WHEN SHOULD I TEST?

Late spring or early summer are the best times to test your well, since coliform contamination is most likely to show up during wet weather. Whether your test results are positive or negative, understand that the sample you collected is just a "snapshot" of your well's water quality. The more samples you have tested, the more confident you can be about the quality of the water you are drinking.

WHAT DO THE RESULTS MEAN?

If coliform bacteria are present in your drinking water, your risk of contracting a water-borne illness is increased. Although total coliforms can come from sources other than fecal matter, a positive total coliform sample should be considered an indication of pollution in your well. Positive fecal coliform results, especially positive E. Coli results, should be considered indication of fecal pollution in your well.

WHAT SHOULD BE DONE IF COLIFORM BACTERIA ARE DETECTED IN A WELL?

When coliforms have been detected, repairs or modifications of the water system may be required. Boiling the water is advised until disinfection and retesting can confirm that contamination has been eliminated. A defective well is often the cause when coliform bacteria are found in well water.

WHAT KINDS OF DEFECTS CAN ALLOW CONTAMINATION?

- **a missing or defective well cap** - seals around wires, pipes, and where the cap meets the casing may be cracked, letting in contaminants
- **contaminant seepage through the well casing** - cracks or holes in the well casing allow water that has not been filtered through the soil to enter the well. This seepage is common in the wells made of concrete, clay tile, or brick
- **contaminant seeping along the outside of the well casing** - many older wells were not sealed with grout when they were constructed
- **well flooding** - a common problem for wellheads located below the ground in frost pits that frequently flood during wet weather.

LONG-TERM OPTIONS FOR DEALING WITH BACTERIAL CONTAMINATION OF A WELL

- Connecting to the regional public water system, if possible
- Inspecting wells for defects and repairing them if possible
- Constructing a new well
- Installing continuous disinfection equipment
- Using bottled water for drinking and food preparation

For further information contact

New York State Department of Health,
Center for Environmental Health
at 518-402-7650 or 1-800-458-1158
or bpwsp@health.state.ny.us

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Coliform Bacteria In Drinking Water Supplies

New York State
Department of Health

WHAT ARE COLIFORMS?

Coliforms are bacteria that are always present in the digestive tracts of animals, including humans, and are found in their wastes. They are also found in plant and soil material.

"INDICATOR" ORGANISMS

Water pollution caused by fecal contamination is a serious problem due to the potential for contracting diseases from pathogens (disease-causing organisms). Frequently, concentrations of pathogens from fecal contamination are small, and the number of different possible pathogens is large. As a result, it is not practical to test for pathogens in every water sample collected. Instead, the presence of pathogens is determined with indirect evidence by testing for an **"indicator"** organism such as coliform bacteria. Coliforms come from the same sources as pathogenic organisms. Coliforms are relatively easy to identify, are usually present in larger numbers than more dangerous pathogens, and respond to the environment, wastewater treatment, and water treatment similarly to many pathogens. **As a result, testing for coliform bacteria can be a reasonable indication of whether other pathogenic bacteria are present.**

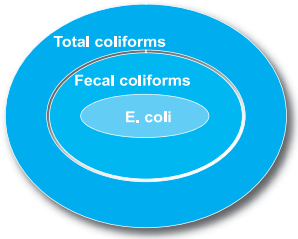
TOTAL COLIFORMS, FECAL COLIFORMS, AND E. COLI

The most basic test for bacterial contamination of a water supply is the test for **total coliform bacteria**. Total coliform counts give a general indication of the sanitary condition of a water supply.

A. Total coliforms include bacteria that are found in the soil, in water that has been influenced by surface water, and in human or animal waste.

B. Fecal coliforms are the group of the total coliforms that are considered to be present specifically in the gut and feces of warm-blooded animals. Because the origins of fecal coliforms are more specific than the origins of the more general total coliform group of bacteria, fecal coliforms are considered a more accurate indication of animal or human waste than the total coliforms.

C. Escherichia coli (E. coli) is the major species in the fecal coliform group. Of the five general groups of bacteria that comprise the total coliforms, only E. coli is generally not found growing and reproducing in the environment. Consequently, E. coli is considered to be the species of coliform bacteria that is the best indicator of fecal pollution and the possible presence of pathogens.



Relation between total coliforms, fecal coliforms, and e. coli.

ARE COLIFORM BACTERIA HARMFUL?

