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# COUNTY OF ORANGE

## HEALTH CARE AGENCY

### ENVIRONMENTAL HEALTH

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#### WATER WELL DISINFECTION AND TESTING AFTER A DEBRIS FLOW OR FLOOD EVENT

##### Debris Flow or Flood Damage Properties – INDIVIDUAL WATER WELLS

Individual water wells may be contaminated as a result of debris flow or flood damage to well system equipment and piping, including the need to access the well casing or replace water lines for the well. Once all repair work is completed to the well and water lines, the well should be disinfected and water samples taken to a State Certified Laboratory for testing.

- The well pump, exposed piping, electrical supply lines, storage tanks and subsurface components of the water supply system may be damaged or destroyed by a debris flow or flood event. **It is strongly suggested** that water well disinfection procedures (see below) be implemented after repairs to the well and water distribution system have been completed. It is also recommended that a water sample be taken and submitted to a State Certified Laboratory for analysis (see list below). This is to ensure that any contamination that may have entered the well as a result of the damage has been mitigated.

**IMPORTANT:** Fuel and other chemical releases and spills are common during debris flow or flood events. If your water smells like fuel or has a chemical odor, it is recommended that a water sample be taken and submitted to a State Certified Laboratory for a chemical analysis before using the water for any purpose.

Use of in-home water treatment devices does not guarantee that the water supply from an individual water system is safe. In all cases, until you know the water is safe, use bottled water or a known safe source of water for all consumptive purposes.

##### **Safety Precautions**

When clearing hazards away from an individual water well prior to cleaning and disinfecting the well, the following safety precautions should be taken:

- Carefully inspect the area around the well for electrical and physical hazards. Those may include broken power lines on the ground or in the water; sharp metal, glass, or wood debris; open holes; and slippery conditions.
- There is a danger of electrical shock from electrical connections that supply power to any individual water well system that has been damaged by a debris flow or flood event. Consult a qualified electrician, well contractor or pump contractor before clearing debris or accessing the well.

- Do not turn on any electrical equipment if there is a persistent smell of fuel such as gasoline coming from the well head. Allow the well to vent. Do not continue with disinfection of the well until the contamination in the well has been removed.
- Before beginning disinfection of the well, clear debris away from it to avoid inadvertently moving debris into the well.

## WATER WELL DISINFECTION

Disinfection involves eight steps:

1. A chlorine solution containing at least 50 mg/L (or parts per million) available chlorine is added to the well. The table below lists quantities of various chlorine compounds required to disinfect 100-foot (30-meters) of water filled casing at 50 mg/L for diameters ranging from 2 to 24 inches (50 to 600 millimeters). Chlorine concentration can be easily measured with a simple pool test kit, if available.
2. If the well pump requires removal for repair or replacement, the pump and discharge pipe should be washed with a chlorine solution as it is lowered into the well.
3. After it has been placed into position, the pump should be turned on and off several times (e.g., “surged”) so as to thoroughly mix the disinfectant with the water in the well. Repeat this procedure several times at one-hour intervals.
4. Pump until the water discharge has the odor of chlorine. The chlorinated water should be pumped through the entire distribution system.
5. The well and associated piping should be allowed to stand without pumping for at least 24-hours.

Diameter of Casing In. (mm)	(70%) Calcium Hypo chlorite	(25%) Chloride of Lime	(5.25%) Sodium Hypo chlorite (Liquid Measure)
2 (50)	¼ oz. (7 g)	½ oz. (14 g)	2 oz. (59 ml)
4 (100)	1 oz. (28 g)	2 oz (57 g)	9 oz (266 ml)
6 (150)	2 oz. (57 g)	4 oz. (113 g)	20 oz. (0.6 l)
8 (200)	3 oz. (85 g)	7 oz. (0.2 kg)	2 ½ pts (1.0 l)
10 (250)	4 oz. (113 g)	11 oz. (0.3 kg)	3 ½ pts (1.7 l)
12 (300)	6 oz. (0.2 kg)	1 lb. (0.45 kg)	5 pts (2.4 l)
16 (400)	10 oz. (0.3 kg)	2 lb. (0.9 kg)	1 gal (3.8 l)
20 (510)	1 lb. (0.45 kg)	3 lb (1.4 kg)	1 2/3 gal (6.3 l)
24 (610)	1 ½ lb (0.7 kg)	4 lb. (1.8 kg)	2 1/3 gal (98.8 l)

6. The water shall then be pumped to waste until the presence of chlorine is no longer detectable. The absence of chlorine is best determined by testing for available chlorine residual using a test kit designed for this purpose.

Disposal of the waste should be away from trees, shrubs, or lawns and into storm sewers, drainage ditches, etc. Note that heavily chlorinated water should not be disposed of through the plumbing systems of homes that utilize individual sewage disposal systems (septic tanks). Such strong disinfectants could neutralize the bacteria needed to stabilize the sewage and also could damage the soil absorption system.

7. A bacteriological sample should be taken and submitted to a laboratory for examination.
8. If the laboratory analysis shows the water is not free of bacterial contamination, the disinfection procedure should be repeated. Depending on the level of contamination, it may be necessary to use a higher concentration chlorine solution (several times that shown in the table). The water should be retested. If the repeated attempts to disinfect the well are unsuccessful, a detailed investigation to determine the cause of the contamination should be undertaken.

When small individual domestic wells to be treated are of unknown depth or volume, at least one pound (0.45 kilograms) of calcium hypochlorite (70% available chlorine) or two gallons (7.51 liters) of unscented household bleach (sodium hypochlorite), such as Clorox or Purex, may be used in lieu of chemicals shown in the table referenced above.

Please Note:

- Some authorities recommend a minimum concentration of 100 mg/L. To obtain this concentration, double the amounts shown.
- Examples of trade names are: HTH, Perchloron, Pittchlor, etc.
- When dry chlorine is used, dry product should be mixed with water prior to use.

### **State Certified Private Laboratories for Drinking Water**

Below is a listing of State Certified Laboratories for drinking water and/or wastewater analysis. The following list is provided for information only. The County of Orange does not endorse the businesses listed.

Associated Laboratories  
806 N. Batavia Street  
Orange, CA 92926  
**(714) 771-6900**

Sierra Analytical  
26052 Merit Circle  
Laguna Hills, CA 92653  
**(949) 348-9389**

Cal Science Environmental  
7440 Lincoln Way  
Garden Grove, CA 92841  
**(714) 895-5494**

Truesdail Laboratories  
14201 Franklin Avenue  
Tustin, CA 92780  
**(714) 730-6239**

Clinical Laboratory of San  
Bernardino.  
21881 Barton Road  
Grand Terrace, CA 92313  
**(909) 825-7693**