

Penn State **Extension**

Common Drinking Water Problems and Solutions

<u>Symptoms in Water</u>	<u>Common Causes</u>	<u>Possible Solutions</u>
Grayish white film in sinks, tubs, dishes, reduced suds in laundry, frequent failure of water heater elements, scale in teapots.	Hardness due to calcium and magnesium dissolved from bedrock. There is no drinking standard but a hardness level above about 120 mg/L ¹ or 7 grains per gallon is most likely to cause these symptoms.	Ion exchange water softener (exchanges calcium and magnesium for sodium or potassium).
Water which is initially clear but produces brown, orange or reddish stains or sediment, metallic tasting water.	Iron dissolved from bedrock or from nearby disturbance (mining, etc.). Iron above the drinking water standard (SMCL ²) of 0.3 mg/L is most likely to cause these symptoms.	Water softener (low to moderate concentrations of iron if recommended by manufacturer) or oxidizing filter for higher concentrations (pH adjustment of water may be necessary). Manganese concentration should also be considered when choosing treatment (see below).
Black specks or black stains, metallic tasting water. Standing water (tub or toilet tank) may appear gray or black.	Manganese dissolved from bedrock or from nearby disturbance (mining, etc.). Manganese above the SMCL of 0.05 mg/L will cause these symptoms.	Water softener (low concentrations of manganese if recommended by manufacturer), oxidizing filter for higher concentrations (pH adjustment of water may be necessary to optimize removal).
Salty taste, corrosion of metals.	Chloride dissolved from bedrock or from various local activities (road salt, gas drilling brines, etc.). Chloride above the SMCL of 250 mg/L is most likely to cause these symptoms.	Reverse osmosis or distillation systems at individual taps. As chloride is very difficult to remove from water, consider developing new source of water.
Orange or opaque gelatinous film or strands coating toilet, and sinks, musty odor. Oily film on water surface (see also page 2).	Iron bacteria . There is no drinking water standard for iron bacteria in water but any presence of these bacteria can cause these symptoms.	Shock chlorination of well, continuous down-well chlorination using pellet drop-pers in severe cases. Follow-up with multi-level media unit. Carbon filtration may be needed to reduce chlorine.
Gurgling or bubbling noise in well, spurting faucets, white gas bubbles in water.	Dissolved gases in water (methane, ethane, carbon dioxide) from natural sources or from mining/gas drilling. There are no standards for these gases. Methane concentrations above 28 mg/L are most likely to cause these symptoms.	Continue routine testing if concentrations is below 7 mg/L. Install vented well cap above about 7 mg/L and aeration system for higher concentrations (above about 28 mg/L).
Rotten egg odor in cold and hot water, black greasy stains.	Hydrogen sulfide, sulfides, sulfate reducing bacteria in groundwater. There is no standard but any amount can cause these symptoms. NOTE: odor at one sink may be caused by bacteria in drain rather than water (disinfect drain to remove odor).	Shock chlorination of well (in some cases), oxidizing filter, continuous chlorination and filtration. Activated carbon filtration may be used for less severe cases.
Rotten egg odor in hot water only.	Hydrogen sulfide generated by a chemical reaction with anti-corrosion magnesium rod (often called the "anode rod") in hot water heater.	Remove and omit rod or replace with alternate metal rod (caution: removing rod may void the heater warranty).

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Turbid, cloudy, or dirty water.	Measurable concentrations of total suspended sediment (TSS) or turbidity caused by silt, sediment, and clay from runoff or nearby earth disturbance or drilling activities. May also originate from oxidized metals (iron above 0.3 mg/L and/or manganese above 0.05 mg/L) that are naturally occurring or from mining.	Cartridge or bag element filtration (less severe cases) or multi-level media filtration (more severe cases).
Oily film floating on water (see also iron bacteria discussion on page 1).	Variety of substances including fuels, motor oil, lubricating oil, cooking oil, animal-derived fats and decomposition of natural organic matter. There are various water tests including Oil&Grease , and total petroleum hydrocarbons (TPH) .	Whole house series-activated carbon filtration. Ongoing testing may be necessary to determine frequency of replacing carbon in the filter.
Blue-green stains in sinks and tubs, metallic tasting water, pin-hole leaks in pipes, corroded fixtures.	Corrosive water generally caused by low pH and low total dissolved solids —can be natural or related to mining activity. Stains are caused by copper (and possibly lead) leached from plumbing. Water with a negative LSI (Langlier Saturation Index) will cause these symptoms.	Acid neutralizing filter, soda-ash injection or replace metal plumbing with National Sanitation Foundation (NSF) approved plastic components.
Bitter; medicinal taste; scaly deposits; laxative effects; may result in rotten egg odor.	Sulfate dissolved from bedrock or caused by nearby coal mining. Sulfate levels above the SMCL of 250 mg/L will cause these symptoms.	Anion exchange (chloride concentration may complicate treatment), reverse osmosis for small quantities of drinking water.
Persistent gastrointestinal illnesses, odor may or may not be present.	Coliform bacteria, fecal bacteria, E. coli bacteria from runoff, septic systems, animals, poor well or spring construction. All of the bacteria have a MCL ³ of less than 1 colony per 100 mL so any detectable level of these bacteria can cause these symptoms.	Shock chlorination of well. Ultraviolet light, chlorination or ozonation system for persistent occurrence.
Pink slime on fixtures, toilet waterline, or sink/shower surface.	Airborne bacteria (<i>Serratia marcescens</i>) growing on surfaces that are regularly moistened	Not a water problem. Clean and dry surfaces frequently, use chlorinated cleaner.

¹mg/L stands for milligrams per liter. This is a common water testing measurement and is equal to ppm or parts per million.

²SMCL stands for Secondary Maximum Contaminant Level—set by EPA for aesthetic problems (tastes, etc.) in drinking water.

³MCL stands for Maximum Contaminant Level—set by EPA for health-related issues in drinking water supplies.

Water test results from a state accredited laboratory should be used to confirm causes and severity to determine the most efficient treatment processes. Testing may also determine other problems that are masked by obvious symptoms. Penn State Extension has many publications that provide more details about all aspects of managing private water wells and springs. Contact your local Penn State Cooperative Extension office or consult our Water Resources Extension web site at <http://extension.psu.edu/water>

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