Most coliform bacteria do not cause disease. However, some rare strains of E. coli, particularly the strain 0157:H7, can cause serious illness. Recent outbreaks of disease caused by E. coli 0157:H7 have generated much public concern about this organism. E. coli 0157:H7 has been found in cattle, chickens, pigs, and sheep. Most of the reported human cases have been due to eating under cooked hamburger. Cases of E. coli 0157:H7 caused by contaminated drinking water supplies are rare.

COLIFORM TESTING

Testing for bacteria is the only reliable way to know if your water is safe. You cannot tell by the look, taste, or smell of the water if disease-causing organisms are in it. The New York State Department of Health recommends that well owners test their water for coliform bacteria at least once a year. If you have experienced bacteria problems in the past, it is recommended that you test your well more frequently.

Tips to Protect Your Water

- Test your well water at least once a year for bacteria and for other contaminants every 3-5 years.
- Test your water for *E. coli* and coliform bacteria after you disinfect and flush your well, or perform maintenance on your system to make sure problems are addressed.
- Regularly check and maintain the well, system components and area surrounding the well.
- Test your water if you notice changes in how your water looks, smells or tastes, after floods, changes in land use or concerns about local contaminants.
- If you suspect your well could be contaminated by gasoline, heating oil or chemicals, contact your health department and the DEC Spill Hotline at (800) 457-7362.
- Keep records of maintenance activities and water testing.
- Contact your health department for advice on maintaining, testing, disinfecting and flushing your well.
- Take steps to get connected to a public water system, if you have the opportunity. Public water is the best option for household water because it is regularly monitored and managed by a certified water operator.

Find your area health department:
www.health.ny.gov/EnvironmentalContacts

www.health.ny.gov/PrivateWells
(518) 402-7650
bpwsp@health.ny.gov

NEW YORK STATE | Department of Health

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3/18

Test Your Well

Protect Your Family's Water

Tips for People on Private Wells

Take steps to make sure the water from your private well is suitable for drinking, preparing food and all household uses.

Germs and chemicals can enter your drinking water from runoff and natural changes in the water that serves your well.

The use of contaminated water for drinking, preparing food and making ice can make you, your family and your pets sick. Babies, children, pregnant women, older adults and people with health conditions are most at risk of health effects from consuming contaminated water.

Regularly Test Your Water

Testing your drinking water is the only way to make sure that your water remains suitable for household uses. Test your water at the tap at least once a year for bacteria and every 3-5 years for the other contaminants listed to the right. The best time to test your water is in the late spring or early summer.

Your lab will provide instructions and bottles. Find a certified lab at https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/.

Also Consider Testing If ...

- You notice changes in how your water looks, smells or tastes.
- There are changes in your household/family, such as pregnancy, new babies or changes in someone's overall health.
- You or your health care provider suspect your drinking water could be causing symptoms such as diarrhea or vomiting.
- You have made repairs to your well, pipes or home structure or have changed your drinking water system.
- You notice changes in land use, such as construction or farming, that could cause runoff to enter your well.
- You have concerns about local contaminants, such as radon or those from nearby industrial or waste sites.
- Your well was recently flooded or damaged by extreme weather.
- The well runs dry or the amount of water flowing from your fixtures changes.

Contact your area health department for advice. Look up your health department by county at www.health.ny.gov/EnvironmentalContacts.

Test Your Well EACH YEAR for

***E. coli* & coliform bacteria-** indicate fecal contamination that can cause symptoms such as diarrhea and vomiting

Test Your Well EVERY 3 - 5 YEARS for

Lead- harmful to many organs and systems in the body and most harmful to developing babies and young children

Nitrate & Nitrite- most harmful to babies; associated with infant blood problems

Arsenic- long-term exposure is associated with nerve and liver damage, cancer, high blood pressure and damage to blood vessels of the heart and brain

Sodium- concern for individuals on restricted sodium diets due to high blood pressure or other medical issues

Iron & Manganese- cause rust or black staining of fixtures or clothes

Turbidity- (cloudy water) interferes with chlorine and UV-light disinfection

pH- causes lead and copper pipe corrosion and metallic-bitter taste

Hardness- causes mineral and soap deposits on fixtures; reduces detergent efficiency

Alkalinity- interferes with chlorine disinfection and causes metallic-bitter taste

Your water could come from a private well if...

