



Healthy Pools. Healthy Bodies.

Flood, Hurricane, Seasonal Closure, and other Catastrophic Circumstances

Swimming pools and spas often are substantially contaminated due to catastrophic events like flooding, prolonged closure, and storm run off. The process the facility must go through to have the facility operational and the water sanitary depends on many circumstances. As a result, there is not one procedure that makes sense for every facility under every set of circumstances. This prevention advisor provides some guidance on several important areas to address when a pool or spa has experienced a catastrophic event and must be cleaned and prepared for use again.

A swimming pool or spa that experiences a catastrophic event needs to be rehabilitated before it can be used again. The facility needs to be isolated and appropriate barriers must be put in place to prevent accidental drowning. Next, the facility must be inspected to better understand any issues and the rehabilitation strategy. The water must be treated and circulated to reduce the risk of the becoming a breeding ground for mosquitoes and becoming a vector for mosquito-borne diseases. Stagnant water also can breed algae and bacteria, which can further contaminate the plumbing and filter systems once they are turned on. Ideally, all debris, dirt, slime, etc. should be removed from the pool. Next, the system should be decontaminated/disinfected. Water should be replaced with potable (drinking) water and normal water treatment operations should commence. Finally, operators should review a start up checklist and inspection to make sure the facility is ready for use. Each of these steps faces some challenges after a catastrophic event.

1. Pool or Spa Assessment / Inspection
2. Drain the pool or spa
3. Decontaminate the pool or spa systems, including the circulation system and filters
4. Water Replacement and Treatment

Depending on the facility and the equipment present, other steps may be needed. Consult with equipment manufacturers for guidance on their specific equipment. Verify with the local health department if an opening inspection is needed. Review local health codes to better ensure compliance.

1. **Pool or Spa Assessment / Inspection**
 - a. The following represent assessment/inspection items that should be addressed to ensure proper operations before the pool or spa is opened for use:
 - i. Inspect the grounds, barriers and gates, safety equipment, the pool itself, deck, bathhouses, and pumps for broken or malfunctioning equipment.
 - ii. Have a qualified electrician, technician, or contractor inspect and repair or replace equipment or wiring that may be damaged including pumps, controllers, meters, power supplies, grounding, bonding, etc.

- iii. Have a qualified technician or contractor inspect and repair or replace heater(s), filter(s), chemical feeder(s), and other circulation system equipment.
- iv. Make sure that the main drain is visibly attached and fully intact and satisfies the ASME/ANSI A112.19.8M anti-entrapment standard. In the event the pool does not have dual drains with anti-entrapment covers, ensure compliance with the Virginia Graeme Baker Pool & Spa Safety Act with additional layers of entrapment protection. Replace and/or repair as needed with qualified workers or contractors. For more information about the Act, go to www.nspf.org. If main drains are not visible, address this item during a later step.
- v. Inspect all inlets and outlet fittings.
- vi. Empty and clean the skimmer baskets or gutters.
- vii. Remove debris, sweep, rinse, and disinfect the decks.
- viii. Clean the hair and lint strainer.
- ix. Restock the first aid kit.
- x. Inspect and replace (if needed) personal protective equipment if necessary.
- xi. Inspect and replace (if needed) drowning prevention/rescue equipment, warning signs and other safety equipment.
- xii. Make sure the emergency phone is working.

The pool inspection topics described above may be useful criteria to review prior to opening a facility for use. The local health department inspection checklist and the local health department code are important references to identify additional inspection criteria. Additional inspection items are listed in the NSPF® Pool & Spa Operator™ Handbook in Appendix 1.

2. Draining the water and Decontamination

- a. Depending on how dirty the water is, operators will have to judge if it makes sense to add disinfectants (also called sanitizers), flocculants/clarifiers to begin disinfecting the water and removing solids from the water, plumbing lines, filter(s), and other circulation system components. The second option is whether to drain and clean the pool and equipment.
- b. Since the ground water table in the area will be higher than normal after a flood or storm, it is very important that the pool or spa not be drained without a hydrostatic relief valve to avoid the pool from being “lifted” from the foundation due to ground water pressure. As a result, a complete drain may not be possible and a partial drain may be the only option.
- c. You may have to wait until the waste water systems in your area are functioning and the water treatment facilities can handle the large volume of water that would come from draining a pool. Before you begin draining, contact the local water department to ensure the system can handle the large amount of water you will be discharging. Follow any normal reporting requirements by the waste-water treatment facility.

- d. If it is safe to drain the pool, do so using the normal procedure taking into account the high water table and the possibility of not being able to completely drain the water.
- e. A portable pump may be needed to remove all the water from any place where the water stands and does not drain.
- f. While the water is draining, rinse and clean the sides several times.
- g. While the pool is drained, it may be an appropriate time for other preventative maintenance including an acid wash of the surfaces, installing dual-main drains, painting, verifying all drain covers comply with ASME/ANSI A112.19.8M standards including the labeling on the drain cover.
- h. In the event the facility decides to clean and treat the pool without draining it, then skip to the decontamination section below.

3. Decontamination

- a. If the water could not be drained:
 - i. Superchlorinate the water and add water clarifiers or flocculants to help settle debris to the bottom. Test and adjust the water pH between 7.2 and 7.8.
 - ii. Debris that settles to the pool bottom should be vacuumed to waste to reduce the risk of plugging the filter and to remove contaminants that will consume chlorine.
 - iii. Maintain the chlorine level and circulate the water. In a spa, make sure that the jets are set at their maximum. Also for a spa, turn the aerator (blower) on and off about every five minutes, while the water is circulating. This will ensure that the air lines are being disinfected.
 - iv. Test the chlorine level and pH in the evening and again in the morning to see if the water has maintained a residual. This will help you understand if there is substantial contamination remaining in the water requiring additional chlorine, flocculants, and/or clarifiers.
- b. If the water has been drained or partially drained:
 - i. Remove all large debris left behind by brushing the pool shell. You should also check the pool or spa shell for any damage that may have been caused. If there is damage, make sure repairs are performed after the surface has been cleaned.
 - ii. Once the debris has been removed, the next step is to clean the pool or spa with a surface cleaner. This surface cleaner can be a mild hydrochloric acid solution (10%) or other surface cleaners designed for recreational water applications.
 - iii. Once the cleaning is accomplished, rinse off the surface to remove any cleaner or acid solution.
- c. Clean or replace the filter with a cleaned, disinfected, or new cartridge filter, fresh sand or fresh DE. Various filter cleaners are available.

4. Water Replacement and Treatment

- a. Refill the pool or spa with fresh potable water.

- b. Once the appropriate water level has been reached, turn the circulation system on and begin to balance the water. Summarized below are the ideal water balance levels; for more information about water balance and pool operations refer to the NSPF® Pool & Spa Operator™ Handbook:
 - i. 200-400 PPM of calcium hardness (150-250 PPM for spas)
 - ii. 80-120 PPM of total alkalinity
 - iii. pH between 7.4 – 7.6
- c. The disinfectant level should be brought up to the level according to the local or state health department regulations and product label directions.
- d. To verify that the decontamination has been achieved, the pool or spa water should be treated with 10 PPM of chlorine disinfectant.
- e. Allow the pool or spa to circulate overnight, or for a period of 8-12 hours, and then check the disinfectant level in the pool or spa.
- f. If free chlorine is consumed overnight, then a demand still exists. If this is the case, inspect and decontaminate plumbing lines, filter(s), and other circulation system components.
- g. If sufficient chlorine residual is found, then proceed with the next step of conducting a complete inspection of all areas of the pool or spa.