TCEQ GENERAL INFORMATION
Water Supply Division
GI-432 • June 2017

Disinfecting Your Private Well

Is Your Well Flooded? Disinfect It Before You Drink It!

If your private well is flooded, do not use water from it until the following three things have occurred:

1. The floodwaters have receded from the well and your plumbing system.
2. You have disinfected the well and your plumbing.
3. You have sampled your water and received a lab report confirming that the disinfected water contained no bacteriological contaminants.

In these instructions we provide information on how to disinfect your well and your household plumbing system and how to sample the water for analysis by a bacteriological laboratory.

You can use these steps any time you suspect that your well has become contaminated by harmful bacteriological contaminants, not just after a flood.

You also have the option of choosing to hire someone to disinfect and test the water from your well.

Before You Begin

Know the hazards

Be aware of the possible hazards involved in disinfecting your well:

- You will be working with water and electricity. Use the appropriate precautions to avoid electrical shock.
- You will be using liquid bleach or solid calcium hypochlorite. These chemicals can burn your skin and eyes and whiten your clothing if handled improperly. Read the manufacturer's warnings on the label and take the recommended precautions.

Find another source of water

Before you start, make sure you have enough drinking water from another source for all the drinking, cooking, and bathing you will need to do for at least 12 to 24 hours. Consider these options for other sources:

- Bottled water.
- Water from some other source that is known to be uncontaminated.
- Water that you boil before use. If you choose to boil water, heat it to the boiling point and let it continue at a full boil for two minutes. Let it cool before using it for drinking or bathing.

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- Water that you have disinfected another way. Find information about disinfecting water at EPA's Emergency Disinfection of Drinking Water webpage at <www.epa.gov/ground-water-and-drinking-water/emergency-disinfection-drinking-water>.

You also need to have some extra water available to flush toilets, but that does not have to be drinking water.

Know how long you need

Allow time for disinfecting your well and plumbing system, and for sampling and analysis:

1. **Disinfect the well itself:** about an hour and a half.
2. **Disinfect the rest of your plumbing:** 12 to 24 hours.
3. **Flush the system:** varies; about 5 to 10 minutes per faucet.
4. **Sample the water and send it to the lab:** about 15 minutes.
5. **Get the results back from the lab:** about two days.

Sampling the water is very important. You shouldn't drink or cook with water from your well until a bacteriological lab confirms that the water is free of harmful germs.

How to Disinfect Your Well and Plumbing System

Gather the information and materials you will need.

Locate on your property:

- The power switch to your well pump.
- The power to your water heater.
- The wellhead. (This is the concrete pad on top of the well. It might be in your pump house or just outside somewhere. It generally has a pipe sticking out that goes to your pressure tank.)
- The faucet nearest to the wellhead. (This should be a water tap that you can hook a garden hose to.)
- If your well is pressurized, locate the pressure release valve. (It might look like a faucet.)
- The well access plug. (It might look like a large bolt.)

Figure 1: The wellhead on your property will typically include a pipe leading to your pressure tank.

Gather these materials:

- Disinfectant: liquid chlorine bleach ("bleach" in the rest of these instructions) or solid calcium hypochlorite.
- A wrench that fits the well access plug.

- A funnel (wide mouthed if you use calcium hypochlorite).
- A garden hose long enough to reach the wellhead from the nearest faucet.

Table: How Much Disinfectant to Use

If your well is this deep:	Use this much bleach:	Or use this much solid hypochlorite:
Less than 100 feet	1 quart	**1/8 cup**
100 to 200 feet	2 quarts (1/2 gallon)	**1/4 cup**
200 to 300 feet	3 quarts	**3/8 cup**
More than 300 feet	**4 quarts (1 gallon) or more**	**1/2 cup or more**

Liquid chlorine bleach

Liquid chlorine bleach is sold as a cleaning product, but not all bleaches will work for disinfecting your well:

- **Don't** use bleach that is scented or odorless—it should have a sharp chlorine odor.
- Find a list of approved brands at <www.tceq.texas.gov/goto/bleach>.
- You may use bleach that is not on this list if it has an NSF (National Sanitation Foundation) seal, as shown in Figure 2, or says "meets NSF Standard 60" on the label.

Figure 2: NSF Seal

The NSF seal. NSF International certifies products for specific uses—for example, bleaches for safely treating drinking water. If you have questions about whether a particular disinfectant is safe to use in your well, call **the NSF at** 800-NSF-8010.

Calcium hypochlorite

Calcium hypochlorite is sold for chlorinating swimming pools. Because it contains more chlorine than bleach, it might be easier to work with, especially if you follow these tips:

- Make sure the calcium hypochlorite you use has an NSF seal or says "meets NSF Standard 60" on the label.
- Get a granular or powdered form, not the large tablets. (They can be hard to break into pieces small enough to fit into the well, and they can be slow to dissolve.)
- If you get a powdered form, be sure it's fresh. (The powder can lose its disinfecting power on the shelf.)

