Admiralty ENVIRONMENTAL 641 W. Willoughby Ave., Suite 301 Juneau, AK 99801 (907) 463-4415

HOME WELL TESTING
FREQUENTLY ASKED QUESTIONS

WHAT ARE THE SAMPLES TESTED FOR?
Samples are typically tested for the presence of the water quality indicator bacteria total coliform and E. coli as well as chemical contaminants such as Nitrate, Nitrite and Total Arsenic.

Any time you notice a significant change in your water quality, you should have it tested. A change in your water's taste, color, or smell is not necessarily a health concern. However, a change could be a sign of a contamination problem.

WHAT ARE TOTAL COLIFORM BACTERIA?
Total coliform refers to a group of bacteria which have common biochemical and structural features. Coliform bacteria are used as indicator bacteria for water quality and are typically found in the digestive systems of warm-blooded animals, soil, plants, and in surface water. They are easy to test for and their presence may indicate the presence of sewage and other disease-causing germs from human and/or animal feces.

WHAT DOES PRESENCE OF TOTAL COLIFORM MEAN?
Your test results may indicate total coliform is present. This group of bacteria typically does not make you sick, but can indicate the possible presence of other harmful bacteria and viruses.

WHAT IS *E. COLI*?
E. coli (Escherichia coli) is part of the fecal coliform sub-group within the total coliform group of bacteria. It is an indicator bacteria for water quality and is very common in the feces and digestive systems of humans and warm-blooded animals. *E. coli* is usually harmless. It is easy to test for and their presence may indicate the presence of sewage and other disease-causing germs from human and/or animal feces.

WHAT DOES PRESENCE OF *E. COLI* MEAN?
Your test results may indicate *E. coli* is present. This indicates fecal contamination in the sample and may mean feces and harmful germs have found their way into your water system. This can cause diarrhea and sickness. This test should not be confused with the test for the more dangerous
E. coli O157:H7.

WHAT ARE THE TREATMENTS FOR TOTAL COLIFORM AND *E. COLI* IN DRINKING WATER?
Boiling is one method for temporarily removing bacteria from water used for drinking, food preparation, dishwashing or tooth brushing. Water should be boiled vigorously for one full minute.

You must disinfect your well to eliminate bacteria. Chlorine, ultra-violet light or ozone treatments will kill or inactivate *E. coli* and other harmful germs in drinking water. If total

coliform bacteria are present, use chlorination to disinfect the well. It may be necessary to sterilize the well several times in order to remove the bacteria completely.

A licensed water treatment professional in your area can suggest and perform the appropriate treatment for your situation (see reference section below). Treatment systems must be properly maintained and should be tested regularly to ensure their effectiveness.

WHAT ARE NITRATE AND NITRITE?

Nitrate and nitrite are nitrogen-based chemicals which occur naturally in water, soil, plants and food. Nitrate and Nitrite are found more commonly in ground water than in surface water, and are two of the more commonly detected well water contaminants. The presence of nitrate in well water also depends on the geology of the land around your well. The most vulnerable wells are those in farm communities or areas with large numbers of aging septic tanks.

WHAT DO MY NITRATE AND NITRITE RESULTS MEAN?

Your test results may show levels of nitrate and/or nitrite. The EPA's maximum limit for nitrate in drinking water is 10 milligrams per liter (mg/L); for nitrite, the limit is 1 mg/L. The sum of the amount of nitrate and nitrite in drinking water should not total more than 10 mg/L. High levels of nitrate and/or nitrite is a potential health problem for new born infants and people on antioxidant medication.

WHAT ARE THE TREATMENTS FOR NITRATE AND NITRITE IN DRINKING WATER?

Do not attempt to remove nitrate and nitrite by boiling water, this will concentrate the contaminant. Treatments to reduce nitrate and nitrite include ion exchange, electro-dialysis and reverse osmosis processes. Distillation may also be used for smaller quantities of water. A well professional can help you select the right treatment. Water should be tested before and after installation of the treatment device and annually thereafter to confirm effectiveness.

WHAT IS ARSENIC?

Arsenic is a naturally occurring mineral found in soil and bedrock. Arsenic works its way into ground water through erosion. Wells that are in or just below large amounts of shale or shaley soil often have higher levels of arsenic in the water.

WHAT DO MY TOTAL ARSENIC RESULTS MEAN?

Your test results may show levels of Total Arsenic. The EPA's maximum contamination limit (MCL) for arsenic in drinking water supplies of 0.01 mg/L or 10µg/L. High levels of arsenic is a potential health problem and long term exposure to arsenic has been linked to a number of cancers.

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WHAT ARE THE TREATMENTS FOR ARSENIC IN DRINKING WATER?

Do not attempt to remove arsenic by boiling water, this will concentrate the contaminant. Arsenic is easy to reduce by ion exchange and reverse osmosis. Water should be tested before and after installation of the treatment device and annually to confirm effectiveness.

