

FACTSHEET: IRON BACTERIA

INTRODUCTION

This factsheet provides basic information for private water well owners regarding iron bacteria in their well water. To determine if water is generally safe to drink, water test results are compared to the US EPA [Primary Drinking Water Regulations](#) table of contaminants, the EPA [Secondary Drinking Water Standards](#). The above standards only apply to public water systems, but the quality and health implications are the same for private well owners. In addition, the WDEQ has a set of standards (WQRR Chapter 8 Table 1) for water quality based on class of use, including domestic, agriculture and livestock. Keep your analytical results and your sampling documentation with your well information for future reference if there is a question about change in water quality.

WHAT IS IRON BACTERIA?

Iron bacteria are small organisms that occur naturally in the environment. They are very common and can be in soil, surface water and ground water. Iron bacteria combine iron, or manganese, with oxygen and produce a 'slime' that can build up on well screens, in piping, or plumbing fixtures. Iron bacteria can grow very quickly and make a well system almost useless in as little as a few months if the conditions are good for bacteria growth. Iron bacteria thrive in waters containing 0.5 to 4 milligrams per liter (mg/L) of dissolved oxygen, and as little as 0.1 mg/L of dissolved iron, and temperatures of 5 to 15° C. Water wells commonly have favorable conditions for the growth of iron bacteria.

Iron bacteria can also cause favorable conditions for the growth of sulfate-reducing bacteria. Sulfate bacteria can cause a 'rotten egg' odor due to the production of hydrogen-sulfide as a by-product.

IS THERE A WATER QUALITY STANDARD FOR IRON BACTERIA?

The short answer is, no. The EPA has not set a maximum contaminant level for iron bacteria, nor does Wyoming have a WQRR Chapter 8, Table 1 standard for iron bacteria. Iron bacteria are generally considered a nuisance issue. These bacteria are not known to cause disease or health issues, but may cause favorable conditions for other disease causing organisms to grow.

WHAT ARE SYMPTOMS OF IRON BACTERIA IN MY WATER?

Iron bacteria can be 'rust-orange,' brown or even red in color. They can build up and look like orange algae in lakes and streams, cause an orange film in toilet water tanks, or cause an 'oily'-looking sheen on water.



A problem with iron bacteria in well water is the buildup of slime or biofilm. The slimes are a by-product of the metabolism of iron or manganese. Biofilms can plug well screens, clog pump intakes, water filters, and piping.

In addition, iron bacteria can cause well water to:

- Have an unpleasant taste or odor commonly described as 'swampy', 'oily or petroleum-like', 'musty', 'sewage', or 'rotten vegetation'
- Reduced well yields due to biofilm buildup
- Slime build up in toilet tanks, piping, water filters, or well casing

- Cause red/orange, yellow or brown stains on fixtures or discoloration of white laundry
- Develop an oil-like sheen on standing water
- Corrode well casing, pump, or piping
- Reduced effectiveness of chlorine disinfection
- Lead to costly and difficult well rehabilitation

HOW DO I TEST FOR BACTERIA IN MY WATER?

If you suspect you may have iron bacteria in your well water, a list of certified labs can be found on the WDEQ Know Your Well Webpage (deq.wyoming.gov/wqd/know-your-well).

Contact your selected laboratory for testing procedures and sample bottles.

CAN IRON BACTERIA ISSUES BE PREVENTED?

Iron bacteria, especially a major infestation, can be very costly and difficult to deal with. The best protection is preventing iron bacteria from getting into your well during construction or maintenance. The following steps can be taken to help minimize the introduction of iron bacteria to your well:

- Use disinfected water during drilling, repair, priming or maintenance of pumps. Never use surface water.
- Ensure that your wellhead is watertight, properly capped, and sticks up above ground at least 12-inches.
- When equipment is removed from the well, it should be placed on a clean dry drop cloth and not the bare ground.
- Disinfect the well, pump and plumbing anytime work is done on the well or well equipment

WHAT CAN BE DONE TO CONTROL IRON BACTERIA PROBLEMS?

The information below is intended as an information source only. The WDEQ suggests you discuss appropriate water treatment

options with a qualified water treatment specialist, since other constituents in your water may affect the selection of the appropriate water treatment method.

Once in your well, it is impossible to fully eradicate iron bacteria, therefore after the initial treatment, well owners should do regular treatment for bacteria problems to minimize future growth. Common treatments for bacterial problems in well are:

- Physical removal
- Chemical treatment
- Pasteurization
- Shock chlorination

Physical removal is generally the first step done in heavily infected wells. This involves the removal and cleaning of all pump equipment and then the scrubbing of the well casing with brushes or other tools. This should be done by a licensed water well contractor or pump installer. Care needs to be taken after scrubbing of the well to ‘lift’ the bacterial material from the well, and not inject it into the formation surrounding the well.

Chemical treatment is commonly done after physical removal and involves the use of acids, surfactants, and disinfectants. Chemical treatments are used to try to penetrate the protective slime surrounding the bacteria. Due to the chemicals used, chemical treatment of a well should be performed by a water treatment specialist.

Pasteurization involves the injection of hot water or steam into the well and maintaining a water temperature of 140°F/60°C for a minimum of 30 minutes. This can be effective, but is expensive.

Shock chlorination is a type of chemical treatment and is most effective for treating minor bacterial issues or as maintenance after physical or chemical treatments. Due to the

protective 'slime' that iron bacteria forms, chlorination is not a good treatment for heavily infested wells. Shock chlorination involves the introduction of a strong chlorine solution into the well, allowing the solution to be recirculated through the piping back into the well, allowing the chlorinated water to sit in the household piping for 24-hours, and then flushing the chlorinated water from the system.

NOTE: Care should be taken when using chlorination in areas where Arsenic may be an issue. Chlorine can cause chemical reactions that may release arsenic from the surrounding geologic material.

REFERENCES

Colorado Department of Health and Environment, Laboratory Services Division, *Iron and Sulfur Bacteria in Water Supplies*
Minnesota Department of Health, Iron Bacteria in Well Water Well Management Program
National Groundwater Association, 2016, *Iron Bacteria What You Need to Know*
Smith, Stuart, Ground Water Science, *Primer on Microbial Problems in Water Wells*
Water Systems Council, Wellcare®, March 2017, Information for you about Iron Bacteria & Well Water