Copper

Copper is a reddish-brown metallic element that is considered an essential nutrient in the human diet. It is also commonly used in brass, coins, pipes, and electrical wiring. Copper is rarely found in high concentrations in groundwater, but can find its way into drinking water through corrosion of pipes. The degree to which copper plumbing will corrode and introduce copper into drinking water depends on the corrosivity of the water. Corrosive water generally has a low pH but other factors such as temperature and conductivity also play in.

Health Effects from Copper
The US Environmental Protection Agency has set 1.3 mg/L as a drinking water standard for copper. This standard only regulates public water systems, but the health implications are relevant for private well owners. High concentrations of copper can cause vomiting, diarrhea, stomach cramps and nausea. Copper has also been shown to cause liver and kidney damage. Children under one year of age and people with Wilson’s disease are particularly vulnerable to the toxic effects of copper.

Treating for Copper
Hot water will leach more copper from plumbing than cold water, therefore avoid using water from the hot water tap for cooking or drinking. Flush the cold water line by running water through the lines for a few minutes before collecting drinking water. You can collect the flushed cold water to rinse dishes or water plants and then fill jugs for drinking water that can be stored in the fridge.

Alternative choices include:
- replacement of copper plumbing with CPVC or other alternative materials that meet local code
- water treatment with a neutralizing tank filter or caustic liquid treatment to reduce corrosivity of water
- removal of copper by installing an adsorption (i.e. carbon or charcoal), reverse osmosis, or distillation system at the drinking water tap

Additional Resources:
- USEPA Maximum Contaminant Levels and Fact Sheets http://www.epa.gov/safewater/mcl.html
**Lead**

Lead is very soft bluish-gray metallic element. It is commonly used in batteries, cable covering, ammunition, gasoline additives, radiation shielding equipment, glass production, and traditionally in paints and solder for plumbing. Lead has been found in moderately high concentrations in natural waters, but usually lead in drinking water comes from plumbing. The degree to which lead from pipes, solder, and fixtures will corrode and introduce lead into drinking water depends on the corrosivity of the water. Dissolved oxygen and low pH are common causes of lead corrosion.

**Health Effects from Lead**
The US Environmental Protection Agency has set 0.015 mg/L as a drinking water standard for lead. This standard only regulates public water systems, but the health implications are relevant for private well owners. High concentrations of lead can cause kidney damage, high blood pressure, and brain damage. Effects can be more severe in children causing delays in physical and mental development.

**Treating for Lead**
Hot water will leach more lead from plumbing than cold water; avoid using water from the hot water tap for cooking or drinking. Flush the cold water line by running the water for a few minutes before collecting drinking water. You can use cold water to rinse dishes or water plants and then fill jugs for drinking water that can be stored in the fridge.

Alternative choices include:
- replacement of copper plumbing with CPVC or other alternative materials that meet local code
- water treatment with a neutralizing tank filter or caustic liquid treatment to reduce corrosivity of water
- removal of copper by installing an adsorption (i.e. carbon or charcoal), reverse osmosis, or distillation system at the drinking water tap

**Additional Resources:**
- USEPA Maximum Contaminant Levels and Fact Sheets  
  http://www.epa.gov/safewater/mcl.html
- World Health Organization Information  
  http://www.who.int/water_sanitation_health/diseases/lead/en/
- NSF International Home Water Treatment Devices  