



ENVIRONMENTAL HEALTH EMERGENCY PREPAREDNESS AND RECOVERY GUIDANCE MANUAL

NORTH CAROLINA

Revised 2018



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Introduction

Preparing for a disaster involves understanding and awareness of hazards that exist and developing plans of action to use before, during and after an emergency. There are four phases of disaster management: mitigation, preparedness, response and recovery. Mitigation is any action that reduces the likelihood of a disaster or reduces the impact the disaster will have. Preparedness is any plan or preparation made to aid in response operations. Response is any action that is taken to reduce damage and save lives and property immediately after a disaster. Recovery is the action taken to return to normal operation following a disaster. This manual will cover all four phases of disaster management and provide tools to assist environmental health specialists during a variety of emergencies or natural disasters.

MITIGATION - PLAN TO MINIMIZE LOSS DURING DISASTER

While a generalized set of operational guidelines CANNOT be put in place to prepare food establishments for all food safety concerns during a disaster, the following are recommendations to minimize loss in a food establishment.

FOOD PROTECTION:

Put as many perishables in the freezer as soon as possible when preparing for a potential disaster. Since freezers are designed to hold temperature better when they are fully stocked, moving the food to the freezer will increase the chances that all the food will remain 41°F or less for longer periods of time if power is lost. It is not recommended to use ice or frozen foods to attempt to regulate temperatures in lift top or other cold food preparation equipment. Putting ice in these units too close to a thermostat/sensor could trigger a defrost cycle or prevent the unit from cycling on and circulating air.

WATER SUPPLY:

Buy bottled water before the storm or fill gallon jugs with water. Bottled water may also be frozen and used as space fillers in the freezer.

ICE:

Put leak-proof containers of ice in the freezer. This will provide a safe source of ice after a disaster and will help to keep a freezer cold during a power outage. Turn off the water supply to ice machines prior to the emergency or disaster; it should remain off until the water supply can be assessed by the water authority.

WASTEWATER:

If a power failure is anticipated and an establishment has a wastewater pump tank, it is advisable to use the manual setting on the pump control box to reduce the amount of water in the pump tank. Taking this action will provide extra storage capacity for wastewater during response time. Any owner or manager of an establishment served by an onsite system should be instructed to contact the system operator or the local health department for additional guidance.

Preparedness

Preparation for a disaster should always be undertaken before a disaster strikes. To that end all environmental health staff should be familiar with the Incident Command Systems (ICS) structure. The link to online training can be found here: <http://training.fema.gov/IS/NIMS.aspx>. All staff should complete ICS 100, 200, 700, and 800. Additional trainings are helpful, and environmental health specialists should look for opportunities to participate in trainings or tabletop exercises with other state and county agencies.

Staff should be familiar with the roles and responsibilities they may have in an emergency. Each agency should have a disaster response policy in place. New employees should be introduced to these plans as part of orientation, and all employees should review plans when updated or annually. It is important to be familiar with the activities you may be called upon to perform. In the event of an emergency, normal job activities may be suspended.

DISASTER KIT

Items to keep in your vehicle

- One warm blanket or sleeping bag
- Cell phone or emergency phone, with auxiliary power and both standard and mobile chargers
- Boots or extra "rugged" shoes; water resistant boots in flood prone areas
- Extra warm clothing and socks (pull-overs, sweatshirts, sweatpants, gloves, and raincoat)
- Lightweight long sleeve shirts and pants to protect against mosquitos for warm weather
- Snacks, such as crackers with cheese or peanut butter, granola
- Bottled water
- Anti-bacterial towelettes and hand sanitizer
- First aid kit
- Insect repellent
- Pepper spray (to be used for protection from aggressive animals)
- Flares
- Non-clumping kitty litter for traction
- Small shovel
- Flashlight with new batteries
- Heavy gauge jumper cables
- Ice scraper

It is important that vehicle maintenance is performed regularly so that all vehicles are prepared for disaster response. When anticipating response to a disaster, oil, fluid levels, and tire pressure should be checked. In addition, there should always be a mobilization and demobilization plan in place. This plan will ensure that everyone is accounted for when traveling to and from home or work sites. Sharing travel plans with family and friends will help to make sure that authorities can be notified if an employee's return does not happen within the expected time frame. If bad weather is expected, tell someone the route you will be taking. Emergency services can assist more quickly if they know the area traveled. Make sure the location service is enabled on your cell phone.

EMERGENCY SUPPLIES FOR ENVIRONMENTAL HEALTH

- Prior to event, evaluate staff vaccination status and seek guidance from medical provider
- Identification – both county and state
- Personal Protective Equipment
 - Gloves – single use food grade plastic gloves and leather work gloves
 - Safety glasses
 - Particulate dust masks (must be properly fit tested)
 - Hard hats (if necessary based on response plan)
- Cell phone with charged batteries, backup batteries and standard/mobile chargers
- Battery powered radios
- Emergency contact list including home and cell phone numbers
- Emergency contact plan and location
- Digital or disposable camera
- Plastic bags, assorted sizes as well as biohazard bags
- Bottled water
- Shelf stable food and snacks
- Clipboard, notebooks, pens and pencils
- Large flashlight with extra batteries
- Duct tape
- Notices that may need to be posted (Do not drink water, boil water, etc.) and any other educational material
- First aid kit
- Insect repellent
- Soap and paper towels, pre-moistened detergent towelettes
- Toiletries and medications needed for travel
- Cash

It is important to remember to use 4-wheel drive vehicles, if available and to fill vehicles with fuel prior to the emergency.

ADDITIONAL EQUIPMENT FOR FOOD AND LODGING STAFF

- Thermometer / thermocouple
- Alcohol prep pads
- Flashlight
- Food grade plastic gloves
- Alcohol based instant hand sanitizer
- Sanitizer test strips
- Forms or other paperwork (embargo, intent to suspend, immediate suspension, product disposition)
- Spare batteries for equipment as needed

ADDITIONAL EQUIPMENT FOR ON-SITE WATER PROTECTION STAFF

- Boots – appropriate for conditions
- Outdoor clothing
- Snake gaiters / snake bite kit
- Water sample collection supplies
- Caution tape and flashlight
- Educational materials discussing septic tank maintenance

DEPLOYMENT AND REQUESTING ASSISTANCE

During a disaster, counties or other states may request assistance from Environmental Health Specialists to assist in storm surveillance and recovery efforts. Any request for assistance to your county must be made through the county Emergency Management system. Contact local Emergency Management personnel, or the Public Health Preparedness and Response (PHP&R) section of NC DHHS for questions about requesting assistance. The following is the procedure that will be followed once a formal request has been made.

- An email will be sent to local health directors requesting permission for employees to deploy, with specific information about dates of deployment, location, and length of time
- Health Directors must work with EH Directors and staff to determine who is willing and available for deployment
- A survey will be included with the email to determine availability and willingness to deploy
- Needed EH staff will be contacted by phone by NC DHHS PHP&R employees, who will verify the contact info, availability, and the critical information about the deployment
- Verification email will be sent at that time to the EHS who is deploying and the supervisor, with the specific information from the phone call in writing
- PHP&R closely monitors environmental situations for the safety and well-being of all deployed personnel, and will make daily phone calls to deployed EHS to ensure constant situational awareness
- Emergency authorization protocol (only requiring signatures from the two local health directors) to simplify authority for volunteering staff.
- NC Emergency Management, FEMA or others may reimburse health departments for expenses during an emergency, and those details will be provided during the deployment request.

EDUCATION OF COMMUNITY PARTNERS

Education of community partners is most effective when provided in advance of a disaster. Restaurants, daycare operators, and other business owners, as well as homeowners and concerned citizens will be better able to respond with appropriate actions if procedures have been addressed ahead of the disaster. Education should be started early and repeated often. Since hurricanes regularly impact North Carolina, hurricane preparedness reminders should be sent to partners at the start of the hurricane season, particularly in areas that receive frequent storm damage. Some handouts and educational materials are provided at the end of this document.

During a Disaster

RESPONSIBILITIES OF THE REGULATORY AUTHORITY DURING AN EMERGENCY

One of the first things that must be done in an emergency is to determine if there is an imminent health hazard. According to the North Carolina General Statutes, NCGS § 130A-2, an “imminent hazard” is defined as “a situation that is likely to cause an immediate threat to human life, an immediate threat of serious physical injury, an immediate threat of serious adverse health effects, or a serious risk of irreparable damage to the environment if no immediate action is taken.” During an imminent hazard situation, the NC General Statutes waive the necessity to obtain a warrant for right of entry (see NCGS § 130A-17).

Any permitted or regulated establishment may result in an imminent hazard being created. There is more specific information for food establishments during an emergency according to the Food Code. The following are specific requirements for food establishments in an emergency per the Food Code.

8-404.11 Ceasing Operations and Reporting.