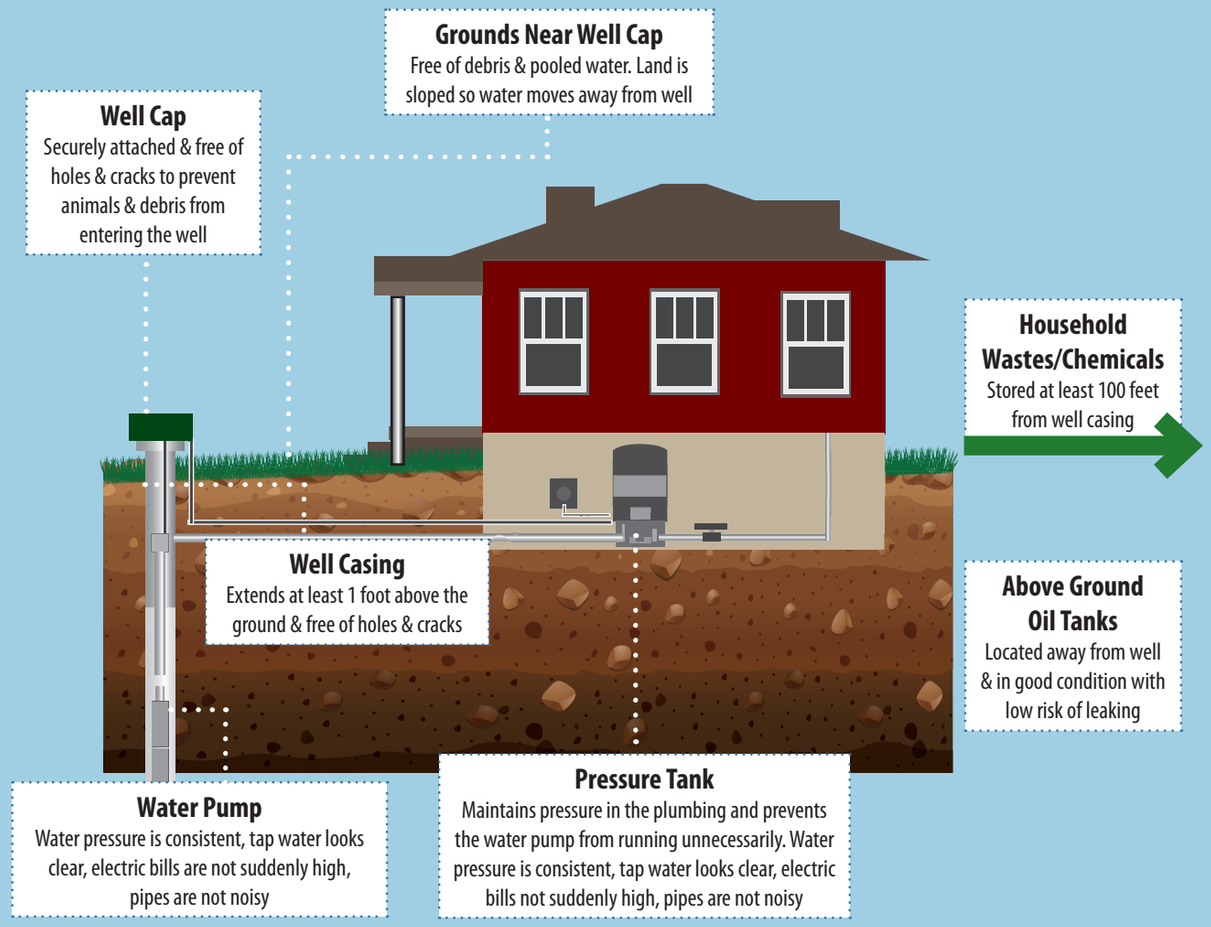
- **You do not receive a water bill.**
- **You live in a rural area.**
- **You have a septic system.**
- **You have a water pump in your home for your drinking water system.**

Questions? Contact Your Area Health Department
www.health.ny.gov/EnvironmentalContacts

Inspect & Maintain Your Well and Water System

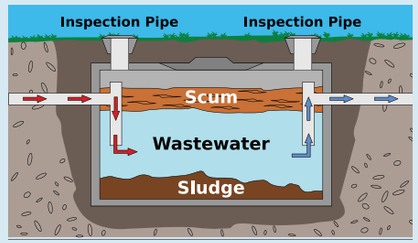
Have a well contractor inspect your well at least once a year to stay ahead of maintenance issues. Regular inspections help prevent contaminants from getting into your tap water from a poorly maintained well. The NYS Department of Environmental Conservation (DEC) has a list of registered well contractors at www.dec.ny.gov/lands/33317.html.

