplies.

Treatment Options? Again, depending upon concentrations, manganese can be removed by water softeners, or an iron filter as described above.

#### HARDNESS

What is it? Hard water comes from elevated levels of calcium, magnesium and other similar substances

found in the soil around a well. Hard water will tend to deposit calcium carbonate (limestone) scale in plumbing systems, particularly on hot water or boiler heating elements. Soft water tends to be corrosive, dissolving metal pipes and fittings.

Acceptable Levels? There is no toxicity associated with hardness and no health standard has been established by the environmental regulatory agencies.

Treatment Options? Water softeners offer the best treatment method for hard or soft water.

The following table gives a subjective							
interpretation of relative hardness							
levels using the two most common							
units of measure for hardness.							
relative	ppm as	grains/					
hardness	CaCO <sub>3</sub>	gallon					
soft	0-75	0-4.39					
moderate	75-150	4.39-8.77					

150-300

>300

8.77-17.54

>17.54

hardness

very hard

hard

### HYDROGEN SULFIDE



What is it? Hydrogen sulfide can be present in ground water containing sulfur under anaerobic (no oxygen) conditions. It is also the product of a bacterial reaction in the presence of sulfate.

Hydrogen sulfide gives water a "rotten egg" taste and odor and is often more noticeable in hot water than cold water. In drinking water supplies it is normally present only at "nuisance" levels.

Acceptable Levels? Like hardness, no health standard has been established by the environmental regulatory agencies for this element.

Treatment Options? Hydrogen sulfide can be converted back to sulfate by any oxidant such as dissolved air, chlorine, or potassium permanganate used to regenerate iron filters. It can also be removed by a carbon filter. If air is used, the water must be detained in a tank and aerated with a diffuser similar to an aquarium. If the hydrogen sulfide is being produced by bacteria growing in the plumbing or treatment system, a thorough disinfection with chlorine is normally required to eliminate the growths.

## TESTING FREQUENCY



troleum products), it would also include any petroleum products), it would be advisable to have your water tested for Volatile Organic Chemicals (VOCs). A less expensive test, the BTEX (Benzene, Tolulene, Ethylbenzene and Xylene) test, will also detect the presence of spilled fuel oil. Have your water supply checked if you have drilled a second well or changed the pump or plumbing. Also have the water supply tested if there is new, or increased activity in your area that has the potential to contaminate a water supply.

#### FOR MORE INFORMATION:

For an excellent reference on this topic, check out <u>Plain Talk About Drinking Water: Questions and</u> <u>Answers about the Water you Drink</u> by Dr. James Symons.

If you have more questions concerning your drinking water or would like more information on this subject, contact your local offices of the UAF Cooperative Extension Service or the Alaska Department of Environmental Conservation.

Contact: Fred Sorensen Water Quality Agent University of Alaska Fairbanks Cooperative Extension Service phone: 907-786-6300 e-mail: dffes@uaa.alaska.edu website: www.uaf.edu/ces/water Contact: Alaska Department of Environmental Conservation Division of Environmetal Health Drinking Water Program phone: 907-269-7656 website: www.dec.state.ak.us/eh/dw For a list of certified water test labs in Alaska, check the Alaska DEC labs website at: http://www.dec.state.ak.us/eh/lab

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