(A) Except as specified in ¶ (B) of this section, a PERMIT HOLDER shall immediately discontinue operations and notify the REGULATORY AUTHORITY if an IMMINENT HEALTH HAZARD may exist because of an emergency such as a fire, flood, extended interruption of electrical or water service, SEWAGE backup, misuse of POISONOUS OR TOXIC MATERIALS, onset of an apparent foodborne illness outbreak, gross insanitary occurrence or condition, or other circumstance that may endanger public health.

(B) *A PERMIT HOLDER need not discontinue operations in an area of an establishment that is unaffected by the IMMINENT HEALTH HAZARD.*

8-404.12 Resumption of Operations.

If operations are discontinued as specified in Food Code § 8-404.11 or otherwise according to law, the PERMIT HOLDER must, when required, obtain approval from the REGULATORY AUTHORITY before resuming operations.

The declaration of an imminent hazard is made by the local Health Director. Environmental Health Regional Specialists as well as the EH Section Emergency Preparedness and Outbreak Coordinator will be available to assist in determining if an imminent hazard exists. Proper communication and documentation will be important in situations where an imminent hazard exists. Documents such as immediate permit suspension forms, embargo forms, and product disposition forms must be used, and can be found on the EH Section website.

Emergency Shelters

Guidelines for sanitation and infection control in shelters, adopted from the Centers for Disease Control and Prevention (CDC) Preparedness and Response. For more information visit [the CDC emergency response website](#).

RESPIRATORY HYGIENE

When emergency shelters are established, precautions should be taken immediately to reduce and prevent the spread of communicable disease. The following measures to contain respiratory secretions are recommended for all individuals with signs and symptoms of a respiratory infection:

- Cover mouth/nose when coughing or sneezing;
- Use tissues to contain respiratory secretions and dispose of them in the nearest waste receptacle after use;
- Perform hand hygiene (e.g. hand washing, alcohol-based hand rub, or other antiseptic hand wash protocol)

COT AND SLEEPING MAT SPACING

The CDC guidelines for shelters, as well as the NC shelter assessment tool advise that adequate cots, beds, or sleeping mats should be available for all individuals, with bedding available to be changed as needed. The recommendation is to provide space of 40 square feet per person in a general shelter, with at least 3 feet between cots, beds or mats.

FOOD SERVICE

Food handling in an emergency shelter situation can be challenging; because conditions will not be ideal, it may become impossible to meet all rules found in the NC Food Code Manual. However, it is important that all main risk factors are addressed (approved sources, employee hygiene, proper holding temperatures, proper cooking temperatures, protection from cross contamination).

Guidance should include the following:

- All individuals with symptoms of foodborne illness (vomiting, diarrhea, sore throat with a fever, jaundice, infected cut or sore on exposed hands and arms) must be excluded from handling food or utensils and should be restricted from the food preparation and serving areas.
- Proper hand washing should be followed by the individuals preparing and serving food. If potable water is not available, a 60-70% alcohol instant hand sanitizer can be used after any visible contamination has been removed from the hands. Pre-moistened towels can be used for removal of visible contamination. However, temporary handwashing stations using potable water in beverage dispensers or other means should be set up as quickly as possible, and traditional handwashing methods used whenever possible.

- Bare hand contact must be eliminated using clean utensils, proper glove use, or menu restrictions.
- Potentially hazardous food, also known as time/temperature control for safety (TCS) foods must be held above 135°F, below 41°F, consumed, or discarded within 4 hours.
- Unless dishwashing equipment is available to wash, rinse, and sanitize multi-use utensils, only single service items should be used.
- If water supplies are compromised, limit food production and service as specified in the water sections of this manual. Foods which are frozen or from hermetically sealed packages and move directly to the oven or fryer without further preparation should be used.
- Areas used for food preparation and all food service equipment and utensils should be cleaned, and then sanitized with a solution of 50-200 ppm chlorine or equivalent after each use.
- Foods prepared in domestic, unregulated kitchens and brought to the shelter should not be served.

ADDITIONAL SHELTER CONSIDERATIONS

Shelters must be prepared with plans for waste disposal, laundry, and toilet and handwashing supplies. A list of shelters that can accept pets and companion animals should be prepared. Shelters that accept pets must have proper supplies to care for animals. Some shelters may also provide medical and counseling services. Day care facilities may be forced to closed until cleared by fire marshal or building officials. Emergency child care facilities may need to be opened or childcare may be provided at the shelter. Specific information on shelter child care are found on the shelter assessment form.

SHELTER ASSESSMENTS

Assessments of emergency shelters should be performed periodically to ensure that adequate supplies are available and needs of people within the shelter are being met. The NC Shelter Assessment form is included at the end of this document and can be found at: <http://epi.publichealth.nc.gov/phpr/docs/NCShelterEnvironAssessForm.pdf>

Other Issues to Consider During a Disaster

ANIMALS

Floodwaters may drive or relocate snakes and other wild animals from their usual habitats, and storm debris may provide harborages for animals to shelter. Domestic pets may become disoriented and agitated, posing a threat to both first responders and residents. If debris needs to be moved or removed, use a tool with a long handle or stick to ensure animals are not in hiding in the area. If domestic animals need to be removed from an area, contact the county animal control office or the NC Animal Response Team for help.

CHEMICALS

Children should not be permitted to play in floodwaters or mud following a disaster. Floodwaters travel through multiple unknown areas that may contain chemicals or other harmful substances. These waters can carry harmful chemicals into houses and residential areas. Rising water can dislodge storage tanks and piping, allowing hazardous materials to flow downstream. Do not attempt to move dislodged tanks, drums or containers without contacting the fire department or hazardous material team to assess the potential danger. Signs of toxic chemical exposure include skin irritation and burning of mucous membranes. Working in chemically contaminated areas requires special personal protective equipment and knowledge of how to work with the hazards.

MOLD

Following heavy rain or flooding, mold growth can pose a significant health hazard. Some molds produce toxins or other respiratory irritants that can have long-term health effects. Assume any items wet longer than one day after water recedes are likely to have mold growth. Mold can grow unseen inside the cavities in walls and produce toxins and irritants when not visible. Walls in flooded areas should be removed to the studs, cleaned, disinfected and allowed to dry thoroughly before rebuilding. Clothing and other fabrics exposed to floodwaters need to be discarded or cleaned and dried as soon as possible. Heating and air conditioning ducts and equipment exposed to floodwaters can become a recurring source of mold exposure unless properly cleaned and disinfected.

MOSQUITOES

Mosquitoes have the potential to increase in numbers after significant rain or flooding and may carry a variety of dangerous diseases and become a nuisance during recovery. To reduce mosquito breeding, drain any standing water immediately. Wear long-sleeved clothing and use insect repellants containing DEET or picaridin when working in flooded areas or other areas where mosquito activity is high.

Response

Permitted food establishments should act as soon as it is safe to minimize product loss and maximize food safety following events such as power loss and flooding. Consider the following recommendations to help ensure compliance with applicable rules and requirements for any establishment. Before an establishment can reopen, these four categories must be assessed and deemed safe: physical safety, safe water supply, approved wastewater disposal, and safe food supply.

PHYSICAL SAFETY

ELECTRICITY:

If an establishment or regulated facility has been affected by flood waters and still has electrical power, an electrical safety hazard may exist. Contact the local Planning & Inspections Department before entering any flooded establishment. The level of danger from electrocution varies depending on the amount of flood water that entered the establishment. There may be little or no risk if water did not get high enough to contact any electrical connections or outlets. There may be concerns associated with hidden junction boxes and any existing wiring that does not meet code and may have gotten wet.

If there is a potentially dangerous situation, power should be disconnected to the establishment and a temporary power pole should be installed to provide a safe source of electrical power, so the establishment can conduct cleanup activities that require electricity.

GENERATORS:

No generator should EVER be connected directly to the panel box without the approval of the local Building Code Official. A generator should be installed before a storm, by a licensed electrician who will install the proper transfer switch. To ensure public safety at any commercial business, ALL work must be done under a permit issued by the local code enforcement office.

Portable generators can be used for equipment that can be directly plugged to them. Equipment that has been flooded or otherwise damaged should not be used. **Generators should never be operated inside a building due to the risk of carbon monoxide.**

SAFE WATER SUPPLY

Public water supplies will issue notices and/or advisories regarding the safety of the water supply if there has been any damage or disruption to the water supply. Questions regarding the safety of a public water supply may be directed to the water authority. If a well has been flooded or otherwise damaged, it should be tested prior to use. Flood waters contain many contaminants that can affect water safety. Water emergencies are discussed with specific guidance and requirements beginning on page 19 of this manual.