Use this diagram to keep an eye out for problems. If you suspect issues and need help, contact a professional. Stop using your tap water for drinking, preparing food and making ice, and switch to bottled until your water is tested and the problem is addressed.



This diagram shows a drilled well. If you have a dug well, your well cap and casing may look different. Learn more about **Standards for Water Wells** at www.health.ny.gov/regulations/nycrr/title_10/part_5/appendix_5b.htm.

Inspect & Pump Out Your Septic System



Have a DEC-permitted waste transporter inspect and pump out your septic system every 2 to 3 years to avoid potential well contamination from a failing septic system. Learn more at ***Septic System Operation and Maintenance*** www.health.ny.gov/publications/3208.

Maintain Water Treatment Equipment

If you have water treatment systems, follow manufacturer recommendations for maintenance and testing and work with a water treatment professional to develop a plan to evaluate and maintain you system. Systems that are not regularly maintained can result in failure of water treatment and loss of water pressure.

Avoid Electric Shock Risk

Before making any repairs:

- Shut off power to the pump and water system.
- Examine for broken wire insulation or missing wire nuts and repair as necessary.
- Wear waterproof, rubber soled shoes or boots.

Contaminants in Your Water?

Stop using your water and use bottled water for drinking, preparing food or making ice if water tests show contaminants in your well water or if you suspect your well could be contaminated.

Follow these steps from **Restoring and Testing Your Private Well** (www.health.ny.gov/PrivateWells):

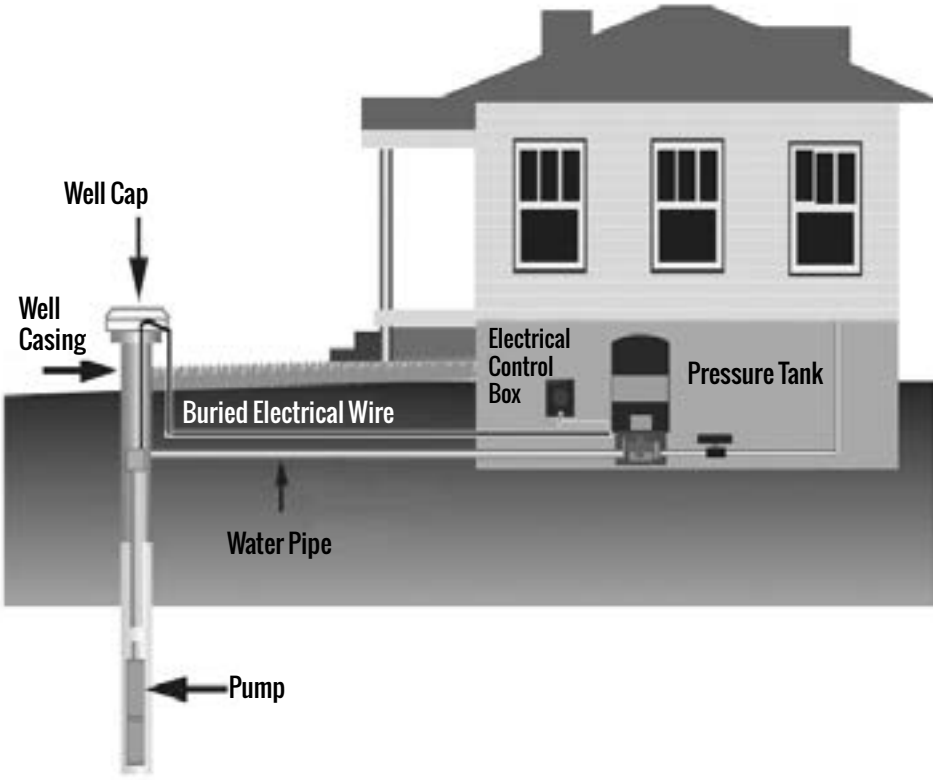
- Check the well and area around the well for damage.
- Repair and flush your well.
- Disinfect your well water to address biological contamination.
- Test your water to assure suitable quality for all household uses.
- Contact your area health department for help if you need it. Look them up at www.health.ny.gov/EnvironmentalContacts.

