

Possible *contaminants*

What could be wrong *with my water?*

Drinking contaminated well water can make you and your family members ill. It can even be fatal, especially for the young and the elderly.

Even though your water may appear to be fine, there are many possible contaminants that you can't taste, see, or smell. Here are a few possible contaminants:

Total Coliforms Coliforms are bacteria that live in the intestines of humans and animals and in the soil. They are used as indicators of the possible presence of harmful bacteria. A total coliforms count of less than or equal to 10 indicates satisfactory drinking water. A total coliform count greater than 10 is a strong indication that disease-causing microorganisms may be present in your water supply. You should not drink the water until it is properly treated.



Escherichia coli* *E.coli are coliforms that live only in the intestines of humans and animals. They are great indicators of the possible presence of harmful bacteria. If any *E. coli* are found in your well water, you should not drink the water until it is properly treated.

Hardness Hardness in well water is due mainly to naturally occurring calcium and magnesium particles. Drinking hard water is not a health hazard. However, it will cause scaling (a buildup of minerals) on utilities and surfaces. Hard water is also very difficult to lather, causing overuse of soap and detergent.





Metals and Minerals Many different types of metals and minerals occur naturally in the environment, and others are derived from man-made sources. Some affect your water's safety, but some only affect the water's colour or smell. Refer to the ***Resources*** on p. 31 on how to find more information on contaminants. Some metals and minerals that may be found in your well water include:

- Lead
- Nitrates
- Copper
- Chloride
- Arsenic
- Iron
- Manganese
- Hydrogen Sulfide



Pesticides and Fertilizers Pesticides are man-made chemicals that are applied to the environment in an effort to control unwanted pests. Fertilizers are added to soil to enhance growth of plants. Well owners should refrain from using any chemicals in the vicinity of their well.



Gasoline, oil, diesel fuel and other solvents Storage tanks can leak fuel into your well, so be sure to look for signs of leakage. Solvents such as paint thinners and degreasers should never be used or stored around water wells. Drinking water contaminated with these chemicals is a health hazard.

Water *testing*

See the Resources section of this booklet for information about testing.



Test for *harmful* bacteria

Bacterial contamination is the most common type of well water contamination. It is recommended that you test your well water regularly for bacteria, including total coliforms and *E.coli*. Contact your local Government Services Centre for information on free bacteria testing. Always carefully follow the instructions included with the water sample bottle to ensure accurate results.

Testing at least twice a year for bacteria is recommended by the DOEC. If you have a shallow well, more frequent testing is suggested.

Early spring is a good time to test your well water for bacteria. Another good time is the day after a heavy rainfall. Melting snow and running water can carry surface contaminants into your well. If your well water is safe under these conditions, it is more likely to be safe the rest of the year.

Test regularly even if your water seems fine, because you can't taste, smell or see bacteria and most other contaminants. Don't rely on your neighbour's test results – wells that are only a few steps apart usually have different water quality.

Besides routine testing, you should also test:

- after major plumbing work, well repairs or major land use changes in your area.
- if you detect changes in water quality, including taste, odour, and appearance
- if regular well users experience unexplained health problems that may be water-related
- after flooding. (If flooding is common in your area you may want to retrofit your well. Contact a DOEC licensed well driller.)
- after lengthy periods of non-use



Testing for Other Contaminants

Drinking water can also be tested for other harmful contaminants such as those mentioned in the ***Possible Contaminants*** section. Anyone drinking well water should consider testing for metals and minerals ***every two years***. Your well water quality may be impaired by naturally occurring metals and minerals, or by human activities such as landfills, road salting, septic systems and construction.

Test your well water for metals and minerals every two years to ensure your water is not a threat to you or your family.

Here are some suggested times to test for certain contaminants:

Test for:	If you had, or detect:
• Gasoline	• Fuel spill, fuel odors or a thin film of oil in your water.
• Pesticides	• Past or present use of these substances near your well, • Pesticide spill or leak, or • Issues about possible backflow through your plumbing into your well during mixing of pesticides and other chemicals.
• Solvents	• Chemical spill in the vicinity of your well, or • Strong chemical odor in your well water

If at any time you think there may be a problem with your well water, you should test it.

An accredited laboratory can test your well water for chemical parameters for a fee. Contact your local Government Service Centre, or search for “water testing” in the government blue pages of your phonebook for more information.

Bacterial contamination

If you get a serious adverse bacterial test result – or have any reason to believe your water is dangerously contaminated – take immediate action.

Use bottled water or eliminate harmful bacterial contaminants by sterilizing your water.



Use one, not both, of the following sterilization methods to eliminate bacterial contaminants:



Bring water to a rolling boil and then boil it for at least one full minute. (A rolling boil is a vigorous boil that cannot be stopped by stirring the water.) Note that although boiling is an effective method of eliminating bacterial contamination it may actually concentrate other types of contamination such as chemicals, metals, and minerals.

– or –

Mix at least 2 drops of liquid household chlorine bleach to each litre of water. If water is cloudy, use 4 drops per litre of water. Let stand for 30 minutes. There should be a faint chlorine smell to the water. Use fresh unscented chlorine containing 5.25 per cent sodium hypochlorite.

Refrigerate boiled or treated water in clean food-grade containers.

Bottled or sterilized water is safe for drinking. It is also recommended for food washing and preparation, brushing teeth, bathing children, and washing dishes.



Shocking should not be used routinely or repeatedly. It is not a substitute for eliminating an ongoing source of contamination or a defect in your well.

Well *disinfection*

Shocking is a temporary method of disinfection used to eliminate a one-time case of bacterial contamination.