LACK OF WATER:

If an establishment has no water, insufficient pressure or capacity of water, they cannot remain open. Establishments must voluntarily close, or the permit should be suspended until water service can be restored. Since there are food establishments that have been granted a variance for emergency water operations, check establishment files to make sure a variance does not exist before suspending the permit. In a food establishment, the amount of water and pressure needed to safely operate will vary depending on menu, size, and complexity of operation. During water main breaks or other water emergencies, the availability of water under pressure may change rapidly and often. Proper communication with all establishments, with clear language regarding expectations is important.

LACK OF HOT WATER:

If an establishment has no hot water due to storm damage or failure of water heater, suspension of the permit is not always necessary. The establishment should be evaluated to determine if proper procedures and equipment are in place in the establishment to allow operation until hot water is restored. Items to consider include type of chemical used for cleaning and sanitizing, dish machine type and visual observation of compliance with hand washing, cleaning and sanitizing procedures.

APPROVED WASTEWATER DISPOSAL

MUNICIPAL OR PUBLIC CONNECTIONS:

If sewage and wastewater cannot be adequately and properly removed from the facility, the establishments' permit will be suspended. Sewage collection can be affected by many factors during a disaster, including loss of power or damage to wastewater treatment facilities. Water conservation efforts must be put in place to help minimize sewage spills or backup into an establishment.

ON SITE WASTEWATER:

Systems that have been saturated with flood waters must dry to function properly. Many wastewater systems rely on electricity to operate. These systems should not be used until they are working properly. Small amounts of water can cause a backup of sewage into an establishment if the wastewater system is not operating properly. Sewage backup into an establishment requires immediate permit suspension.

SAFE FOOD SUPPLY

According to the Federal Food, Drug, and Cosmetic Act, “a food shall be deemed adulterated if it bears or contains any poisonous or deleterious substance which may render it injurious to health...”. Food that has been contaminated or adulterated in a food establishment must be discarded, along with any food that is suspected to be contaminated or cannot be determined to have met storage and temperature requirements. **When in doubt, throw it out.**

PHYSICAL OR CHEMICAL CONTAMINANTS

Physical or chemical contamination of food can come from many sources, including flood waters, building or equipment debris, broken containers, fire extinguishers, etc. Foods, including packaged food products, that have been contaminated by any physical contamination must be discarded. However, food in hermetically sealed cans that show no evidence of damage can be cleaned, sanitized and used provided the food inside will be cooked thoroughly to 165°F. For specific instructions on cleaning undamaged cans, refer to Appendix A.


BIOLOGICAL CONTAMINANTS:

A combination of time and temperature is the key to controlling most biological contaminants. **If the power has been off for more than four hours, refrigerated foods need to be evaluated to determine safety of the product. Establishments with questions regarding safety of food after power outage should be instructed to Contact the local health department before operation.** If the power has been off for less than four hours, it is likely that the food has not been in the temperature danger zone for more than four hours and will not have to be discarded if the refrigeration is operating properly and proper food handling practices are in place. However, high risk foods, or facilities that serve highly susceptible populations, may pose greater risk. Frozen foods that have not exceeded 41°F can be refrozen or maintained at refrigerator temperatures. Frozen foods that have, in whole or in part, exceeded 41°F for longer than four hours must be discarded.

LOSS OF POWER AND FOOD SAFETY RESPONSE

During a complete power loss, it is not safe for a food establishment to remain open. Establishments which do not close voluntarily should have their permit immediately suspended until power is restored and the food supply is evaluated. When power is lost, all refrigerated and frozen foods should be evaluated before used or refrozen. The loss of power means loss of temperature control for refrigeration and freezers, unless back-up power is in place. When this type of power loss event occurs, the food must be examined to determine if it is safe for human consumption.

To ensure food is safe, use a thin probe, tip sensitive thermometer to determine if any of the TCS food has risen above 41°F. All TCS food which has been above 41°F for longer than four hours or an unknown amount of time should be discarded. TCS foods 41°F or below, should be returned to properly functioning refrigeration equipment and monitored to make sure the proper temperatures are maintained. Foods can also be cooked to proper temperatures immediately for



service or hot holding if adequate refrigeration is not available. Frozen, partially-thawed food is safe to cook or refreeze if it has not risen above 41°F. It is important to ensure proper storage of ready-to-eat foods above and away from raw meats in freezers. If there is a partial thaw event, raw meat products could provide a source of cross contamination and could result in food being discarded.

It is important to keep refrigeration units closed to help with temperature control. The amount of time a refrigerator can maintain temperature once power is lost depends on multiple factors such as temperature of cooler and size of the unit; a full freezer can be expected to keep food cold for 24 to 48 hours. Make sure all TCS food temperatures are evaluated immediately after power is restored. Any TCS food that has been above 41°F for more than four hours, or for an unknown amount of time, the food should be discarded.

Block ice can be purchased and used to assist in maintaining freezer temperatures in the event of a prolonged outage. Dry ice can also be used. Fifty pounds of dry ice should be adequate to hold an 18-cubic foot full freezer for two days. Dry ice produces carbon dioxide, a heavy gas that will remain in low spots without assisted ventilation. Ventilate indoor areas well to avoid hazardous carbon dioxide concentrations and avoid skin contact with dry ice. Symptoms of exposure to carbon dioxide include hyperventilation, headaches, shortness of breath, and perspiration.

FLOODWATER AND FOOD SAFETY RESPONSE

Do not eat any food that has contacted floodwaters. Discard any food in a non-waterproof container if it has been in contact with or may have contacted floodwaters. Undamaged, commercially canned foods can be saved if properly disinfected (see Appendix A). Food containers with screw-caps, snap lids, and home canned foods should be discarded if they have contacted floodwaters because they cannot be disinfected.

Paper products and other single service items cannot be adequately cleaned after contact with flood water. These items must be discarded if they contact or may have contacted flood waters. To avoid having to discard single service items, move them to a higher shelf, off floor and away from windows prior to a potential storm.

Discard wooden cutting boards, plastic utensils, baby bottle nipples and pacifiers if they have contacted floodwaters as sanitation of these items cannot be ensured. Thoroughly wash metal pans, ceramic dishes and utensils with soap and hot water, and sanitize by boiling them in clean water or by immersing them for 15 minutes in a solution of one teaspoon of chlorine bleach per quart of water.

Recovery – Guidelines for Cleaning and Sanitizing

Note that for remodeling work, it may be necessary to obtain building permits and/or review of the site for the presence of hazardous materials (asbestos and/or lead based paint).

EQUIPMENT

Thoroughly clean and sanitize all salvageable equipment. Use a detergent and a sanitizing solution made with one cup of bleach in four gallons of water. Equipment may be saved if:

- It is made of stainless steel or other nonabsorbent materials.
- It contains only non-absorbent, closed cell polyurethane insulation.

Refrigerators, freezers and other equipment with fiberglass insulation must be evaluated to see if the insulation has been flooded. If so, the insulation must be removed and replaced. Styrofoam or closed cell polyurethane insulation could be cleaned per the manufacturer recommendations. A thorough inspection of the electrical components (wiring, compressors, switches, etc.) by a qualified professional is vital to determine if replacement is needed. Water heaters should be replaced if floodwaters got into the gas burner, electrical parts, or insulation.

Take the following precautions when salvaging post-mix and beverage machines, coffee or tea urns, ice machines, glass washers, dishwashers and other equipment with water connections:

- Flush waterlines, faucet screens and waterline strainers, and purge fixtures of standing water.
- Clean and sanitize all fixtures, sinks and equipment using detergent proper sanitizing.
- Also see Section (x), "Decontamination of Ice Machines."

Discard any damaged equipment that cannot be repaired to ANSI standards, or includes flood-damaged wood, or plastic laminate components (counters, cabinets, bars, etc.)

WALK-IN COOLER RESTORATION GUIDELINES

In general, the walk-in cooler in a flooded food service facility needs to be individually reviewed due to factors such as length of time and severity of damage. Remediation techniques will not guarantee the absence of odors that may develop in the future.

- If the inside of the cooler has a quarry tile floor with 6-inch sealed coving and the water did not rise above the coving, the interior surface can be cleaned by scrubbing with soap and water, then sanitized with a solution of one cup of bleach with four gallons of water. Ensure adequate ventilation when cleaning this enclosed space.
- If the inside of the cooler has walls that connect directly to the floor, and the caulking seal is intact, the interior surface can be cleaned by scrubbing with soap and water, then sanitized with a solution of one cup of bleach with four gallons of water. Verify the walls of the cooler are made of wood frame with closed foam insulation before cleaning. If the inside of the walk-in cooler has been previously damaged and the floodwaters rose above the damaged areas, the entire panel will need to be replaced.
- The panels can be disassembled, cleaned and sanitized to remove debris if the walk-in cooler is free standing and there is not a satisfactory seal at the wall and floor juncture.
- If the walk-in cooler has a permeable wood floor, it must be replaced after a flooding event.
- If the walk-in cooler has an aluminum interior floor, it should be removed, and the area underneath should be power-washed to remove debris.