What not to use

Don't use other disinfectants in your well. After all, you want to drink this water! Especially avoid these:

- Scented (or "scentless") laundry bleaches.

- Chlorine-free bleaches.
- Disinfectants designed for hot tubs.

Disinfecting the well

The time needed for this part of the process depends on whether or not you have a pressurized well. If your well has a screened vent at the wellhead, or if you haven't used an air compressor to maintain water pressure, your well is probably not pressurized.

Disinfecting a pressurized well

This process takes at least 12 hours:

1. Turn off the power to the well pump and air compressor.
2. At the wellhead or pump house, find the pressure-release valve. Before you open it, be sure that you are in the open and breathing fresh air, not the vented air, which may contain hydrogen sulfide, methane, or other gases that sometimes can build up in wells.
3. Open the valve to release all the pressure in the well.
4. Remove the access plug. (You'll need to replace it later.)
5. Put the funnel in the opening where you removed the access plug.
6. Pour in the bleach or calcium hypochlorite. (See the table on page 3 for the right amount to add.)
7. Replace the access plug. Let the well sit for at least 12 hours. During this waiting period:
    - Following the manufacturer's directions, turn off the power to your water heater and drain it.
    - Drain any other water-storage tanks that are connected to your plumbing system.
    - If you can, collect at least some of this water (for example, in 5-gallon buckets) to use whenever anyone needs to flush a toilet during the rest of the disinfection process.
    - Read the rest of these instructions—especially "How to Sample Your Water and Understand the Results" on page 6. You can save yourself some time later by finding a water-sampling kit now.
8. When the 12-hour waiting period is over, turn on the power to your well pump and air compressor.

More than you can do?

If you are not comfortable carrying out these steps, contact a professional water-well driller to perform them for you.

Disinfecting a non-pressurized well

1. Turn off the power to the pump.
2. Remove the access plug.
3. Put the funnel in the opening where you removed the access plug.
4. Pour in the bleach or calcium hypochlorite. (See the table on page 3 for amounts.)

5. Connect the garden hose to the faucet nearest the wellhead.
6. Turn the power to the pump back on.
7. Turn on the faucet and run water through the funnel into the well for one hour. By circulating the chlorinated well water, you will expose all fittings and equipment in the well to the chlorine solution and improve the germ-killing action.
8. During this hour:
    - Following the manufacturer's directions, turn off the power to your water heater and drain it.
    - Drain any other water-storage tanks that are connected to your plumbing system.
    - If you can, collect at least some of this water (for example, in 5-gallon buckets) to flush toilets during the rest of the disinfection process.
    - Read the rest of these instructions—especially "How to Sample Your Water and Understand the Results" on page 6. You can save yourself some time later by finding a water-sampling kit now.
9. After the hour is up, remove the garden hose and funnel and immediately replace the access plug.

Disinfecting your plumbing

To disinfect the rest of your plumbing system, you will fill the pipes with chlorinated water from the well and let it remain at least overnight—if you can, let it remain for 24 hours. For the best results, follow the steps below:

1. Working away from the well, go to the next closest outside faucet. Turn it on, run the water until you can smell the sharp odor of bleach (chlorine), and then turn it off.
2. Repeat step 1 until you have reached all the outside faucets.
3. Refill the water heater, but don't turn the heat back on yet.
4. Refill any water-storage tanks.
5. Go inside and flush each toilet until the water coming in smells chlorinated.
6. Repeat step 1 on each inside faucet. Be sure to include bathtubs, showers, and other faucets and to do this to the cold- and hot-water faucets.
7. If you have a chilled-water line on your refrigerator, run it until you smell bleach.
8. Now that your plumbing system is full of chlorinated water, let everything stand at least overnight or, if you can, for 24 hours to kill germs in your plumbing. During this time:
    - Don't use this water for drinking, cooking, bathing, washing clothes, or washing dishes.
    - You can use this water for flushing toilets, or you can use water collected from draining your water heater. If the toilet isn't clogged, it will flush if you pour in 2 or 3 gallons of water from a bucket.
    - If you have an icemaker, let it run, but dispose of all the ice it produces.
    - Run your empty dishwasher and clothes washer through a full cycle.

Flushing the system

After the chlorinated water has been in your plumbing system for 12 to 24 hours, it's time to flush the system. This process will take about the same amount of time it took to fill the system with chlorinated water—about 5 to 10 minutes per faucet, on average:

1. While you are carrying out the rest of these steps, drain your water heater and any other water-storage tanks connected to your plumbing system.
2. Starting with the outside faucet farthest from your well, open the faucet and run it until you no longer smell chlorine and the water is clear of any debris or color.
3. Working your way back toward the well, continue step 2 with each outside faucet. Don't flush any inside faucets until you have finished outside—otherwise, you might flood the septic system.
4. Flush each toilet once.
5. Repeat step 2 with each inside faucet.
6. If you have a chilled-water line, run it until you no longer smell bleach. Dispose of all of this water.
7. Refill the water heater and any other water-storage tanks.
8. Following the manufacturer's directions, turn the power to your water heater back on.
9. Run a rinse cycle on your dishwasher and your washing machine.

