



## Hydrogen Sulfide in Drinking Water

### Origins of hydrogen sulfide

Hydrogen sulfide (H<sub>2</sub>S) occurs at objectionable levels in approximately 5-10 percent of water supply wells in Massachusetts. Bedrock wells experience the problem more than dug wells. Hydrogen sulfide can be formed naturally as a byproduct of the decomposition of organic material, possibly aided by the presence of sulfur-reducing bacteria. These bacteria are not hazardous to human health. Organic material is often prevalent in swampy areas, and when dissolved in water, breaks down to form many byproducts, including hydrogen sulfide. Hydrogen sulfide can also be produced by chemical reactions of soil and bedrock minerals containing sulfur.

There are many possible byproducts of these chemical reactions. Where there is sufficient oxygen available, these byproducts include water and sulfate; when there is not sufficient oxygen, then different byproducts are produced often having unpleasant taste and odor characteristics. If the water that recharges your bedrock or dug well has little dissolved oxygen, taste or odor problems are possible. A lack of oxygen is called an anaerobic condition.

### Hot water tanks:

It has also been reported that hydrogen sulfide can be produced within a hot water tank by complex chemical/ biological reactions that are related to the use of anticorrosion rods made of magnesium. These rods are used to prolong the life of the steel liner in a hot water tank. This possible explanation of the origin of hydrogen sulfide can be evaluated by comparing the hot water to the cold water. If there is no odor in the cold water, these corrosion protection rods could support the production of the hydrogen sulfide odor. To be very sure there is no odor from the cold water, you may need to agitate and slightly warm the "cold" water in a large flat bottom pan, since at higher temperatures, taste and odor characteristics are much more observable.

**Replacement of Anti-Corrosion Rods:** If the odor is only from the hot water system (the odor is not in the cold water taken directly from the well) and if there are magnesium corrosion protection rods, then an easy solution to the hydrogen sulfide may be possible. If the water is not corrosive, these rods may be removed permanently. Where the water is corrosive, DES suggests substituting aluminum protective rods for the magnesium. Replacement or removal of these rods, however, may void the tank warranty. Check with your hot water tank dealer.

### Health significance:

Hydrogen sulfide gas, at the concentrations found in drinking water, is not hazardous to health. Odor identification is imprecise and thus it is difficult to accurately and consistently characterize all the odor factors in water. Other odor characterizations (such as medicine, sweet) may indicate other types of chemical contaminants in the water that may pose a health risk.

**For more information** contact the Massachusetts Department of Environmental Protection or the Rowley Water Department at 978-948-2640 x101