FURNISHINGS AND FURNITURE

Furnishings and fixtures that are porous or absorbent will need to be discarded if they have been in contact with floodwaters. Examples are:

- All upholstered furniture (chairs, bar stools, benches, booth seats and bar arm rests);
- Any tables or booths that cannot be thoroughly cleaned and sanitized; and
- Books and paper products that cannot be cleaned.

Clothes and drapes can be washed with potable water containing a sanitizing agent, such as bleach. Cloth items which say dry clean may be salvaged by dry cleaning.

FLOORS, WALLS AND CEILINGS

If floodwater has soaked the sheetrock, insulation or ceiling tiles, remove these items to 30 inches above flood line. Paneling may be removed and saved. Proper air circulation must be maintained to allow for the drying of studs and walls. Wet studs and sills do not need to be replaced if allowed to dry properly. Flooded portions of studs and sills should be cleaned and treated with bleach and water solution.

Undamaged walls, hard surfaced floors and other surfaces should be cleaned and disinfected with a solution of one-quarter cup of bleach to one gallon of water. Vinyl wall covering should be removed and cleaned properly or discarded. Ceilings should be evaluated to determine if roof leaks have caused damage to ceiling tiles. Any acoustic tiles that are not cleanable must be discarded.

Flooring such as linoleum must be discarded if soaked, but tiles and vinyl flooring can be saved if cleaned and sanitized. Tiles and vinyl should be removed when on wooden subfloor so that it can be properly dried. Wall-to-wall carpet and padding must be discarded if soaked.

CHILD CARE CENTER RECOVERY

Environmental Health Specialists should contact Division of Child Development and Early Education (DCDEE), which holds the license for child care centers, to discuss recovery and reopening after a storm. DCDEE maintains a disaster plan for use in their licensed facilities and will help to provide guidance for child care centers. The Appendix C contains the DCDEE checklist for weather events used for child care centers. For more information, visit the [Emergency Preparedness section of the DCDEE website](#).

If the child care center has a well for water supply that has been covered with floor water, it must be chlorinated and tested prior to use. The local health department should provide complete instructions on chlorination. It will be important to know the diameter of the well casing and the depth of the well to complete chlorination. Flooded septic systems must also be evaluated before use.

LODGING AND INSTITUTION RECOVERY

Along with food and furnishing concerns that will be present in lodging and institution establishments, assessment of mattresses and other bedding must be done to determine what items can be salvaged and what must be discarded. Laminate or particle board furniture that has been warped or damaged should be discarded. Mattresses that have been contacted by floodwaters must also be discarded. Companies that specialize in clean-up following flooding may be used to determine what can be salvaged in lodging facilities.

The Division of Health Service Regulation (DHSR) holds the license for institution establishments and should be contacted by local environmental health specialists during an emergency. DHSR will make the final determination on whether a facility must be evacuated and will help determine what work must be done to re-open a damaged facility.

SWIMMING POOL RECOVERY

Pre-Disaster Preparation

- Remove or secure pool furniture, warning signs and safety equipment.
- Raise or remove pumps if there is a possibility they will be flooded.
- If chemical storage room can be flooded, move chemicals to a location that is protected from flooding and that still meets chemical room and hazardous materials storage requirements.
- If pool has an off season cover that can be secured over the pool, install it to keep out debris.

Post-Disaster Recovery

- Check to see if there was damage to any part of the fence, pool, pool pump, filter, chlorinator, equipment room, chemical storage room, safety equipment, and warning signs.
- Any major damage should be reported to the local health department immediately.
- Due to excessive flooding and/or debris, the pool may need to be completely drained to fully remove all debris and sediment. However, high ground water may need to recede before a pool can be drained. It is recommended that flooded pools be drained and hyperchlorinated in accordance with CDC guidelines. Do not drain a pool which does not have a hydrostatic relief valve until ground water levels have returned to normal.

Post-Disaster Recovery

- If the pump room has been flooded or damaged, it is strongly recommended to wait until water recedes and do not enter until the pool's electrical system has been checked by a licensed electrician or electrical contractor. Any necessary repairs should be made to the electrical system before the pump is reenergized. Electrical permits and electrical code inspections may be required depending on the scope of the damage and repairs needed.
- Clean the pool to completely remove soil, sand, and other debris. Once the pool is refilled with water from an approved source, it should be hyperchlorinated in accordance with CDC guidelines to inactivate Cryptosporidium that may have entered the pool during a flood event. This will inactivate any Cryptosporidium that may be in parts of the circulation system after draining the pool. Instructions for hyperchlorination can be found on the CDC website at the following link: <https://www.cdc.gov/healthywater/swimming/pdf/fecal-incident-response-guidelines.pdf>
- Repair any damaged handrails and ladders, being sure to reattach any severed or damaged electrical bonding components as needed. Electrical permits and electrical code inspections may be required depending on the scope of the damage and repairs needed.
- If any pool recirculation equipment such as the pool pumps, filters or chlorinators are damaged and need to be replaced, contact your local health department and get approval for any replacement equipment **prior to installing**. It is also recommended to **get the specific equipment specifications approved by the local health department prior to purchasing**. Check with the local electrical code inspector to see if a permit and electrical inspection is needed to reattach power to an existing or replacement pool pump before it is energized.
- Repair any fences and gates as needed to form an effective barrier. Fences that are more than 50% destroyed shall be replaced in accordance with the requirements of Rule .2528.
- Check operation of the emergency pool phone. Make sure warning signs and safety equipment are in place. Replace any damaged or missing emergency pool phones, warning signs and safety equipment as needed.
- Check all drains covers for damage and proper installation. Replace any damage drain covers and check to make sure undamaged ones are secured in accordance with the manufacturer's installation instructions.
- Once repairs have been made and prior to reopening the pool, request an inspection by the local health department.

Water Emergencies

Public water supplies are active systems that are susceptible to contamination, either during an emergency or due to structural damage or issues within the water system. At times, the water system operator or the Public Water Supply Section of Division of Environmental Quality (DEQ) may notify or advise water customers that the water should not be used for drinking unless it is first boiled or disinfected with chlorine. Users may also be notified not to use water which may be unfit for drinking due to chemical contamination. DEQ provides varying levels of notification, based on risk, and will notify the local health department for transient systems, and both the local health department and state EH officials for community or non-transient systems. If there are questions regarding the level of notice or advisory, contact the Environmental Health Emergency Preparedness and Outbreak Coordinator (919) 218-6943 to ensure proper communication with the public and establishment operators.

TYPES OF WATER SUPPLY EMERGENCIES

Contamination

Occasionally water supplies are contaminated or are suspected of being contaminated with microorganisms or chemicals due to a break in a water main or other damage to the distribution system. When contamination of a public water supply is suspected, the water utility operator or the Public Water Supply Section may issue an advisory or notice concerning use of the water supply. A low system pressure of less than 20 psi, system power loss, flooding of system, identification of sanitary defects or persistent total coliform presence can result in a “Boil Water Advisory” issued by the N. C. Public Water Supply Section and/or the owner of the water source. A confirmed Fecal Coliform (*E. coli*) sample will result in a “Boil Water Notice” being issued using the “*E. coli* Bacteria MCL” template (a copy of this template from EPA is listed in the Appendix page 39).

If a **NOTICE** is issued due to the water testing positive for *E. coli* or other contamination, the establishment shall not operate until the water supply is safe. If the affected establishment is a foodservice establishment and it does not voluntarily close, the permit will be suspended. Licensing agencies will be notified for establishments where the local health department does not hold a permit. Facility staff should empty, clean, and sanitize any equipment that may have contacted contaminated water (ice machines, soda fountains, coffeemakers, etc.). All beverages, ice and any other food products that were made with contaminated water must be discarded. Sample cleaning procedures for ice machines can be found in the Appendix, page 31. When the water supply is deemed safe by the water authority, normal operations can resume.

If an **ADVISORY** is issued due to pending test results or other unconfirmed issues from a water main break or system maintenance, the establishment may remain open for operations, but may want to take certain precautions, as found on page 35. The establishment may use bagged ice from an approved ice manufacturing facility, bottled water and drinks, and serve food that has been cooked or made with bottled or boiled water. Permit action is generally not

taken, but a Notice of Intent to Suspend or Revoke Permit may be issued depending on cause and/or severity of the source of the contamination.

If a water supply is contaminated with chemicals, the Occupational and Environmental Epidemiology Branch of the N.C. Department of Health and Human Services, Division of Public Health will be consulted to assess the potential health risk. If the water system is regulated by the Public Water Supply Section, section staff may issue a “Do Not Drink the Water” notice if the health risk is deemed unacceptable.

