National Testing
Laboratories, Ltd.
Quality Water Analysis

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# *CORRECTIVE ACTION BROCHURE*

Water, our most precious commodity, never wears out BUT it can become contaminated. The safety of our water cannot be taken for granted and testing your drinking water is an excellent way to monitor it. Although water may look, smell and taste fine, it may be harmful to your health. Fortunately for us, it is possible to treat almost any water problem with proper treatment equipment. This can be done safely, reliably, and at a reasonable cost. This brochure provides a handy reference to help improve your water through information and suggested treatment. It addresses parameters covered in all of our informational tests; therefore, your individual report may not include all of the following items.

## HOW TO INTERPRET YOUR RESULTS

Your report has the following six columns:

| | |
|---|---|
| Status | The symbols in this column provide a quick indicator of the results for each contaminant. See the "Definition and Legend" section on the report for the description of each symbol. |
| Contaminant | This column list the name of each contaminant tested. |
| Results | This column indicates the actual amount of each contaminant found in the sample. If nothing is found above our minimum detection level, the report shows "ND", and stands for "None Detected". |
| Units | Unless otherwise indicated, results and standards are expressed as an amount in milligrams per liter (mg/L), sometimes referred to as parts per million. |
| National Standards | This informational water quality report compares the actual test result to national standards as defined in the EPA's Primary and Secondary Drinking Water Regulations. See the "Definition and Legend" section on the report for more details. |
| Min. Detection Level | The smallest quantity of a contaminant that our instruments can detect. |

## COLIFORM BACTERIA

Coliform Bacteria are groups of bacteria that indicate the possible presence of infectious disease organisms. It is recommended that water with coliform bacteria not be consumed until the problem is resolved. Coliform bacteria may get into the water supply through surface water run-off, especially after heavy rainfall. Fecal coliform, when accompanied by high nitrate and sulfate levels, may indicate a septic system or other fecal pollution source. Coliform bacteria present at a public water supply user's faucet may be a result of water and sewage pipes being cross connected causing plumbing backflow. In the microbiological section of your report, you will see a brief narrative indicating the presence or absence of coliform bacteria. If you have a positive result for coliform, the narrative will note the presence or absence of E. coli bacteria. E. coli (a subset of fecal coliform) is a type of coliform bacteria that is indicative of human and animal feces contamination. This narrative may also indicate that the results may be invalid due to lack of collection information or because the sample has exceeded the 30 hour holding time. The most common cause for this is that the date and/or time collected was not properly noted on the paperwork sent back to the laboratory with the sample. Another common cause is that the sample was not returned to the laboratory by overnight delivery service, or there was a delay by the overnight carrier.

**Recommended Treatment**: Chlorination, Ozonation or Ultraviolet Light. Instructions for disinfection of a well can be found at the end of this brochure.

**PLEASE NOTE:** When elevated levels of the following contaminants are found in your water, consulting the local health department, a physician or a local water treatment specialist may be advisable.

## ALKALINITY

Most natural drinking water has an alkalinity in the range of 10 to 500 mg/l. Alkalinity in drinking water is due largely to the presence of sodium, calcium, and magnesium carbonates.

## ALUMINUM

The fourth most common element in the earth's crust, aluminum is naturally present in drinking water and is added as a chlorination preparation at water utilities. Most of what is added is usually removed, but a residue may sometimes be passed into treated water. Aluminum may cause discoloration of water.
**Recommended Treatment**: Distillation or Reverse Osmosis

## ARSENIC

Arsenic in water can result from both natural process and industrial activities, including smelting operations, use of certain pesticides, and industrial waste disposal. Arsenic compounds have been shown to produce acute and chronic toxic effects which include systemic irreversible damage. The EPA has classified it as a known human carcinogen.
**Recommended Treatment**: Reverse Osmosis, Distillation, or Activated Alumina Absorption

## BARIUM

Barium is a naturally occurring metal found in many types of rocks. In stream water and most groundwater, only traces of the element are present. It is also used in oil and gas drilling muds, automotive paints, bricks, tiles and jet fuels. Exposure has been associated with hypertension and toxicity in animals.
**Recommended Treatment**: Distillation or Reverse Osmosis