If you suspect your well could be contaminated by gasoline, heating oil or chemicals, stop using your water and immediately contact your area health department and the DEC Spill Hotline at (800) 457-7362.

Resume using your water after contamination is addressed and water tests confirm your water is suitable for household uses.

Flood recovery

Restoring and Testing Your Private Well After a Flood

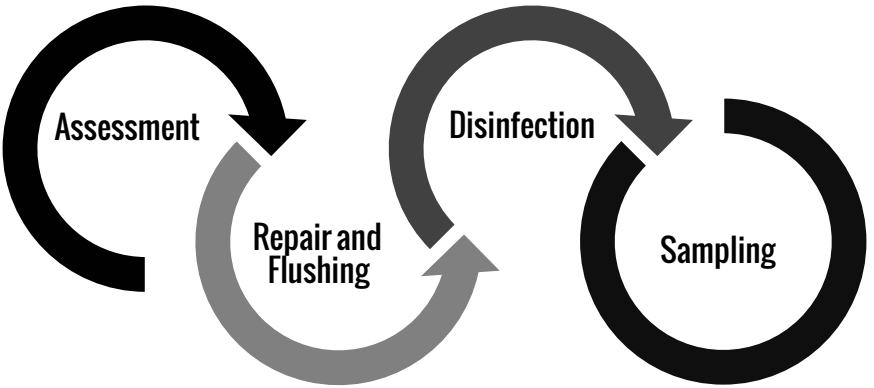


After flooding, water from private wells may not be safe to drink. Private well owners should take steps to restore their private water supply.

When a private water well has been flooded, the water in it may be contaminated with **waterborne pathogens** (germs) that can cause serious illness in humans and pets. If you believe that your well has been contaminated, **stop using your well water for drinking and cooking purposes.** Check with your local health department about other acceptable sources of water.

If you believe your well may be contaminated by gasoline, heating oil or other chemicals, do not use your well and immediately contact your local health department or the Department of Environmental Conservation (DEC) Spill Hotline at (800) 457-7362.

This booklet provides guidance on how to address possible contamination. There are four action steps needed to get a flooded well back into service safely:



Assessment

A flood will leave warning signs that a water well may be unsafe. Floodwater carries large pieces of debris that can dislodge parts of the well and distort or crack the well casing. Floodwater may also deposit mud or sediment in the well. If you see any of these conditions you should have a professional repair the system. Below are things that a well owner can look for; any one of these signs may indicate that a well is contaminated and the water may be unsafe. If you suspect the well has been affected by floodwater, stop using it until it is checked.

Well pump

Most private wells have the pump located inside the well casing and submerged, so well owners will probably not be able to inspect the pump. If the pump or well casing needs repair, contact a qualified professional, registered well driller, or pump contractor to evaluate and service it. Do not turn on your well pump until the well has been assessed and repaired as needed. Contact your local health department for help in locating registered well contractors. A list of DEC registered well contractors can also be found at: www.dec.ny.gov/cfmx/extapps/WaterWell/index.cfm?view=mainwiz

Six steps to assess your well

Step	What to look for	When to call a pro
1. Turn off power to the well.		
2. Check whether the well was flooded.	Check for signs of flooding. If you did not see the area during the flood, debris and mud and water or mud stains may indicate that the well was flooded.	If you don't have safe access to the well.
3. See if the ground surface around the well is broken or unstable.	Check for erosion that may lead to unsafe conditions or a pathway for surface water and contaminants to get in the well. Check whether flood water entered the well.	If you need to regrade land around the well or repair/replace the well or casing.
4. Inspect electrical components and wires.	Look for exposed/damaged wiring or electrical components. Check whether water entered any electrical components. Do not touch electrical wires. If electrical connections or controls located outside the well casing remain submerged, **do not turn on the pump.**	If any water or damage is seen, or if it is suspected that any part of the electrical system has been submerged, call an electrician or well professional.
5. Check the well casing.	A bent/cracked well casing may allow water, sediment and debris to enter the well and increase the risk of contamination.	If the well casing needs to be repaired or replaced.
6. Check the well cap and seal.	See if the cap and seal are securely fastened to the well casing. Sediment and debris may enter the well through a loose well cap and contaminate it.	If sediment and debris have entered the well, call a professional before restarting the well.