Loss of Water

Water supply can be lost due to problems with the water source, such as drought emergencies, or problems with the treatment and distribution systems, such as floods, power outages, and damaged pipes. If a regulated facility loses its primary water source, it is important to determine the cause and possible duration of the outage. Repair and maintenance of the distribution system which can be completed in a few hours may only require an alternative source of drinking water. Long-term water losses will require closure of food establishments, unless a pre-approved water emergency plan has been approved. Institutions and other care facilities are required per 15A NCAC 18A .1313 to notify the local health department and switch to an alternative water supply for flushing toilets, bathing, handwashing, cooking, dishwashing, cleaning and other purposes when the water supply is interrupted for longer than four hours. The following are some of the elements necessary in a back-up water supply plan for an institution facility.

DRINKING WATER

Water for drinking must be immediately available during a water supply failure. Facilities and establishments are not required to store drinking water on site but should have a plan to obtain it quickly. The amount of water needed for drinking should be estimated based on two liters of water per person per day for all people.

Amount of water for 10 people = 20L, or 5.3 gal, or 21 qt, or 34 (20oz) bottles, or 42 pints per day

The emergency plan should identify several nearby sources able to supply sufficient quantities of bottled water and how the water will be transported. Possible sources may include bottled water companies, food establishments and wholesalers, and beer or soft drink distributors. Bottled water companies are a good source for drinking water because they also have trucks used to transport their product. The N.C. Department of Crime Control and Public Safety, Division of Emergency Management maintains several warehouses with stocks of bottled water to be distributed by the National Guard during such emergencies. Requests for bottled water must be made through the county or local emergency management coordinator.

FLUSHING TOILETS

Water used for flushing toilets does not need to be suitable for drinking and can be obtained from any available water source. Some possible sources are boilers, water heaters, public pools, fountains or ponds. Buckets or carts will need to be available to transport water. Toilets can be flushed by dumping one to two gallons of water from a bucket into the toilet bowl. Do not place water in toilet tanks because they are connected to the potable water

supply. The emergency plan should identify sources of water for flushing toilets and where to obtain containers and carts needed to transport the water to the restrooms.

BACK-UP WATER SUPPLY

A back-up water supply will be needed to maintain essential functions such as food preparation, hand washing, bathing, cleaning, dishwashing, laundry and disposal of bodily waste whenever the primary water source is disrupted for more than one day. Generally, the back-up water supply should provide 25 gallons of water per day for each person unless the plan includes alternatives to reduce the amount of water needed (switching to single-service utensils to reduce dishwashing and outsourcing laundry operations, etc.). Facilities regularly serving 25 or more patients and staff are regulated by the Public Water Supply Section and cannot switch to another water source without prior approval. Any facility connected to larger public water systems must obtain approval from the Public Water Supply before any physical connection is made to the building plumbing system.

On-Site Wells

Some facilities/establishments have on-site wells to provide back-up water in an emergency. To serve as a back-up water supply for a building connected to a public water supply, the back-up well must meet all requirements of the *Rules Governing Public Water Systems* (15A NCAC 18C) and must be approved as a community water supply. The back-up well and storage tank must be purged, and the pump run periodically to limit scale and corrosion and prevent the pump from seizing.

Emergency Water Plan

Food establishments without a back-up supply on-site must have a pre-approved plan to use an alternate water source and remain open. These plans must be submitted to the NCDHHS Food Protection Program for review and approval prior to use. These plans require many components for emergency water, including use of a tanker truck to move water from one public water supply system to another. Cleaning and sanitizing of tankers, verification of the water source, and approval of the connection must all be considered. Additional information on what must be included in emergency plans can be found on pages 37-38 of this document.

Solid Waste and Trash Removal

Proper disposal of garbage and refuse is necessary to minimize the development of odors, prevent such waste from becoming an attractant for insects and rodents, and prevent the soiling of food preparation and food service areas. Improperly handled garbage creates nuisance conditions, makes housekeeping difficult, and may be a possible source of contamination of food, equipment and utensils.

For purposes of this manual, the following recommendations are categorized into two broad types of solid waste: putrescible and non-putrescible waste.

PUTRESCIBLE WASTE

Putrescible waste is capable of decay and spoilage, which creates an unfavorable environment for public health, and should be addressed promptly.

- Storage areas for garbage and refuse containers should be kept thoroughly clean to avoid attracting insects or rodents.
- Storage areas should be large enough to accommodate all of the containers needed by the operation in order to prevent the scattering of garbage and refuse.
- All containers should be maintained in good repair and cleaned as necessary to store garbage and refuse under sanitary conditions as well as to prevent the breeding of flies.
- Garbage containers should be available wherever garbage is generated to aid in the proper disposal of refuse.
- Outside receptacles should be constructed with tight-fitting lids or covers to prevent the scattering of the garbage or refuse by birds, breeding of flies or entry of rodents.
- Proper equipment and supplies should be available to accomplish thorough and proper cleaning of garbage storage areas and receptacles, so unsanitary conditions can be eliminated.
- All wet food debris should be double-bagged before placing in dumpster.
- Arrangements should be made with the dumpster maintenance provider to ensure the dumpster can be emptied promptly or as needed.

NON-PUTRESCIBLE WASTE

For purposes of this manual, non-putrescible waste includes such items as cardboard boxes, dry cans, construction debris and yard debris.

- Domestic non-putrescible waste, such as cardboard boxes, dry cans and paper, should be stored separately from putrescible waste until disposal.
- Avoid placing non-putrescible debris in dumpster to conserve as much dumpster space as possible for putrescible debris.
- Yard debris should be stored separately from domestic and construction debris and should be disposed of in the designated municipality or county site.
- Care should be taken when handling yard debris. Protective clothing should be worn to avoid insect stings and exposure to plant allergens.
- Construction waste should be stored separately from domestic and yard debris and should be disposed of in the designated municipality or county site.
- Care should be exercised when handling suspected harmful materials, such as asbestos and lead paint. Asbestos and lead-based paint issues should be referred to the Health Hazards Control Unit, N.C. DHHS/Division of Public Health, 1912 Mail Service Center, Raleigh, NC 27699-1912. Phone: (919) 707-5900.

Disposal of all debris should meet the requirements of the North Carolina Solid Waste Management rules. The North Carolina Division of Waste Management can be contacted at N.C. DEQ, 401 Oberlin Road - Suite 150, Raleigh, N.C. 27605. Phone: (919) 707-8200.

Septic System Recovery

Septic tanks contain waste, and people can get sick from being exposed to the sewage found in septic tanks and flood waters. Heavy rainfall can make septic systems function improperly. After such an event, it may take several days for your system to return to normal. Pumping the tank immediately may not help. Conserve household water to prevent backups of sewage in your home.

CONSERVING WATER

Septic systems with a pump need electricity. Without it, sewage can back up into your home. Conserve water from your tap until power is restored. Do not continue to use water if sewage backs up into the house, or if water or sewage is observed surfacing near the septic system. Keep children out of wet areas affected by sewage.

KNOW WHAT TO EXPECT

When power to the system is restored, repairs may be necessary prior to returning to normal water use. The services of an electrician may also be needed if the sewage system's electrical units were flooded or had any physical damage.

SIGNS OF DAMAGE

Most septic tanks are not damaged by a flood since they are below ground and completely covered. However, septic tanks or pump chambers can become filled with debris. Signs of damage include settling or inability to accept water. If you suspect your septic tank has been damaged, call a professional to inspect, service, and clean it.

AFTER THE STORM

Removal of debris may damage a septic system. Vehicles can crush drain fields, tanks and distribution boxes, especially when the soil is saturated. Make sure no one drives in or around your septic tank and drain field and allow stumps to rot in place or have the stumps ground with a small stump grinder.

Remove and discard household goods contaminated with sewage that cannot be disinfected, such as rugs, wall coverings and drywall. Always wear rubber boots and waterproof gloves when cleaning up sewage.

SAFETY CONSIDERATIONS FOR DAMAGED BUILDINGS

ELECTRICAL HAZARDS

Floodwaters and wet building components near electrical wires and circuits can conduct electricity. Standing on wet ground or floors will make you more susceptible to electrocution. To avoid electrocution when entering a flooded or damaged building, verify power at the main breaker or fuse on the service panel is off. Do not turn the power back on until a qualified electrician has inspected the electrical equipment. Do not touch electrical equipment if the ground is wet unless you know the power is off and **never** handle a downed power line.

When using a generator to supply power to a building, it is possible for electricity to back-feed from the building which energizes power lines causing a risk of electrocuting the utility line workers trying to restore permanent power. Buildings powered by a generator must be disconnected from the utility grid by turning off the main breaker or fuse at the service panel. Unless a qualified electrician has installed a transfer control device in your service panel to prevent the back-feed of electricity, use extension cords directly from the generator for powering appliances and avoid energizing the building electrical system.

If downed power lines are present, contact the utility company to remove the hazard before doing any clearing work in the area. Be careful of overhead electrical lines when using ladders and other equipment. All switches and motors, which have been in contact with floodwaters, must be thoroughly cleaned, dried and inspected before reusing them. Operators should be instructed to use only wet-dry vacuums designed to remove water from wet materials.