More than you can do?

If this process for disinfecting a well seems like more than you want to handle, call a plumber or licensed water-treatment specialist to have it done for you. While not that complicated, it's important to have the job done right.

How to Sample Your Water for Bacteriological Contaminants and Understand the Results

Now that you have disinfected the well and your plumbing system, there are four steps to getting a valid sample and a meaningful test result:

1. Get the right container and form.
2. Collect the sample.
3. Send the sample to the lab for analysis.
4. Read the lab report and understand the results.

Until you are sure that your water is not contaminated, you shouldn't use it for drinking, cooking, bathing, washing dishes, washing clothes, or household cleaning.

Get a container and form

You have to use a special container to collect a drinking-water sample and complete a special form to send with the sample to a lab for analysis:

- If your area has experienced a hurricane, flood, or other natural disaster, recovery teams may be distributing water-sampling kits. Check with the

county or local emergency-management coordinator in your area to see if you can get the container and form you need.
- If not, call a public health laboratory near you and ask someone to send you a kit for collecting a water sample for bacteriological testing. If you can't reach a lab near you, you can use one that is farther away. It's important to find a lab that can serve you quickly.

Public-health laboratories in Texas

Find the public-health laboratory nearest you on the list of accredited labs in Texas at <www.tceq.texas.gov/goto/certified_labs>.

You may call also call the TCEQ at 512-239-3754 and ask for this information.

Collect the sample

Find a good sampling location. The best site is an outside faucet in the open that does not leak.

- Take the sample at the faucet, not through a hose.
- Avoid sampling from fire hydrants, dirty areas, and areas behind bushes.
- Do not take samples from kitchen or bathroom sinks.
- Try not to sample in high or gusty winds or when it is raining.
- Handle samples carefully! It is easy to contaminate them. Contaminated samples give inaccurate results.

Follow these steps to take the sample:

1. Do not open the sample container yet. Open the faucet to full flow for 3 minutes to clear the line.
2. Reduce the flow to a slow, steady, spray-less stream—about the thickness of a pencil (¼ inch).
3. Be careful not to touch the inside of the container when you open it.
4. Do not rinse the container out—just fill it without splashing.
5. Close and seal the container. Make sure it doesn't leak—leaking samples cannot be accepted for analysis.
6. Note the time. (You will need to enter this on the form you send in with the sample.)

Send the sample to the lab

Don't delay! Your sample must arrive at the laboratory no more than 30 hours after you collect it. But first complete the form and pack the sample properly. If you have questions about this, ask the lab.

Fill out the submission form

With your sampling container, there will be a bacteriological submission form. Here's how to complete it for a private well:

- For "Name of Water System," write "Private."
- For "County," write in the name of your county.
- For "Send Results To:" enter your name and mailing address.

- Enter the date and time that the sample was taken.
- For “Type of System,” write “Individual.”
- For “Water Source,” give as much information as you can—for example, the location, diameter, and depth of the well. If you know the aquifer that the well is drilled into, enter that information, too.

Pack and send in the sample

Enclose the sample container in a plastic bag, seal it, and wrap the bag securely in bubble wrap or some other suitable padding. Put it on ice and the form in a box or envelope and send it by express delivery to the lab for analysis.

Check out the results

It should take about two days for the lab to complete its tests and return the results to you. The most important part of the results is the part about coliform organisms. There are three possible outcomes:

1. **Coliform organisms not found.** This is good news: As far as levels of harmful bacteria are concerned, your water is considered safe to drink at the time of sampling.

2. **Coliform organisms found.** This is not good news. Coliform organisms are present in your water, and it might not be safe to drink. Here is what to do:
   - Don’t use the water for drinking, bathing, cooking, preparing food, making ice, washing dishes, or cleaning.
   - Instead, boil or disinfect your water before you use it, use bottled water, or get water from another source,
   - If you choose to boil your water, heat it to the boiling point and let it continue at a full boil for two minutes. Let it cool before using it for drinking or bathing.
   - To learn how to disinfect water, go to EPA's Emergency Disinfection of Drinking Water webpage at <www.epa.gov/ground-water-and-drinking-water/emergency-disinfection-drinking-water>.
   - Disinfect the well and repeat the test.
   - Until you get a test result of “coliform organisms not found” from the lab, continue to boil or disinfect your water, use bottled water, or use water from another source.
   - If repeated tests continue to show coliform organisms are present, consider adding continuous disinfection equipment to your well.

3. **Unsuitable for analysis.** This is a gray area: The lab could not draw a conclusion, perhaps because of a sampling error. For example, if you rinse out the container before you collect the sample, the result might be “unsuitable for analysis.” If you get this result, you may choose simply to repeat the test, or you may consider disinfecting the well again before repeating the test.