



# COMMUNITY DEVELOPMENT SERVICES

## ENVIRONMENTAL MANAGEMENT DEPARTMENT

<http://www.edcgov.us/EMD/>

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**TO: Owners/Operators of Public Pools Located in the County of El Dorado**  
**SUBJECT: Procedures Following a Contamination of a Public Pool by Feces, Drowning Incidents, Vomitus or Dead Animals**

Contamination of a pool can be of great public health concern and can most commonly occur from fecal accidents, vomitus or dead animals. A drowning or a near drowning can cause an individual to become incontinent and thus can also provide a source for contamination. It is essential that when any of these incidents occur that you as the owner or operator act quickly to effectively mitigate any public health hazards stemming from the contamination of your pool. Listed below are the procedures you must take to adequately protect the users of your pool.

### **Background:**

Centers for Disease Control (CDC) revised the disinfection time required to kill pathogens, such as *Cryptosporidium* (*crypto*) from 9600 CT\* to 15,300 CT with 2.0 parts per million (ppm) non-stabilized free chlorine. *Crypto* is a one-celled parasite that can cause a gastrointestinal illness called cryptosporidiosis associated with diarrheal disease. CDC further advises that non-stabilized free chlorine (either calcium hypochlorite or sodium hypochlorite) be used to disinfect fecal accident contaminated pool water.

### **For All Fecal Accidents:**

- Have all pool users exit the pool. Maintain the pool closed for use while the sanitizing procedures are being followed.
- Remove all visible fecal material. Vacuuming stool from the pool is not recommended. If a pool water-vacuuming device is used, the waste water must be discharged to the sewer, not back into the pool recirculation system. Equipment used to remove visible fecal material is to be thoroughly cleaned and sanitized prior to storage.

### **For Formed (solid) Stool:**

- If the fecal accident involves a **formed stool** (solid, not liquid), raise the free available chlorine concentration of the pool water after removing the stool to 2 mg/L (parts per million) at a temperature of at least 77°F (25°C) and maintain the pH between 7.2 – 7.5 for at least 30 minutes before reopening the pool.

### **For Loose (diarrhea) Stool:**

- If the fecal accident involves **diarrhea** or a loose stool, raise the free available chlorine concentration to 20 mg/L (parts per million)†\*\* at a temperature of at least 77°F (25°C) and maintain the water's pH between 7.2 – 7.5 for at least 12.75 hours to achieve a contact time (CT) value of 15,300. *Crypto* CT inactivation values are based on killing 99.9% of *Crypto*. Per CDC recommendations, this level of *Crypto* inactivation cannot be reached in the presence of 50 ppm chlorine stabilizer∞, even after 24 hours at 40 ppm free chlorine, pH 6.5, and a temperature of 77°F (25°C). Extrapolation of these data suggest it would take approximately 30 hours to kill 99.9% of *Crypto* in the presence of 50 ppm or less cyanuric acid, 40 ppm free chlorine, pH 6.5, and a temperature of 77°F (25°C) or higher.

For fecal accidents involving diarrhea or loose stool, backwash the filter after reaching the CT inactivation value (after the 12.75 hours with 20 ppm). Be sure the effluent is discharged directly to the sewer and in accordance with state or local regulations. Do not return the backwash through the filter. Where appropriate, replace the filter media.

### **Additional Measures for all Fecal Incidents:**

- Ensure that the filtration system is operating while the pool reaches and maintains the proper free chlorine concentration during the disinfection process.
- Sanitizing of all pool interior surfaces and recirculation equipment will be required which would expose the interior pool and pumping-filtration equipment surfaces to the “15,300 contact time” equivalent.
- When the sanitizing-contact time period is completed, the pool can be re-opened for bathing provided excess free chlorine levels are reduced to acceptable values, the pH is balanced as needed, the filter(s) are recharged, and the recirculation system is operating.
- Establishment of a fecal incident log is recommended. Document each fecal incident by recording the date and the time of the event, whether it involved formed stool or diarrhea, and the free chlorine and pH levels at the time or observation of the event. Before reopening the pool, record the free chlorine and the pH levels, the procedures followed in response to the fecal incident (including the process used to increase chlorine levels if necessary), and the contact time.
- **Vomiting** in the pool while swimming is a common event. Often, vomiting results from swallowing too much water, meaning that the vomit is probably not infectious. However, if the contents of the stomach are vomited, it is important to act immediately. The germs most likely to be spread by vomit are noroviruses (also known as Norwalk-like viruses). Respond to the vomit incident (*when vomit contains more than regurgitated water*) as you would respond to a formed stool fecal incident. The time and chlorine level combinations needed to kill noroviruses and *Giardia* are similar. Since killing *Giardia* is the basis for CDC’s formed fecal incident response recommendations, this protocol should be adequate for disinfecting a potentially infectious vomit incident.
- **Smaller sized animals** that are found dead in a pool do not necessarily pose a health risk to swimmers. Many different types of domestic and wild animals — including skunks, birds, mice, gophers, rats, snakes, frogs, and bats — are commonly found dead in pools. Most germs carried by animals are killed by chlorine within minutes in a well-maintained pool.¥ To help ensure healthy swimming in a pool where a dead animal has been found and where the pool is not well maintained, the following simple steps below must be followed to remove the animal and disinfect the water:
  - (a) Close the pool to swimmers.
  - (b) Put on disposable gloves.
  - (c) Use a net or bucket to remove the dead animal from the pool.
  - (d) Double bag the animal in plastic garbage bags.
  - (e) Clean off any debris or dirt from the item used to remove the dead animal.
  - (f) Remove gloves and place them in the garbage bags.
  - (g) Close the garbage bags and place them in a sealed trash can to help keep wild animals away from the dead animal.
  - (h) [Wash your hands](#) thoroughly with soap and water immediately.
  - (i) Raise the free chlorine concentration to, or maintain it at, 2 parts per million (ppm); maintain the pH levels at 7.5 or less; keep the temperature at 77°F (25°C) or higher. The free chlorine and pH should remain at these levels for 30 minutes.
  - (j) Confirm that the filtration system is operating properly during this time.