FIRE AND EXPLOSION HAZARDS

If flooding has drowned pilot lights on gas-powered appliances or structural damage has broken gas pipes, there can be a buildup of gas in a building to levels that could cause an explosion.

Before entering a damaged building, verify the gas has been turned off at the meter. Never use a cigarette lighter or other open flame to see in a dark building. Use a flashlight, rather than turning on electrical switches, until you have checked for gas. Open the doors and windows to allow trapped gas to escape. If you smell gas, leave the building. Fire can pose an increased risk in a disaster because water supplies and sprinkler systems may not work, and firefighting equipment may already be in use or have difficulty traveling to your location. Fire extinguishers should be included in the tools used when rehabilitating damaged buildings.

STRUCTURAL FAILURE

Inspect foundations for structural cracks or other damage caused by moving water. Buildings that have shifted from foundations should not be entered. Flooded basements and crawl spaces should be emptied as soon as possible. Take care to assure pressure from saturated soil outside will not cause foundations or walls to collapse when water is removed from basements. Examine buildings for sagging roofs or other signs of structural failure before going inside.

When entering a building, wet building materials such as sheetrock made heavy by water may fall off walls or ceilings causing injury. Look for sagging ceilings or bowed walls and avoid walking under or near them. If water has risen above the ceiling or the roof has been damaged, large amounts of water and wet insulation above the ceiling can cause the ceiling to fall. Ensure the ceiling is not in compromised before entering building. If in doubt, contact a building official and do not enter a building if safety cannot be determined.

SAFETY CONSIDERATIONS FOR DAMAGED BUILDINGS, CONT.

CARBON MONOXIDE

Combustion appliances such as gas- or diesel-powered generators and pumps, space heaters and gas or wood-burning stoves or fireplaces can produce carbon monoxide – a poisonous gas that can cause serious illness or death. Use combustion equipment such as generators and gas grills outdoors where their exhaust cannot enter the building. Ensure all facilities use only heaters designed for indoor use inside buildings and ensure there is adequate ventilation in the building. Do not try to use gas stoves designed for cooking to heat indoor areas. Follow the manufacturer's instructions on the use of combustion equipment. Symptoms of carbon monoxide poisoning are headaches, dizziness, nausea, tiredness or flushed red skin color. If any of these symptoms occur, leave the building immediately and seek medical attention. Check the exhaust vent to make sure it is still operating prior to restarting gas fueled heating systems.

ASBESTOS

Asbestos was previously used in more than 3,000 building products and can be found in homes, public, commercial, and industrial facilities. These materials are typically not hazardous if they are in good repair and are not disturbed. However, if asbestos containing building materials are in poor repair or if they are improperly handled during a renovation or demolition activity, asbestos fibers can be released. Exposure to asbestos fibers can cause serious health problems. Breathing airborne asbestos fibers can lead to an increased risk of lung cancer; mesothelioma, a cancer of the lining of the chest or abdominal cavity; and asbestosis, scarring of the lungs.

Building products that may contain asbestos include: insulation on boilers, steam pipes, water pipes and ducts; cementitious siding or roofing shingles; ceiling tile; asphalt and felt roofing applications; wallboard and mud joint compound; sprayed-on surface materials on walls and ceilings; insulation (wall or ceiling), floor tiles and sheet vinyl floor coverings, etc.

Because of the potential hazards associated with the handling of asbestos containing building materials, there are specific regulatory requirements that must be met prior to renovation or demolition activities occurring in food establishments, child care centers, lodging establishments and institutions. These requirements include: having an inspection conducted by an NC accredited asbestos inspector prior to renovation or demolition activities taking place; using NC accredited asbestos workers and supervisors to properly remove any asbestos containing materials that have been damaged by floodwaters or will be damaged by the renovation/cleanup activities; applying for permit/notifications for applicable renovation or demolition activities; clearance air monitoring in applicable public areas; and proper disposal of asbestos waste.

- **DO NOT** dust, sweep, or vacuum debris that may contain asbestos.
- **DO NOT** saw, sand, scrape, or drill holes in asbestos materials.
- **DO NOT** use abrasive pads or brushes on power strippers to strip wax from asbestos flooring.
Never use a power stripper on a dry floor.
- **DO NOT** sand or try to level asbestos flooring or its backing.
- **DO** keep activities to a minimum in any areas, such as crawl spaces or attics, having damaged material that may contain asbestos.
- **DO** take every precaution to avoid damaging asbestos or materials that may contain asbestos.

SAFETY CONSIDERATIONS FOR DAMAGED BUILDINGS, CONT.

LEAD BASED PAINT

Lead-based paint and other coatings were routinely used in buildings built before 1978. Child occupied facilities (COF) built before 1978, can include day cares, preschools and kindergartens and can present lead hazards to children and adults when damaged by manmade or natural disasters. When performing renovation and demolition activities that disturb lead-based paint there are specific federal requirements that need to be followed. Under an emergency provision the Lead-Based Paint Renovation, Repair and Painting rule exempts certain activities to the extent necessary to respond to the emergency, then all remaining activities would be subject to the rule. The Environmental Health Specialists should advise the property owner/manager that the Health Hazards Control Unit (HHCU) has guidance available for such emergencies and they should contact the HHCU at 919-707-5950.

OVEREXERSION AND MUSCULARSKELETAL INJURIES

Recovering a flood-damaged building requires removal of soaked flooring, furnishings, wallboard and insulation. These items, when soaked with water, weigh more than normal items. Owners and operators must be aware that soaked furnishings will be harder to move and use proper lifting techniques. It is best to use a two-man crew to move bulky items. Wind damage can topple trees and structures, leaving large amounts of heavy debris to move. Remind all community partners that during the recovery phase, they should drink plenty of clean water, eat properly and get plenty of rest. Fatigue is a contributing factor in many injuries.

HEAT STRESS

Clean-up workers are susceptible to a variety of heat-related problems, including heat stroke, heat exhaustion, heat cramps and fainting. Taking frequent breaks to cool down and drink fluids will help prevent overheating. Wearing light-colored clothing helps reduce heat absorption from sunlight and scheduling more physically demanding work during cooler hours will help. Opening windows or using fans indoors can also help reduce heat stress.

INJURIES FROM SLIPS, TRIPS, AND FALLS

A major cause of injury following heavy wind damage is falls from roofs, ladders or trees. Do not work on ladders or roofs unless someone is available to hold the ladder and call for help in an emergency. Leaves and other debris may make surfaces more prone to cause slips or falls. When possible, use slip resistant shoes or other safety shoes, and do not climb ladders while holding items. Wet flooring or surfaces are also more likely to cause slips and falls. Always use caution. Recommend any community partner use a certified professional if the correct equipment or skills to do the job safely is not available. When hiring a certified professional, remind community partners to check to see if they are bonded and insured in NC, and that all applicable permits have been obtained for work.

ANIMALS AND INSECTS

INSECTS

The most common reasons for emergency room visits following a hurricane are stings and bites. Mosquitoes, stinging caterpillars, snakes, fire ants, wasps and hornets could cause problems as citizens begin the business of cleaning up after a hurricane.

STINGING INSECTS

Bees, wasps and hornets may have had their nests disturbed by wind and rain of some natural disasters. These insects can become very aggressive while trying to defend their disturbed nests and former nest sites. Before beginning clean-up activities, survey the site to see if bees, wasps or hornets are hovering in the area. If they are present, use a commercially-available pesticide labeled for wasp and hornet control to clear the area before entering.

Stinging caterpillars, such as the familiar saddle-back caterpillar, normally live in the canopies of trees and do not contact humans. Toppled trees from excessive winds can put stinging insects into areas frequented by people cleaning up downed limbs. Caterpillar stings are very painful. To avoid them, wear long pants, long-sleeved shirts, socks and gloves when picking up and carrying limbs and leaves.

Insect repellants do not work on stinging insects. If prescribed by your physician for insect allergies, make sure you have epinephrine (“epi-pen”) in your emergency kit; its use will help prevent anaphylactic shock if you are stung.

MOSQUITO BORNE ILLNESSES IN NC

La-Crosse Encephalitis (LAC)

Although rarely fatal, La Crosse encephalitis is the most common mosquito-borne illness in NC. It is spread by tree-dwelling mosquitoes and is most common in the western part of the state. Symptoms occur from a few days to a couple of weeks after being bitten by an infected mosquito. These symptoms include fever, headache, nausea and vomiting. In more severe cases, convulsions, tremors and coma can occur. Children under 16 years of age and the elderly are the most susceptible to the disease.

West Nile virus encephalomyelitis (WNV)

West Nile virus has been found across the state during past mosquito seasons. People typically develop symptoms between 3 and 14 days after being bitten by an infected mosquito, if they develop any symptoms at all. Most people who are infected with West Nile virus - approximately 80 percent - will not become ill. Up to 20 percent of the people who become infected will display mild symptoms, including fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms typically last a few days. About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis, and often require hospitalization. These symptoms may last several weeks, and neurological effects may be permanent. People over the age of 50 and those with weakened immune systems are more likely to develop serious symptoms of WNV if they do get sick.