## CADMIUM

Cadmium is found in very low concentrations in most rocks, as well as in coal and petroleum and often in combination with zinc. It is introduced into the environment from mining and smelting operations. Other cadmium emissions are from fossil fuel use, fertilizer application, sewage sludge disposal or galvanized pipe corrosion. Acute and chronic exposure to cadmium in animals and humans may cause hypertension, anemia, and kidney effects.
**Recommended Treatment**: Distillation or Reverse Osmosis

## CALCIUM

Calcium exists in soil and rock such as limestone, dolomite and gypsum. Drinking water contributes only a small amount of the required daily intake. Concentrations as great as 1800 mg/l of calcium in water are reported harmless. It can be a nuisance as it contributes to the hardness of the water and build up on pipes or water heaters may inhibit their performance. Low levels can be helpful as it tends to form a coating on pipes which may prevent corrosion.
**Recommended Treatment**: Water Softener

## CHLORIDE

Chloride in water can be a residual of chlorine and has been attributed to use of salt to de-ice roads. Other sources of chloride in ground water may be related to sea water trapped in sediments. High levels can contribute to corrosivity of plumbing and may be accompanied by high sodium levels which may be a health concern.
**Recommended Treatment**: Reverse Osmosis

## CHROMIUM

Chromium is a naturally occurring metal. It is often used in electroplating of metals. Although chromium is not currently mined in the U.S., waste from old mining operations may enter surface and ground water through runoff and leaching. Exposure at high levels has been shown to result chronic toxic effects such as dermatitis, ulceration of skin or liver, and kidney damage in animals and humans by ingestion.
**Recommended Treatment:** Distillation or Reverse Osmosis

## COPPER

Water can be a significant source of copper intake depending upon the geographic location, water character, water temperature, and the presence of copper pipes. At concentrations above 1mg/l, copper can stain laundry and plumbing fixtures. Copper can also cause a greenish/blue tint to blond hair. Copper is an essential element at lower levels but levels above 5 mg/l can cause gastrointestinal disturbances or other acute toxic effects.
**Recommended Treatment**: Distillation, Reverse Osmosis, or "Soda Ash" Feed

## FLUORIDE

Fluoride is naturally occurring and may be added to municipal water systems. At an optimum level of 1 mg/l, it has been shown to be effective in reducing dental cavities. Levels over 2 mg/l may cause mottling of teeth in normal individuals living in a temperate climate. Federal law requires a community well system to notify users when monitoring indicates that fluoride in the users' water exceeds 2 mg/l. The current allowable level is 4 mg/l. Your family dentist should be notified of your fluoride level.
**Recommended Treatment**: Distillation, Reverse Osmosis, or Activated Alumina

## HARDNESS

Hardness is usually caused by the presence of calcium and magnesium in water. They can combine with soap to form a scum on water and a ring around the tub. You may find larger amounts of soap are required to form washing suds.
**Recommended Treatment**: Water Softener – To convert your results from mg/l to grains per gallon, divide your hardness results by 17.1

## IRON

Iron in drinking water is a very common problem. It occurs naturally from rock or can be introduced by plumbing materials. When iron comes in contact with oxygen, it changes to a reddish compound that can discolor bathroom fixtures and laundry. At this time, there are no known health effects from elevated iron in drinking water.
**Recommended Treatment**: Water Softener, Oxidation and Filtration, or Distillation

## LEAD

The main source of lead in drinking water is leaching from lead piping and lead solders. Lead enters primarily in areas having soft, acidic waters. When elevated lead levels are found, consult a physician. Children and fetuses are especially sensitive to lead poisoning.
**Recommended Treatment**: Distillation, Reverse Osmosis, or "Soda Ash" Feed

## MAGNESIUM

Magnesium is commonly found in rocks such as granite, sandstone, limestone and dolomites. High levels can be a nuisance contributing to the hardness of the water and inhibiting performance of pipes and water heaters.
**Recommended Treatment**: Water Softener