- (k) Disinfect the item used to remove the dead animal by immersing it in the pool during the 30 minute disinfection time.

Exception:

**Dead raccoons in pools, however, can pose a health risk to swimmers.** Raccoons can be pests and can spread germs to humans. It is important to keep raccoons out of your pool and watch for raccoon feces (poop) in and around your pool. Raccoon feces can sometimes contain the eggs of a worm called *Baylisascaris procyonis*, which can infect humans, particularly children, and cause severe neurologic illness. Because *Baylisascaris* eggs are particularly tough, adding chlorine to the water will not kill them. If a lab test has confirmed that the raccoon was infected with *Baylisascaris* or you don't know if the raccoon was infected because the raccoon's feces were not tested, there are two options for cleaning your pool.

Remember to close the pool to swimmers until you have finished cleaning the pool.

Option 1:

- (a) Filter the pool for a minimum of 24 hours and then backwash the pool filter.
- (b) Put on disposable gloves to replace the filter media (if possible). Double bag the discarded material in plastic garbage bags. Remove gloves and place them in the garbage bags. Wash your hands thoroughly with soap and water afterwards.

Option 2:

- (c) Backwash the pool filter.
  - (d) Drain and hose down the pool.
  - (e) Put on disposable gloves to replace the filter media (if possible). Double bag the discarded material in plastic garbage bags. Remove gloves and place them in the garbage bags. Wash your hands thoroughly with soap and water afterwards.
  - (f) Refill the pool.
- **Bird Droppings** may contain many germs that can infect humans. Duck and goose droppings, in particular, might contain germs such as *E. coli*, *Salmonella*, *Campylobacter*, or *Cryptosporidium (crypto)*. Most germs in bird droppings are killed by chlorine within minutes in a well-maintained pool. The germ *Crypto*, however, has a tough outer shell that allows it to survive for a long time in the environment. *Crypto* can survive for days even in properly chlorinated pools. Respond to finding numerous bird droppings in the pool as you would respond to a formed stool fecal incident.

### **Notes:**

1. Fecal accident pool closure procedures are based on recommendations by the Centers for Disease Control and Prevention. (<http://www.cdc.gov>)
2. \*The CT inactivation value is the concentration (C) of free chlorine in ppm multiplied by time (T) in minutes (CT inactivation value = C x T). If you choose to use a different free chlorine concentration or inactivation time, you must ensure that the CT inactivation values remain the same. To determine the length of time needed to disinfect a pool after a diarrheal incident at 15 ppm, use the following formula:  $C \times T = 15,300$ . Solve for time:  $T = 15,300 \div 15 \text{ ppm} = 1020 \text{ minutes}$  or 17 hours. It would take 17 hours to inactivate *Crypto* at 15 ppm.
3. †Many conventional test kits cannot measure free chlorine levels this high. Use chlorine test strips that can measure free chlorine in a range that includes 20–40 ppm (such as those used in the food industry) or make dilutions with chlorine-free water when using a standard DPD test kit.

4. \*\*If a different free chlorine concentration or inactivation time is used, ensure that the CT inactivation values always remain the same.
5. High levels of chlorine may damage pool equipment. Exercise caution or consult with an experienced aquatic professional.
6. ∞Chlorine stabilizers include compounds such as cyanuric acid, dichlor, and trichlor.
7. ¥ A well maintained pool is defined as one with a free chlorine concentration of at least 1.0 ppm and 1.5 ppm when using Cyanuric Acid, with a pH range of 7.2-7.8.