WHAT DOES A 'ND' RESULT MEAN?

ND stands for Not-Detected at the minimum reporting limit. Your results may also be reported as less than the minimum reporting limit, for example, Nitrite as N <0.1 mg/L. This means the level of contaminant present in the sample was not at a high enough level to report accurately, but was less than 0.1mg/L.

HOW DO CONTAMINANTS GET IN TO MY WELL WATER?

A private well uses ground water as its water source. There are many sources of contamination of ground water. Here is a list of the most common sources of contaminants:

- Decaying plants and naturally occurring chemical and mineral deposits (for example, arsenic, radon, uranium);
- Local land use practices (fertilizers, pesticides, livestock, animal feeding operations, biosolids application);
- Manufacturing processes (wood, paints, dyes, metals);
- Wastewater, sewer overflows, polluted storm water runoff;
- Malfunctioning wastewater treatment systems (for example, nearby septic systems)

WHY DOES MY WELL WATER HAVE A FUNNY SMELL OR TASTE?

A number of factors can cause water to look, smell or taste different, but it is generally safe to drink. If your water supply comes from a municipal treatment plant it is tested on a regular basis. Bad smells can come from drains and be mistaken for an odor from the water.

If your water smells or tastes unpleasant it should be tested for potentially harmful contamination. If you notice a sudden change in the taste or appearance of your water it should be tested as it may be an indicator of a more serious problem.

Methods to measure color, taste and odor are expensive and are fairly subjective and it is not always possible to identify or remove the odor or smell producing substance.

An odor or taste in water can be caused by:

- Organisms living in the water;
- Environmental contaminants;
- Chemicals used to remove organisms living in the water; and
- Concentrations of metal from the pipes used to deliver it.

WHAT ARE THE TREATMENTS FOR THESE CONTAMINANTS

Contaminant	Associated Color, Odor or Taste	Cause / Source
Aluminum	Blue color, odorless and tasteless	Aluminum salts are used as coagulants to purify municipal water taken from reservoirs.
Chloride	Salty taste	Chlorides are leached from various rocks into soil and water by weathering.
Chlorine	Bleach-like smell	Introduced into water from chlorination, the most universally used disinfectant and water purification method.
Copper	Blue-green or light yellow color, metallic taste	Comes from the pipes used to carry your well water If either are present your pipes may need to be replaced
Decay of plant material / algae blooms	Yellow color, musty, earthy odors and rotten eggs	Occurs when water filters through organic matter, mud, muskag and marshlands and rocks containing minerals such as pyrite and the water contains too much decomposing organic matter and there is not enough oxygen in the water. Although water treatment removes the algae and other organisms, smell and odor compounds may linger.
Foaming Agents	Frothy or cloudy appearance, oily, fishy or perfume like odor	Detergents and similar substances when water has been agitated or aerated.
Iron	Rusty brown color, sediment, metallic taste	Occurs when groundwater is brought to the surface and mixes with the air. Iron becomes less soluble and settles out as reddish iron compounds.
Lead	Colorless, odorless and tasteless	Sometimes used in household plumbing materials or in water service lines used to bring water from the main to the home. A prohibition on lead in plumbing materials has been in effect since 1986. Comes from the corrosion of household plumbing systems; and erosion of natural deposits. The amount of lead depends on the types and amounts of minerals in the water, how long the water stays in the pipes, the amount of wear in the pipes, the water's acidity and its temperature.
Sulfate	Rotten egg smell with a bitter or salty taste	Occurs naturally in many areas, and peaks during certain times of the year. Sulfates are discharged into water from mines and smelters and from pulp and paper mills. Atmospheric sulfur dioxide, formed by the combustion may contribute to the sulfate content of surface waters.

There are a number of removal technologies available to treat aesthetic problems with water;

- Identify source of contamination and prevent it entering the water source
- Manage pH of water to prevent pipe corrosion
- Filtration and flocculation to remove metals
- Aeration to remove odor and metals
- Granular activated carbon to remove odor, color and foaming
- Distillation, reverse osmosis and electro-dialysis to remove chloride, nitrates, total dissolved solids and inorganic substances

The success of a treatment system depends on the overall nature of the water supply.

REFERENCES

http://water.epa.gov/drink/info/well/index.cfm

http://water.epa.gov/drink/contaminants/

https://www.cdc.gov/drinking-water/safety/guidelines-for-testing-well-water.html?CDC_AAref_Val=https://www.cdc.gov/healthywater/drinking/private/wells/testing.html

http://www.watersystemscouncil.org/well-owners/

https://www.watersystemscouncil.org/water-well-help/wellcare-info-sheets/

- **Where your Water Comes From**
- **Testing**
- **Bacteria**
- **Nitrate and Nitrite**
- **Arsenic**
- **Disinfecting**

http://www.who.int/topics/drinking_water/en/