
ENVIRONMENTAL Fact Sheet



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Iron Bacteria in Drinking Water

Elevated levels of iron or manganese in water wells often give rise to the growth of iron bacteria. These organisms produce a filamentous, slimy deposit that can clog filters and plumbing components.

Types of Iron Bacteria

Iron bacteria include a number of organisms that obtain carbon from the carbon dioxide (CO₂) in the air and obtain energy from dissolved iron or manganese. Iron bacteria occur naturally in the soil and thrive when there is adequate food (i.e., iron and/or manganese). Iron bacteria are small, approximately 1-2 microns wide and 3-15 microns long. (A micron is one millionth of a meter.) Species of iron bacteria include: *Sphaerillus*, *Clonothrix*, *Crenothrix*, and *Leptothrix*.

Health Risk

Although iron bacteria can make water unsightly and cause an unpleasant taste and odor; there is no health risk associated with iron bacteria. There are also no health concerns regarding iron in drinking water. There is some concern, however, with very high levels of manganese in drinking water. The Department of Environmental Services has adopted a health-based groundwater quality standard for manganese of 0.84 mg/L. Because staining from manganese begins to occur at 0.05 mg/L, treatment to remove it is almost always performed at levels well below the health standard.

Problems

Iron bacteria can form an orange-brown slime on water fixtures and clog water use devices, sometimes to an extreme. The slime can build up on the ends of faucets, on the screens of laundry machines, on pump impellers, and on the insides of pipes and tanks. As the material builds and thickens over time, it can break off in a large mass, clogging the system or component. Iron bacteria can also cause the water to have an unpleasant taste or odor.

Origin of Iron Bacteria

Iron bacteria occur naturally in the environment. Although iron bacteria can be present in groundwater, they typically exist on the top of the ground in limited numbers because of a limited food supply. The most common origin for iron bacteria in wells is their entry during well drilling or pump installation operations. To prevent introducing bacteria of any kind into a well, the

drilling process and the installation of the submersible pump assembly must be kept clean and the well must be disinfected at the completion of any construction, maintenance, or pump work. Visit the Drinking Water and Groundwater Bureau's fact sheets webpage at www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm and scroll to fact sheets WD-DWGB-1-2 through 1-6 for information on proper well construction.

Laboratory Testing

Generally laboratory testing for iron bacteria is not necessary. Iron bacteria's presence can be easily confirmed using the following procedure:

Fill a clear glass container with water. Let the sample sit quietly allowing any discoloration to occur and settle to the bottom of the container. Once the settling has completed, visually examine the sediment. If the sediment appears as a rusty flour-like powder, it is likely that there are few, if any, iron bacteria in the water. If the sediment has a fluffy three-dimensional appearance (like strands of stained cotton fibers) then there is probably a substantial amount of iron bacteria present.

Treatment to Kill Iron Bacteria

Once introduced into a well, iron bacteria are difficult if not impossible to fully eradicate. Chlorination is the most practical method to kill or control iron bacteria. A well can be disinfected and iron bacteria killed by adding chlorine. For information on how to safely and properly disinfect a private well, visit the fact sheets webpage provided above and scroll to WD-DWGB-4-11, "Disinfecting a Private Well."

Treatment to Remove Iron or Manganese

There are two common methods for removing iron or manganese from water: water softening and oxidation/filtration. Where iron bacteria are present in the raw water, a sizeable pre-filter will be needed if a water softener is installed. If treatment by oxidation/filtration is chosen, no pre-filter is necessary. For information on water treatment options for the removal of iron and manganese, visit the fact sheets webpage provided above and scroll to fact sheets WD-DWGB-2-5, 2-12, 3-7 and 3-8.

For More Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at <http://des.nh.gov/organization/divisions/water/dwgb/index.htm>. All of the bureau's fact sheets are on-line at <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>.

Note: This fact sheet is accurate as of August 2010. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.