FOOTHILLS
HEALTH DISTRICT

Division of Environmental Health
N.C. Department of Environment, Health, and Natural Resources
and Your Local Health Department

COMMON PROBLEMS ASSOCIATED WITH PRIVATE WATER SUPPLIES AND A GUIDE TO WATER QUALITY CONTROLS

Excessive amounts of iron and maganese compounds in water are very noticable because of the staining problems they can cause. Iron causes a reddish-brown stain and maganese causes a brownish-black stain, both of which may color clothes, cooking utensils, and kitchen and bathroom fixtures. Water containing these elements in excess can have a disagreeable metallic taste, and coffee and tea made with this water are black instead of brown and have a bad flavor.

Water with a pH below 6.8, slightly acidic water, is often corrosive and can cause rapid deterioration of metal parts of the water and sewage system and water-using appliances such as dishwashers, washing machines, and cooking utensils. Acid water dissolves iron from galvanized pipes, causing rusty stains, and produces blue or green stains from copper pipes.

Sulfur water, or water containing dissolved hydrogen sulfide gas, is most easily recognized by the characteristic “rotten egg” odor and taste. It combines with iron and maganese to cause black water tht stains clothing, fixtures, and cooking utensils. It turns silverware black, corrodes pipes and plumbing fixtures, and in some instances, ruins paint and wallpaper.

Taste, odor, color, or turbidity problems can also affect water supplies. These are troublesome, as they affect the individual and the use he makes of the water.

Sewage contamination is recognized only by the diseases that might result from drinking impure water. A glass of water may be bright and clear but may be loaded with disease-producing organisms. Some common diseases caused by drinking impure water are polio and hepatitis. Others that may come from impure water are typhoid fever, cholera, and dysentery. If coliform microorganisms are present in water, this is an indication of sewage contamination. High levels of nitrates and chlorides can also indicate sewage contamination.

All water quality control equipment costs money initially, and also to operate and maintain, but bad water is also costly. The first thing to do toward solving a bad water problem is to have the water analyzed. This should consist of two types of analyses – bacteriological analysis to determine sewage contamination and chemical analysis to determine chemical or mineral content. The chemical analysis can be made by the local water quality control equipment dealer; the Division of Laboratory Services, N.C. Department of Environment, Health, and Natural Resources; or a private laboratory. The bacteriological analysis can be made by the Division of Laboratory Services, NCDEHNR, or a private laboratory. Samples submitted to the Division of Laboratory Services, NCDEHNR, should be taken by your environmental health specialist from your local health department or a licenses physician. Once the result of the analysis is obtained, the proper equipment can be installed to adequately treat the water.

A competent, reliable dealer should be selected to install the equipment suited to the

particular needs. Water quality control equipment should be installed in a definite sequence. If there is an acid condition, the water must be neutralized; then any iron, maganese, or hydrogen sulfide must be oxidized and filtered out. If hardness is present, it can be removed by a water softener. Taste, color, odor and bacteriological contamination may be removed at several places in the sequence. Suggested treatement schemes are given in Table 1.

Impurities	***Problem***	***Remedy***
Hardness	Scale in pipes and water heaters, causes curd on dishes and fabrics, dulls hair.	0-3gpg* (0-50ppm) – None 3-20 gpg (50-300ppm) – Softener 20+ gpg (>300 ppm) – Softener (Large Capacity or automatic)
Iron and Maganese	Discolors water, stains plumbing fixtures and fabrics, destroys good flavor of coffee and tea.	0 to .3 ppm** - None 0.3 to 2 ppm – Softener when in hard water. 0.3 to 3 ppm – Polyphosphate feeder followed by softener 3 to 10 ppm – Oxidizing filter 3 to 25 ppm – Chlorination or aeration followed by filtration Iron Bacteria – Chlorination followed by filtration
Acid Water (low pH)	Corrosion, attacks pipes and tanks; red stains from galvanized pipe; blue-green stains from copper.	pH 6.2 to 6.8 – Neutralizer pH below 6.2 – Soda ash feeder
Hydrogen Sulfide	“Rotten Egg” taste and odor. Turns silverware black.	0.5+ - Chlorination followed by filtration 0.5 to 5 ppm – Oxidizing Filter
Suspended matter; color in water	Cloudy, muddy, dirty water	Sand Filter
Taste and odor	Water not desirable for drinking.	Remove source of bad taste or odor, then chlorination followed by filtration.
Bacteria (Coliform)	Source of disease. Unfit for human consumption.	Remove or correct source of bacteria, then superchlorination, dechlorination.
Nitrates	Health hazard in amount 10ppm (n)	Ion Exchange
Chlorides	Health hazard in amount 250ppm (Cl)	Ion Exchange

*gpg = grain per gallon (1 gpg = 17ppm)
**ppm = parts per million

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