



“Tip sheets helped us learn about our well water.”

Get Tip Sheets at www.rivelltesting.org:

- 14 Tip Sheets about harmful substances
- 10 Tip Sheets about treatment choices
- 3 Tip Sheets about other topics of concern

Well water is groundwater, meaning that it comes from the water stored in the earth and rocks below ground. Even though groundwater is *under* the surface, substances *on* the surface, such as gas from a lawnmower or animal waste, can seep down and pollute it. Some natural substances stored in rocks and soil can also affect the smell, taste, color, and safety of well water.

Sulfate and Hydrogen Sulfide in Drinking Water Wells

Sulfates: Natural minerals that may cause water problems

Sulfates are a “nuisance” rather than a health hazard, but may cause problems.

Hydrogen sulfide: A natural gas that produces a “rotten egg” smell and may cause water quality problems

You have likely smelled hydrogen sulfide — a rotten egg smell that sometimes comes from sewage treatment plants and human belly gas. In groundwater, it’s produced from natural processes of decay. Too much can cause water quality problems.

What problems can too much sulfate or hydrogen sulfide cause?

Sulfates in household drinking water can cause:

- **Loose bowels** — which can lead to the body not having as much water and fluids as it needs. This is mostly a concern for infants. Sulfates are not considered a health risk for adults.
- **Bitter taste** due to scale buildup in plumbing pipes
- **Dark slime** that can clog plumbing and stain clothing

Hydrogen sulfide gas is not usually a health risk in the amounts present in household water. But, it can cause:

- ▶ **Rotten egg smell** (which may be noticed most when water is first turned on or when hot water is used, perhaps in the shower)
- ▶ **Bad taste** in water and food and beverages
- ▶ **Corrosion** (wearing away) of metals such as iron, steel, copper, and brass This may affect plumbing.
- ▶ **Yellow or black stains** on kitchen or bathroom fixtures
- ▶ **Tarnish** on silverware or cookware



How will I know if I have too much sulfate or hydrogen sulfide in my well water?

Use a State-certified lab to test your water.

Find a list here: www.health.ri.gov/find/labs/privatewelltesting.

Compare the numbers and letters on your lab test results with the standards (limits) set by the United States Environmental Protection Agency (EPA).

- **Sulfate:** The EPA standard is a Secondary Maximum Contaminant Level (SMCL). SMCL is a water quality standard for *nuisance* substances, not a *health concern*.

EPA limit (SMCL) for sulfate:

250 mg/L (milligrams per liter)

250 ppm (parts per million)

- **Hydrogen Sulfide:** EPA sets no standards. This gas can produce the rotten egg smell and tarnish silverware at about 1 or 2 milligrams per liter or less. Since you can smell and taste it, there's no need to test to *find* it. But, you will need to test to find out *how much* is in your water. The amount helps determine which treatment method will work.

If sewage pollution is the suspected source, also test for bacteria.

How do sulfate and hydrogen sulfide get into well water?

- **Sulfates** occur naturally in soil and rocks. As water seeps down through them, it can dissolve sulfates into groundwater, the source of well water.
- **Hydrogen sulfide gas** also occurs naturally in groundwater and can come from many sources:
 - ▶ Plant materials rotting underground
 - ▶ Wells drilled in shale or sandstone or near coal or oil fields
 - ▶ Bacteria that eat sulfates and produce hydrogen sulfide as a by-product
 - ▶ Water heaters that contain magnesium rods to prevent corrosion. A chemical reaction can take place that turns natural sulfates in the water to hydrogen sulfide.

What can I do about too much sulfate or hydrogen sulfide in my well water?

Best treatment depends on how much and what form of sulfate or hydrogen sulfide your well water has. Choices may include:

- A whole-house treatment system if levels of these substances are high
- A treatment system installed at the kitchen sink for drinking and cooking water
- Buying bottled water
- Installing a new well

If the hydrogen sulfide is a result of sulfur bacteria in the pipes, you may be able to disinfect with household bleach (“shock treat”) to kill the bacteria. But, they will likely come back.

If the rotten egg odor is only present in hot water, it may be due to a magnesium rod in your water heater. Replacing it with an aluminum rod should solve this.

Treatment systems used, depending on amount to be treated:

- ▶ Activated carbon— Tip Sheet 17
- ▶ Aeration— Tip Sheet 18
- ▶ Iron removal filter— Call us
- ▶ Oxidizing chemicals— Call us

Important: Before you install a treatment system, call us for expert advice. *Before* you buy a system, ask how it will be installed and whether installing costs extra. Get at least 3 price quotes. *After* you buy a system, be sure to:

1. Keep all the paperwork and directions.
2. Learn what you must do to maintain the system and do it.

Learn more

Get Tip Sheets about choosing and buying water treatment systems at www.riwelltesting.org.