Repair and flushing

How to clean your well

Take the following steps before using the well again. Be sure the electricity is off until you complete your check of the well. Never step in water around a well unless you are sure the power is off.

Wait until the well has been restored by proper flushing and disinfection before you drink or wash with well water.

Four steps to flush your well

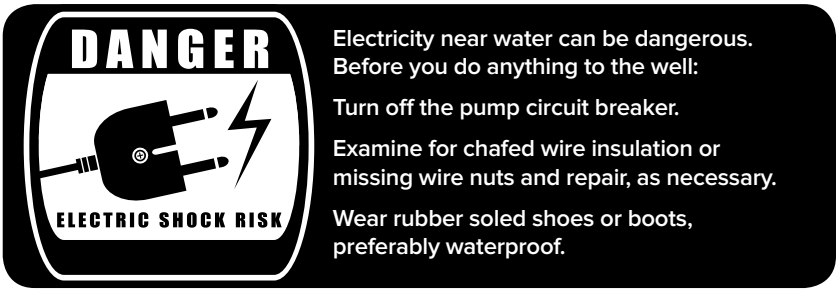
1. **Clean.** Remove any visible mud, sediment, and other debris from the well casing, cap, and other accessible components. If there is excessive mud or sediment in the well, get professional help to remove the pump before cleaning or repairing.
2. **Regrade.** If the ground around the well is sloped down towards it, re-grade it so surface water flows away from the well casing. Surface water may contain contaminants that can get into the well if water flows down along the well casing.
3. **Start pump.** After the pump has been inspected and repaired, or replaced if necessary, turn it on. If it does not start or pump water, get assistance from a registered well driller or pump contractor.
4. **Flush.** Pump the water until it runs clear to get rid of any floodwater in the well. Use a hose connected to an outside faucet so the flushed water flows to a nearby drainageway rather than into your septic system or public sewer (after flooding, both septics and public sewers may be overwhelmed and unable to hold more wastewater). Depending on the size and depth of the well and extent of contamination, pumping times will vary; it may take thirty minutes, or it could take several hours or days until the water runs clear.

Disinfection

How to kill the germs

Disinfect (sanitize) your water to kill germs before using the water for any household purposes. Changes in the water's appearance, taste, or odor may indicate possible contamination. Even if your well is working, you should use other sources of water for drinking, food preparation, and brushing teeth until your well test results show the water is safe to drink. Check with local health department personnel about other acceptable sources of water.

A concentrated bleach solution needs to be circulated through the well and house plumbing to assure proper disinfection of the well and plumbing before use of the well water. Below is a step by step method to sanitize a well before restoring it to full use. If your well is a "point well", or if the well pump is a jet pump, it is recommended that you hire a water well contractor to disinfect your well.



12 steps to disinfect your well

1. **Attach a hose to the outdoor faucet** that is closest to the well or pressure tank. The hose needs to be long enough to reach the well. Run water through the hose until it is clear.
2. **Mix 2 quarts of regular, unscented household beach with 10 gallons of water** in a large bucket in the area of the well casing. **Do not use "splashless", scented, or gel variety bleach.**
3. **Turn off the electric power to the well pump** (the switch is probably located at the circuit breaker box or near the pressure tank). Carefully remove the well cap (and well seal if there is one). Set aside.
4. **Turn the electric power to the well pump back on.** Place the other end of the hose into the casing. Turn the faucet with hose on.

12 steps to disinfect continued

5. **Pour 10 gallons of the water and bleach mixture down the open well casing while the water is running through the hose.** Continue running the water through the hose placed inside the well casing.
6. **Run the water at each indoor and outdoor faucet until a chlorine odor is present,** and then shut off each faucet (except the faucet with the hose).
7. **Continue running water through the hose and down inside the well casing to recirculate the chlorine solution.** Use the hose to also wash down the inside of the well casing.
8. **After one hour of recirculating the water, remove the hose from the well.** Fill a bucket with 10 gallons of water. Shut off the faucet that the hose is connected to and make sure all the other faucets are still shut off to assure the pump is stopped. Remove the hose from the well.
9. **Mix two more quarts of bleach in 10 gallons of water.** Use about half a gallon of the mixture to rinse and disinfect the well cap (and seal if there is one). Turn off the electric power to the well pump. Pour the remaining mixture into the well. Replace the well cap (and seal).
10. **Allow the well to stand idle for at least 8 hours, preferably 12 to 24 hours.** Avoid using the water during this time. The electric power to the pump still needs to be off.
11. **Turn the electric power to the well back on after it has been idle for 8 to 24 hours.**
12. **Purge the well and plumbing of the chlorinated water.** Connect a hose to an outside faucet and place the other end of the hose away from grass and shrubbery. Open the faucet and run the water until the chlorine odor disappears. Open all the other indoor and outdoor faucets until the chlorine odor disappears.