## MANGANESE

Manganese in water is a common, naturally occurring problem but can also be introduced by industry. It can produce a brownish discoloration and have a very unpleasant odor and taste. It may produce black deposits and black filaments. Chlorine bleach should not be used in laundry washed in water with a high iron or manganese content because it can cause stains to set. Currently known cases of manganese poisoning have occurred at elevated levels much higher than levels found in most natural water.
**Recommended Treatment:** Water Softener, Oxidation and Filtration

## MERCURY

Mercury is one of the least abundant elements in the earth's crust. This metal is used in electrical equipment and some water pumps. It usually gets into water as a result of improper waste disposal. Exposure at high levels may result in kidney disease or central nervous system problems.
**Recommended Treatment**: Distillation or Reverse Osmosis

## NICKEL

Nickel is not commonly found in nature as a pure metal. Nickel is often used in electroplating, stainless steel and alloy products. It generally gets into water from mining and refining operations. The absorption of dietary nickel from the gastrointestinal tract appears to be quite low, with the majority of nickel passing through the body.
**Recommended Treatment**: Distillation or Reverse Osmosis

## NITRATE and NITRITE

Nitrates occur naturally; however, the major sources of nitrates or nitrites in drinking water include fertilizer, sewage and feedlots. The toxicity of nitrate in humans is due to the body's reduction of nitrate and nitrite. These contaminants can cause methemoglobinemia (blue baby syndrome). Therefore, notifying your baby's pediatrician of these levels is advisable.
**Recommended Treatment**: Distillation, Reverse Osmosis or Ion Exchange Systems with Nitrate Specific Resin.

## pH

pH is a measure of the hydrogen ion content of water. The suggested level is a range of 6.5 – 8.5. A value of 7 is neutral, which is the ideal. Values lower than 7 are called "acidic" and values above 7 are called "basic" or "alkaline". A pH difference of one actually represents a tenfold difference in acid or base content. Acidic water dissolves metals readily and can be corrosive to plumbing which can increase the amount of toxic metals leaching into the water. Drinking water with a high pH by itself is not necessarily a problem, although the underlying cause may be a health concern.
**Recommended Treatment**: Low pH: Neutralizing Chemical Filter, "Soda Ash Feed", or Limestone Tank

## PESTICIDE, HERBICIDE AND PCBs

A common route for pesticides, herbicides and PCBs to reach your water is through runoff from surface water and leaching into ground water. Pesticides are used to control insects and other "pests". Certain pesticides have been banned but may still be found in the environment. Some herbicides may be used to control algal blooms in reservoirs and general weed control. PCBs were once widely used in electrical transformers and industrial equipment. There may be a range of health effects related to the nervous, respiratory, or reproductive systems, as well as the heart, liver or kidneys. Also, some PCBs are probable carcinogens.
**Recommended Treatment**: Granular Activated Carbon

## SELENIUM

Selenium is found naturally in food and soils. It is used in electronics, photocopy operations, glass manufacturing, chemicals, drugs, and as a fungicide and feed additive. It can cause dermatitis or affect the nervous system.
**Recommended Treatment**: Distillation or Reverse Osmosis

## SILVER

Silver is a relatively rare metal originating from natural sources and from industrial waste. The only adverse effect resulting from chronic exposure to low levels of silver in animals and humans is a blue-gray discoloration of the skin and internal organs.
**Recommended Treatment**: Distillation or Reverse Osmosis

## SODIUM

Sodium in water can come from geological sources, road salt or as a result of using a water softener. A guidance level of 20 mg/l in drinking water is suggested by the EPA for the high risk population of hypertensive and heart patients. If your sodium intake is being monitored, consult your family physician for advice.
**Recommended Treatment:** Distillation, Reverse Osmosis, or Demineralization

## SULFATE

Sulfate is found in almost all natural water. It may enter through waste discharges and may indicate septic leaching into the water supply. Sulfate presence can cause a pungent odor and taste in drinking water and may have a laxative effect.
**Recommended Treatment**: Oxidation and Filtration, Distillation or Reverse Osmosis