Shocking your well is a relatively complicated exercise that requires care and skill. You may want to engage professional assistance. Public health offices are a source of detailed instructions. While shocking may provide a temporary solution, it may be more effective to boil the water you drink.

To properly shock your well, ensure you get detailed instructions from a licensed well driller or a Public Health Office. Information you will need to know include:

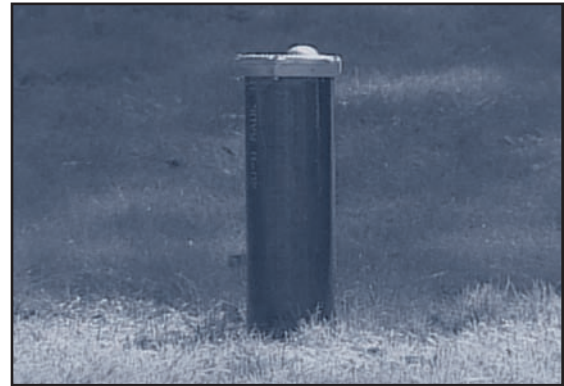
- the correct amount of bleach to use in your well – using too much or too little can cause problems. See Newfoundland and Labrador Government guidelines for disinfecting dug and drilled wells.
- how to remove all filters.
- how to shut down your entire water distribution system to give your entire well water system at least 12 hours, and no more than 24 hours, contact time with the chlorine.

Ensure chlorinated water is properly and safely drained from the system - not into the septic system!

Well water should not be consumed until you have at least three bacteria-free tests conducted at least one week apart.



Exercise care in shocking your well.



Eliminate the cause

If you have contaminated water, begin by considering the possible sources of contamination. Reducing or eliminating contaminants at the source is the best place to start.

Next, take a closer look at your well. If your well water continually exceeds drinking water standards for bacteria, there is likely an ongoing source of bacteria affecting your well. Are there defects in the location, construction, or maintenance of your well that could account for the contamination? See the previous sections of this booklet. Address any problems you identify.

If you can't detect the cause of the problem, bring in a DOEC-licensed well driller right away.

You may be able to save yourself a lot of money by hiring an DOEC-licensed well driller to solve the problem instead of buying a home water treatment device. Treatment can be beneficial – it may even be necessary in some circumstances. But treatment should be the final option, after taking steps to reduce contaminants and improve your well.



Treatment *systems*

Treatment systems should be selected to address your specific needs. Consult a professional when installing a water treatment system.

For bacteria

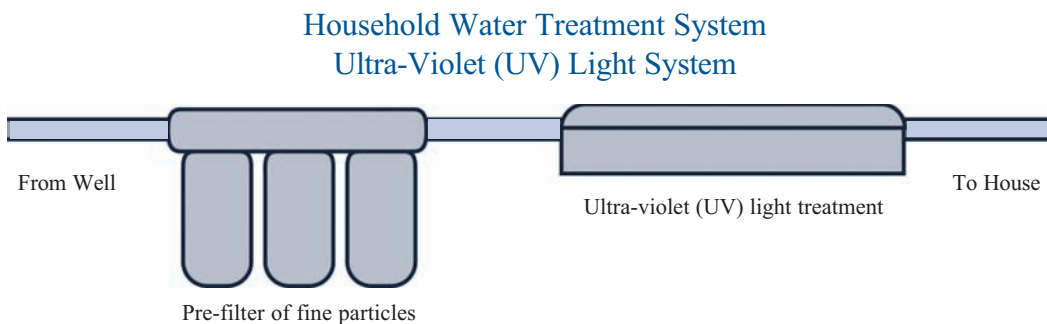
If your water is contaminated, it is better to remove the source of the contamination than to treat the water. However, if the problem cannot be solved at the source, a number of water disinfection systems are available. Each system requires routine maintenance. Refer to the owner's manual. Regular testing of your water must continue.

Chlorinators continuously add chlorine to your water distribution system, allowing sufficient contact time for the chlorine to kill the bacteria. These units must be checked often to ensure that the right amount of chlorine is being added.

Ultra-violet (UV) light filters use UV light to kill bacteria, viruses, and intestinal protozoa in pre-filtered water. A Class A system is required (NSF 55). Pre-filtration of water is generally required for this treatment to work properly. The light needs to be replaced regularly. Drinking water needs to be refrigerated after treatment.

Distillers boil water, then condense the vapour and collect it in another compartment. Bacteria and minerals are removed, and some chemicals. Water should be filtered before treatment and refrigerated afterwards. Standard is NSF 62.

Ozonators inject small amounts of ozone gas into water to kill most bacteria. Treated drinking water should be refrigerated.



For other contaminants

WARNING: the following treatment systems
do not kill bacteria.

Reverse osmosis removes some chemicals – but not bacteria – by passing pre-filtered water through a membrane. This process, which removes inorganic chemicals such as chloride and nitrate, is often used in combination with carbon filters. Reverse osmosis wastes large amounts of water, which could be a concern if water supplies are limited or the septic tank is over-burdened. An option is to use Reverse Osmosis only for drinking water. The standard is NSF 58, but it may be certified under NSF 42 or 53.

Activated carbon filters (pitcher style, tap-mounted, or under-sink) can improve taste and odour and remove organic chemicals. Standard is NSF 42. Larger systems, often used as a pre-treatment for reverse osmosis and water softening systems, remove volatile organic compounds. Standard is NSF 53.

WARNING: bacteria can be trapped and multiply in
a carbon filter. Regular maintenance is required.

Ion exchange water softeners should remove calcium and magnesium “hardness”, thus reducing the scaling tendency. Standard is NSF 44. Common domestic water softeners increase the level of sodium in drinking water. Individuals on salt-reduced diets should consult their physician if sodium levels in their drinking water exceed 20 mg/litre.