Sampling: How to test your well

Now that the well and house plumbing have been disinfected, the next step is sampling.

After the chlorine has been flushed out of the water system (the water should not smell of chlorine), test the water (as outlined below) to confirm that it is free from contamination. If chlorine odors persist, you may have to repeat flushing or wait several days before testing. Until testing shows that the water is free of contamination, you should use bottled water or check with local health department personnel about other acceptable sources of water.

Pre-Sampling Checklist

Before sampling the well water, be sure the following have been done:

- ☐ The area around the well has been drained of floodwaters and cleaned up.
- ☐ The well is in good condition, operable, and any needed repairs have been completed.
- ☐ The well has been flushed of any floodwater that may have entered it, and the attached plumbing has been properly disinfected.
- ☐ The well has been disinfected and the pipes have been flushed to remove chlorinated water.

9 steps to test your well

1. **Obtain a sterile "BacT" bottle from a NY State certified lab.** (www.wadsworth.org/labcert/elap/comm.html or contact your local health department www.health.ny.gov/nysdoh/water/doh_pub_contacts_map.htm)
2. **Do not open the bottle until you are ready to fill it, and close it immediately once it is filled with sample water.** Do not rinse the contents from the bottle. Do not touch the inside of the bottle or bottle cap with your fingers (if you do, STOP and get another bottle).
3. **Remove the anti-splash screen from the kitchen faucet cold water tap.**
4. **Disinfect the faucet tip by dipping it in a capful of bleach, or by "flaming" the faucet tip with a lighter or match for 10 seconds (be sure to remove rubber faucet seals first).**
5. **Let the cold water run for 4 - 5 minutes.**
6. **Fill the sterile bottle to the 100 ml line and cap it tightly. REMEMBER... do not touch the inside of the bottle or lid.**
7. **Fill out the sample label and form provided by the lab.** Remember to add contact and address information.
8. **Put the filled bottle in your refrigerator.**
9. **Return the bottle to your chosen laboratory. Make sure to keep the sample chilled on the way to the laboratory.**

Next steps to protect your well

Here are some improvements you can make to protect your well from future damage:

Retest Your Well: You should consider retesting the well water after several weeks. If flooding and groundwater contamination is extensive, your well may be at risk of recontamination for some time.

Drill a New Well: If frequent flooding of your well occurs, consider drilling a new well where it is not subject to seasonal flooding. Make sure your well is constructed in such a manner that seasonal floodwater cannot enter the well. Contact a registered well driller for advice (see website on page 3).

Grading: The ground surface immediately surrounding a well casing and, if possible, the property in general, should be graded to direct surface water away from the well. If erosion around the well has been a problem, consider protecting the area with plants or shrubs, or take other erosion control measures.

Extend the Well Casing: Casing can be extended to a height above the expected or experienced level of the floodwater to keep floodwaters out. In flood-prone areas, it is recommended that the well casing be extended at least 1 – 2 feet above the highest recorded flood level. A registered well driller should perform this work.

Upgrade the Well Cap: Install a well cap that will prevent water, insects, and rodents from getting in. A registered well driller should perform this work.

More information

Contact your local health department or district office.
www.health.ny.gov/EnvironmentalContacts

Other Related Publications

Carbon Monoxide: Know the Hazards
Carbon Monoxide: The Silent Killer
Don't Be Left in the Dark
Drinking Water and Food Guidance After a Flood
Flood Cleanup and Home Repair
Flooding Quick Reference Guide
How to Use an N95 Mask
Checklist and Resources for Repairing Your Flooded Home
How to Avoid Getting Sick and Injured after a Flood
Mold and Your Home: What You Need to Know
What Homeowners Need to Know about Fuel Oil Spills and Flooding

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www.health.ny.gov/FloodHelp