ANIMALS AND INSECTS, CONT.

Eastern Equine Encephalitis (EEE)

Eastern Equine Encephalitis is the most serious mosquito-borne illness in North Carolina. About fifty percent of human EEE cases are fatal, with young children and the elderly most at risk. Symptoms can develop from a few days to two weeks after being bitten by an infected mosquito. They include rapid onset of fever and headache and can resemble a case of the flu. Survivors of EEE infections may suffer from long-term effects to the nervous system. Therapy is limited to treating the symptoms of the disease, since there is no specific cure.

RABIES

Rabies is transmitted by exposure to mammals that have been infected with the virus. The infected animal may not show symptoms but still be able to transmit the disease. Specimens will need to be packaged according to federal shipping requirements. Counties should have available wrapping materials including labels, ice packs, insulated containers, and lab submission paperwork. Efforts should be made to hold animals for observation rather than submitting animals for testing. Humans with exposure must be evaluated by trained medical staff.

SNAKES AND OTHER REPTILES

Areas which have been affected by floodwaters frequently become infested with snakes after the waters have receded. When working in areas after a flood, care should be taken to be observant for snakes even inside recently occupied buildings. Protective equipment such as snake gaiters or high leather boots should be worn.

Other reptiles, such as alligators, can also be pushed into populated areas after flooding. Only individuals trained for dealing with these types of animals should attempt to control or contain them. Keep people away from these dangers until trained personnel can respond.

DOMESTIC ANIMALS

Copies of current vaccination records should be available and kept with the animal. If it becomes necessary for the animal to be temporarily relocated, proof of vaccination (especially rabies) will be needed. The NC State Animal Response Team was formed after Hurricane Floyd to assist with domestic animal problems during emergencies. For more information on the NC State Animal Response team, visit their website at <http://sartusa.org> or contact them at 1-888-989-SART or State Animal Response Team, PO Box 33038, Raleigh, NC 27636-5212.

ANIMAL CARCASS REMOVAL

During an emergency, domestic and wild animals may die. Proper disposal of their carcasses is important to prevent the spread of pathogens and ground and surface water contamination, as well as for pest control. Guidelines for animal burial following a natural disaster can be viewed online at <http://www.ncagr.com/oep/docs/isabel/Animalburialguidelines.pdf>.

APPENDIX

APPENDIX A: CLEANING AND DISINFECTING PROCEDURES

DISINFECTING UNDAMAGED CANS (DAMAGED CANS SHOULD BE DISCARDED)

- Remove paper labels (paper can harbor bacteria) and re-label with a permanent marker.
- Wash the containers in a strong detergent solution.
- Use a brush to remove any dirt and silt.
- Rinse the scrubbed containers. Removing dirt and silt and rinsing is very important because the chlorine solution won't work well if cans are dirty.
- Wear rubber gloves to protect your hands during the disinfection process. Strong detergent and bleach solutions can be hard on bare hands.
- Immerse the clean, rinsed containers in a lukewarm (75 to 120°F) solution of chlorine for two minutes. Use two (2) tablespoons of five percent chlorine bleach per gallon of water. Chlorine loses its effectiveness when it is in a solution and open to the air or when it contacts unclean materials.
- Change this disinfecting solution frequently. Dump it out and mix fresh solution if the water gets cloudy.
- Take cans out and air dry before opening or storing.
- Use foods from disinfected containers as soon as possible because cans may rust.

DISINFECTING KITCHEN UTENSILS

- Wash all dishes and utensils in hot, soapy water with a brush to remove dirt.
- Sanitize glass, ceramic and china dishes, glass baby bottles, and empty canning jars in the same way as for undamaged cans.
- Dishes with deep cracks should be thrown away.
- Metal pans and utensils can be disinfected by immersing them in water and boiling for 10 minutes.
- Kitchen utensils made of iron will probably be rusted. Remove the rust by scouring with steel wool, then disinfect with a bleach solution and re-season. To do this, apply a light coat of unsalted fat or oil and place in a 350°F oven for about an hour.

DISINFECTING FOOD PREPARATION AND SERVING AREAS

- All food preparation and serving areas should be cleaned and sanitized prior to use.
- Use a chlorine solution equivalent to 100 ppm (1/2 tablespoon of household bleach (5.25% sodium hypochlorite solution) in 1 gallon of potable water to sanitize.
- Use chlorine test strips to insure adequate concentration of sanitizing solution.

CLEANING MOLD AFFECTED AREAS

[HTTPS://WWW.CDC.GOV/MOLD/PDFS/HOMEOWNERS AND RENTERS GUIDE.PDF](https://www.cdc.gov/mold/pdfs/homeowners_and_renters_guide.pdf)

APPENDIX B: ICE MACHINE CLEANING PROCEDURES

This document was adapted from the AFDO Food Emergency Pocket Guide. This guide can be downloaded as a smartphone app on an Android Device, or may be obtained from the following website: <http://www.afdo.org/page-1279483>

Procedure 1: Commercial Removable. If the ice maker contains removable ice contact surfaces, then:

- 1.1 If available, follow the manufacturer's recommended cleaning procedure, or:
- 1.2 Run the unit through 2 or 3 freezing cycles. This should ensure that water entering the unit is safe. Option: If the water supply line to the machine can be drained and flushed by disconnecting it or bypassing the machine, the freezing cycle can be skipped. Drain enough water to thoroughly flush the incoming water line; a 20-30 second run should suffice;
- 1.3 Turn the water supply off;
- 1.4 Disconnect the unit from electrical power (recommended);
- 1.5 Remove and discard any ice;
- 1.6 Remove all ice-contact parts of the machine and,
 - 1.6.1 Wash in hot, soapy water
 - 1.6.2 Rinse in clean water
 - 1.6.3 Sanitize for at least 2 minutes in a solution of one ounce of household bleach per three gallons of water (~100 ppm available chlorine);
- 1.7 Reassemble the unit and re-start machine.

Procedure 2: Commercial Non-Removable. If the icemaker does not contain removable ice-contact surfaces or is designed to be cleaned in place, then:

- 2.1 If available, follow the manufacturer's recommended cleaning procedure, or:
- 2.2 Run the unit through 2 or 3 freezing cycles or flush the water supply line (See Procedure 1.2);
- 2.3 Turn off the water supply;
- 2.4 Drain the machine;
- 2.5 Circulate a cleaning solution of warm soapy water for two minutes; drain system;
- 2.6 Circulate clean water rinse for two minutes; drain system;
- 2.7 Circulate a sanitizing solution containing one ounce of household bleach per three gallons of water. Ensure at least two minutes of contact time;
- 2.8 Drain the system;
- 2.9 Wash, rinse, and sanitize the ice storage bin;
- 2.10 Return the drain valves to their normal operating positions and restart system.

APPENDIX C: DCDEE DISASTER CHECKLIST



Emergency Preparedness and Response in Child Care

Facility Preparation Checklist for Child Care		
ECE programs can use this Facility Preparation Checklist to prepare for and reduce risk from weather-related and natural emergencies.		
Items	✓	Applies to ECE programs
NOAA Weather Radio		All
Landline and cell phone		
Emergency generator if possible		
Surge protectors		
Batteries		
Plywood boards to cover windows		Those at risk for hurricanes
Building and pipes insulated		Those at risk for severe cold weather
Rock salt, sand, and snow shovels		
Extra blankets and clothes		
Building	✓	Applies to ECE programs
Two exits identified from each room		All
<i>Windows used as egresses (exit) can open</i>		<i>FCCHs, some centers</i>
All evacuation routes are clear of clutter		All
Evacuation route is identified for evacuation cribs, stroller, wheelchair or other devices used to evacuate children and adults who are non-mobile		
Cribs, sleeping mats, and sitting areas away from hazards that can fall		
Heavy items and furniture secured to wall studs		
Heating, cooling, gas, and electrical systems checked regularly		
<i>Portable heaters at least 3 feet away from things that can burn</i>		<i>Those using portable heaters</i>
<i>Portable heaters only on when an adult is present</i>		
Elevated furnace, water heater, and electrical panel		Those at risk for flooding
<i>Basement sealed with waterproofing</i>		<i>Those with basements and at risk for flooding</i>
Annual fire inspection completed		All
Smoke detectors in working order		
Fire extinguishers in working order		
Sprinkling system to extinguish fire in working order		Those with sprinkling system
Carbon Monoxide (CM) detectors in working order		Those with CM detectors
Electrical outlets are not overloaded		All
Matches and lighters are out of children's reach		All
Outdoors	✓	Applies to ECE programs
Street address is easy to see from the street		All
Anchored equipment is properly installed		
Dead and rotting trees removed		
Bushes and trees are cut back as needed		
Safe meeting places	✓	Applies to ECE program
Safe meeting place outdoors		All
A safe room in the interior of the building		
Safe meeting places in each room		
Off-site evacuation locations: in the neighborhood, out-of-neighborhood, out-of-town		

APPENDIX D: RESPIRATOR USE FOR THE GENERAL PUBLIC

A public health policy option during emergency response and recovery in certain situations may be to encourage the public to use respirators to protect themselves from inhaling dusts and particulate matter. In workplaces, strict regulations and practices are required to assure that employees get the best available protection. The Occupational Safety and Health Standard (OSHA) 29CF 191.134 describes in detail requirements for the use of respirators by employees in the workplace. These regulations and practices are not practical for public users, so the level of protection is likely to be less than can be achieved by employees in workplace settings.