## TOTAL DISSOLVED SOLIDS

TDS values are a measure of the amount of solids dissolved in your water. If you left a small amount of coffee in a cup for a few days, the water would evaporate and the dissolved solids would stay behind. The TDS value is derived from certain items on your report and possibly other soluble substances.
**Recommended Treatment**: Distillation or Reverse Osmosis

## TRIHALOMETHANES

Trihalomethanes (THMs) are in many water supplies, especially municipal water supplies where it may be formed as a by-product of the reaction of chlorine and organic matter. The most common THM, chloroform was one of the earliest anesthetics, but is no longer used for this purpose because of its toxic side effects. It is used widely as a solvent in industry. This group of compounds can effect the nervous system and muscles and may be carcinogenic.
**Recommended Treatment**: Granular Activated Carbon

## TURBIDITY

Turbidity in water is caused by suspended matter, such as clay, silt, fine particles of organic and inorganic matter, and microscopic organisms. A turbid sample may not appear clear to the naked eye.
**Recommended Treatment**: Distillation, Reverse Osmosis, or Cartridge Filtration

## VOLATILE ORGANIC CHEMICALS (VOCs)

This group of chemicals can be described by their behavior. They readily "evaporate" into the air at very low temperatures. For example, gasoline contains VOCs. If you have ever pumped gas and spilled it, especially on a warm day, it disappears very quickly into the air and you can smell it very strongly (similar to applying perfume to skin). VOCs can exist in water and a small increase in temperature will release them into the air (for example taking a hot shower). It may be in your interest to investigate the source of any presence of these compounds in your water.
**Recommended Treatment**: Aeration or Whole House Carbon Filtration

## ZINC

Zinc is considered an essential element in human and animal nutrition. It may come from industrial contamination or corrosion of plumbing. In concentrations over 5 mg/l, zinc produces an objectionable taste and may cause water to appear milky, or upon boiling, to seem to have a greasy surface scum. Cases of zinc poisoning have been reported from prolonged consumption of water at concentrations of 40 mg/l.
**Recommended Treatment**: Distillation or Reverse Osmosis

## DISINFECTING A WELL (from Ohio Department of Natural Resources)

1. Remove well cover. Pour the required amount of bleach into the well. SEE TABLE BELOW.
2. Run ALL faucets in the house, one at a time, until you smell the chlorine at the faucet. This ensures that the whole system will be disinfected.
3. Connect a garden hose to an outside tap or an indoor tap with the correct thread fitting. Put the other end of the hose into the well, turn on the faucet, and from time to time move the hose so that the chlorinated water bathes the sidewalls of the well casing. Do this for at least six hours. Turn off tap and remove the hose from the well.
4. Replace the well cover
5. DON'T USE THE WATER for at least twelve hours. Forty-eight hours in optimal.
6. Run the water to waste but NOT IN THE SEPTIC SYSTEM for several hours, or until the chlorine taste is dilute enough to be unobjectionable. The best way to run the water to waste is to use the garden hose mentioned above (item 3). Direct the hose into an area where the chlorinated water will not cause environmental damage or affect the water supply of others. For a typical well, this may take 3-4 hours.

   NOTE: To avoid pump overheating and possible damage, turn off the water when flow is at a trickle and wait at least 15 minutes before turning on the pump again
7. After a week of use, retest for bacteria.

8. In some cases, one chlorination treatment WILL NOT be sufficient. Repeat disinfection procedures as needed.

| Well Depth | Amount of Liquid Household Bleach |
|---|---|
| Up to 150 ft. | One Quart |
| 151 to 300 ft. | Two Quarts |
| Over 300 ft. | One gallon and 1 cup on crushed swimming pool tablets |

**FINALLY....**

Be aware of activities in your community that can put your drinking water at risk. Talk to your neighbors to determine if problems with your drinking water are individual or community-wide. Check out the history of the area in which you live to determine if past activities are having a present impact on your drinking water.