



PLUMAS COUNTY ENVIRONMENTAL HEALTH

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DISINFECTION OF WELLS & WATER SYSTEMS

WHEN SHOULD I DISINFECT A WATER SYSTEM or WELL?

This guide is intended to assist in disinfecting contaminated water systems and wells after inundation by flood waters, or when water pressure has dropped below 5 pounds per square inch (psi), or when a routine bacteriological test shows contamination.

Keep in mind that the disinfection is only effective against disease organisms that come in contact with the disinfectant solution for a sufficient amount of contact time. Disinfection will not remove chemical contamination.

Water Systems or Wells Contaminated by Flood Water: Flood water is dirty water and can be assumed to carry many types of disease organisms from septic tanks, sewers, wild and domestic animals, as well as silt.

- The presence of flood water in the well water and/or water system is a health emergency and you should not drink the water!
- Drinking flood contaminated water could make you sick.

Water Systems Subject to Power Outages: A water system that relies on well pump(s) or booster pump(s) that does not have a back-up source of power (generators), will lose water pressure and subsequently could allow dirty outside water to enter the water lines and contaminate the water system.

Water Systems or Wells Contaminated with Bacteria:

- Fecal Coliform or E-coli Bacteria: If a bacteriological water test shows the presence of fecal coliform or E-coli bacteria in the water system is an indication that the water system is open to contamination by animals and/or has sewage entering the water system.
 - The presence of fecal coliform or E-coli bacteria (fecal positive test result) is a health emergency and you should not drink the water!
- Total Coliform Bacteria: If a bacteriological water test shows the presence of total coliform bacteria in your water system, this indicates that contaminants have entered the well or water piping system. The presence of total coliform is an indication that the water system is not adequately protected from contamination.
 - The presence of total coliform bacteria (total positive test result) without the presence of fecal coliform or E-coli bacteria (fecal negative test result) is not a health emergency and you can continue to drink the water.

CAN I DISINFECT A CONTAMINATED WATER SYSTEM or WELL MYSELF?

You might need someone to help, however you should be able if you are careful and have a few basic tools. The most important thing to remember is don't do anything to make the problem worse such as dropping a wrench, bolt, or dirt into the well, or disconnecting the well pump and losing it down the well.

DISINFECTION OF CONTAMINATED WATER SYSTEMS & WELLS

HOW DO I DISINFECT A WATER SYSTEM or WELL?

The following are provided as suggestions only (Note: specific circumstances or safety concerns may require actions that are not covered in the following):

- 1) Open a water faucet and run the well pump allowing the water to flow to waste (onto the ground or to the sewer) until the water looks as clean as possible.
- 2) Remove the well cap (or if the well cap can not be easily removed - open the plug on the well cap) and pour the appropriate quantity of bleach into the well casing.
 - a. Caution!
 - i. Even household chlorine bleach will cause injury if it contacts skin or eyes and will damage clothing. Follow the manufacturer's precautions when handling and using bleach!
 - ii. Keep children and animals away from chemicals.
 - iii. Don't let any dirt fall or tools into the well!
 - b. Use Clorox® or other generic non-scented bleach.
 - i. Avoid the use of swimming or spa pool chlorine unless it states on the label "approved for potable water disinfection" as pool chlorine usually has stabilizer chemicals that are not good for drinking water.
 - ii. Refer to the below listed table for the amount of disinfectant (bleach) required.
- 3) After adding disinfectant (bleach), loosely replace the well cap onto casing or plug cap opening to avoid anything falling into the well.
- 4) Wait for about 30 minutes to allow the bleach to blend into all the water in the well.
- 5) After the 30 minute wait time, starting at the faucet farthest from the well, open the faucet and allow the water to flow until the water is clear and there is a strong smell of chlorine, and then close the faucet.
- 6) Repeat this process for each water faucet in the water system - including the hot water taps.
- 7) If possible, with the well cap removed, wash down the inside of the well casing with the bleach solution:
 - a. Attach a "clean" garden hose to the water tap nearest to the well and allow the water to flow until the water is clear and the bleach odor is strong.
 - b. Don't let the bleach solution splash into your eyes or onto your skin or clothing!
 - c. Without allowing the end of the hose to enter the well, use a low velocity flow of the bleach solution to wash down the inside of the well casing and the pump drop tube.
 - d. When washing the casing is complete, shut off the hose faucet.
- 8) Securely reinstall the well cap onto the well casing and/or the plug into the well cap.
- 9) If possible, allow the water to "stand" in the well, water piping, water pressure tank, and water heater for approximately 24 hours. Keep children and animals away from the chlorinated water.
- 10) After 24 hours, starting again at the farthest faucet from the well as described above, flush out all taps until there is no bleach odor – including the hot water piping.
- 11) The water should be tested to verify the system is free of bacteria. Contact Environmental Health if you need instructions on how to take a water sample.

HOW MUCH DISINFECTANT SHOULD I USE?

The amount of chlorine disinfectant required depends on the size and depth of the well and the type of disinfectant available for use (note: household bleach is usually 5% available chlorine).

DISINFECTION OF CONTAMINATED WATER SYSTEMS & WELLS

QUANTITY OF CHLORINE COMPOUND REQUIRED TO DISINFECT A 100 FT DEEP WELL (OR LENGTH OF PIPE) AT 50 PARTS PER MILLION (PPM)	
Diameter of pipe or casing	CHLORINE COMPOUND (BLEACH)
	5% Available Chlorine (household bleach – sodium hypochlorite) liquid
2 in	2 ounces (~60 ml)
4 in	9 ounces (~270 ml)
6 in	20 ounces (~600 ml)
8 in	2-1/8 pints (~1.0 L)
10 in	3-1/2 pints (~1.7 L)
12 in	5 pints (~2.4 L)
16 in	1 gallon (~3.8 L)
20 in	1-2/3 gallons (~6.3 L)
24 in	2-1/3 gallons (~8.8 L)

For wells with depths of 100 to 200 feet, use twice (2x) as much bleach as listed above. For wells with 6-10 inches in diameter with an unknown depth, use a full gallon of 5% bleach. Using a little more bleach is better than not using enough.

CHLORINE BLEACH DILUTION FOR DISINFECTING LARGE VOLUMES OF WATER – VALUES IN PARTS PER MILLION (PPM)					
Amount of water to be treated (gal)	CHLORINE COMPOUND (BLEACH)				
	5% Available Chlorine (household bleach – sodium hypochlorite) liquid				
	1 ppm	5 ppm	25 ppm	50 ppm	100 ppm
50	1 tsp	1 oz	3.5 oz	6.5 oz	13 oz
100	2 tsp	2 oz	6.5 oz	13 oz	26 oz
200	1 Tbl	3 oz	13 oz	26 oz	1 qt
500	1.5 oz	6.5 oz	1 qt	2 qt	1 gal
1,000	3 oz	13 oz	2 qt	1 gal	2 gal
2,000	6 oz	26 oz	1 gal	2 gal	4 gal
5,000	13 oz	2 qt	2.5 gal	5 gal	10 gal
10,000	26 oz	1 gal	5 gal	10 gal	20 gal
25,000	2 qt	2.5 gal	12.5 gal	25 gal	50 gal
50,000	1 gal	5 gal	25 gal	50 gal	100 gal

The source of the data for the above tables is from the CEHA "Disaster Field Manual"

If you require additional information, or have a particular problem, please contact Plumas County Environmental Health Department in Quincy at (530) 283-6355 or Chester at (530) 258-2536.