Volunteer organizations that **require** workers to use respirators must follow the OSHA standards, the same regulations and practices required by employers. Volunteer organizations that allow **voluntary use** of respirators must provide workers with basic information included the OSHA Standard Appendix D (Information for Employees Using Respirators When Not Required by the Standard) attached at the to this guidance.

Even the limited protection provided by respirators when used by the public or voluntary organizations may provide some benefits to healthy users with minimal risks when used for protection against inhaling dust and particulate matter. Examples include protection against particulate matter in air pollution, wildfire smoke, bacteria and viruses and during cleanup of mold growth after a flood.

There are several ways that the general public can use to maximize the chance of good protection and minimize potential harms.

- Only use disposable Filtering Facepiece Respirators (FFR), sometimes known as “N95 respirators” They are respirators that pull air through a through filter media integral to the facepiece. Sometimes the entire facepiece is composed of the filter media They are very different from dust masks or surgical masks, are highly engineered, very efficient at collecting particulate matter of all sizes including fine particulate matter in air pollution and biological aerosols. These respirators have two heavy duty straps, nose clips, sometimes and exhalation valve, and other features that provide a snug fit to the face.
- Filtering Facepiece Respirators used by the general public will **not** provide adequate protection from toxic dusts such as asbestos or lead. They do not provide protection against gases, vapors, and odors. They should never be used in any situation where there is any potential for the presence of an oxygen deficient atmosphere, for example in poorly ventilated confined spaces such silos, vaults, sewers, manholes, digesters, manure pits and storage bins.
- Only respirators certified by the National Institute for Occupational Safety and Health (NIOSH) or cleared by the Food and Drug Administration (FDA) are acceptable for public or voluntary use. Approved respirators can be identified by labels on packaging and on the device.
- Users must follow the manufacturer’s instructions on the respirator package or insert to choose the best size of respirator for an effective fit. A cleanly shaved face will allow the respirator to fit tightly.
- Inspect the respirator before each use to be sure that all components such as straps and nose bridges are in good condition.
- Users must closely follow the manufacturer’s instructions to don respirator on correctly. A pictorial guide can be found at <https://www.cdc.gov/niosh/docs/2010-133/pdfs/2010-133.pdf>.

APPENDIX D: RESPIRATOR USE FOR THE GENERAL PUBLIC

- Users must make sure the respirator fits properly, by performing a user seal check. See the OSHA/NIOSH [video on donning/doffing and how to conduct a proper user seal check.](#))
- Users should avoid touching the contaminated surface of the respirator to prevent transfer of potentially harmful particles to the hands. Users need to remove (doff) respirators properly to avoid transfer of contamination to the hands and dispose respirators properly.
- Some respirators are identified as “single use only” and should be disposed after each use. Others may be worn until damaged, soiled, or causing noticeably increased breathing resistance.
- Users must not share respirators with others
- Sometimes a single user may be able to reuse the same respirator several times during a work shift. If reuse is anticipated, plan and store the respirator following the manufacturer’s instructions, in a way that protects the respirators from damage (including deforming the straps), dust, contamination, sunlight, extreme temperatures, excessive moisture, damaging chemicals, and in a way that prevents deformation of the facepiece and exhalation valves. Respirator performance will degrade over time and new respirators should be provided on a daily basis.

Appendix D to Section 29CFR 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

APPENDIX E: CFP RESOURCE - EMERGENCY ACTION PLANS

DEVELOPING A WRITTEN FOOD SAFETY EMERGENCY PLAN

The written food safety plan includes the steps you will take during an emergency. Remember that there may be regulations/ordinances that apply and consultation with local regulators may be appropriate. When managing Time/Temperature Control for Safety (TCS) food during an emergency, the facility must have a written plan prepared in advance. This plan should be maintained at the facility and available to the Regulatory Authority upon request. Consider incorporating the following information in your plan:

PEOPLE:

1. Identify the person(s) who have responsibility for implementing the plan.
2. Identify people/positions that are “critical” and what tasks must be performed.
3. Maintain a current list of emergency contacts. In addition to updating contact information for people within your company, include information for those who can help with the emergency such as utility companies (water, power, sewer, gas, etc.), garbage hauling service, dry and frozen ice suppliers, refrigerated trucking companies, food warehouses, septic tank pumping services, local and state health departments, fire, police, state emergency management agencies, emergency broadcast station frequency numbers and other pertinent regulatory authorities, etc.
4. Remember that computers and phones may not be operable and alternative communication methods may be necessary.

EQUIPMENT:

1. Identify the equipment and supplies needed. This may include large items such as generators and refrigerated trucks.
2. List items needed to perform tasks such as thermometers, insulated covers, caution tape, certain types of cleaning supplies, hand hygiene chemicals, etc.
3. List any necessary personal protective equipment (PPE) such as protective clothing, goggles or gloves needed to protect employees from potential hazards.
4. Consider having Emergency Kits available for different types of emergencies such as a kit for fire response, power outages, etc.

MENU:

1. Prepare an “emergency menu” in advance including a reduced number of recipes for food items that require limited preparation.

INSTRUCTIONS FOR PERFORMING TASKS:

1. Provide detailed step-by-step procedures for performing each task. For example, explain how to calibrate equipment, how to take temperatures, how to clean spills, etc. These can be written in the form of a standard operating procedure (SOP).
2. Explain how, when and where the task will be performed.

APPENDIX E: CFP RESOURCE - EMERGENCY ACTION PLANS

MONITORING:

1. Identify what food units, holding cases and equipment will be monitored or what food products will be checked.
2. Detail how frequently the task will be performed (hourly, daily, etc.).
3. Explain what methods will be used and the tools needed (thermometers, etc.) to perform monitoring tasks.
4. Include details regarding who will perform the monitoring.
5. Identify what records need to be kept.
6. Provide copies of the reporting forms, data logs and checklists that will be used to record the data and information.
7. Procedures for monitoring temperatures of TCS food should ensure the warmest portion of the food is checked unless an ambient air temperature thermometer is in place and monitored to ensure the safety of the food. When monitoring refrigerated cases, the temperature should be measured in the part of the unit where food temperatures will be the warmest.

WASTE DISPOSAL

1. Determine how you will handle waste, including discarded food.
2. Consider the likelihood that waste disposal services may be interrupted or erratic.
3. Include method for handling small volumes of food that have been denatured or destroyed before placing in an outside refuse bin (closed, sealed container). Consideration will also need to be made for large volumes of food refuse that will have to be held and transported to a licensed landfill whenever pickup service is available.
4. Contact your disposal company to pre-plan for emergencies; when possible, have additional waste disposal units delivered onsite.

For more information or for full text of the “Emergency Action Plans for Retail Food Establishments, Second Edition,” use the following link:

<http://www.foodprotect.org/media/guide/Emergency%20Action%20Plan%20for%20Retail%20food%20Est.pdf>

APPENDIX F: SAMPLE EPA DRINKING WATER NOTICE

DRINKING WATER WARNING

_____ water is
Name of Water System

Contaminated with *E. coli*

BOIL YOUR WATER BEFORE USING

What should I do?

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a boil, let it boil for three (3) minutes, and let it cool before using *or* use bottled water. ***Boiled or bottled water*** should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What does this mean?

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps and associated headaches. *E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a greater health risk for infants, young children, some of the elderly, and people with severely-compromised immune systems.* These symptoms are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What happened? What is being done?

Our water system detected *E. coli* bacteria in a pipe of our distribution system. As our customers, you have a right to know what happened and what we are doing to correct this situation. On (date)_____, we learned that coliform bacteria were present in at least one of our routine samples collected on (date)_____. As required by the Revised Total Coliform Rule, one of our follow-up steps was to collect repeat samples at and near the location where the positive sample was originally taken. On (date)_____, we learned that coliform bacteria were also present in at least one of our repeat samples collected on (date)_____. Our water system had a combination of routine and repeat positive samples where at least one of the positive coliform bacteria samples was also *E. coli* positive, which resulted in an *E. coli* maximum contaminant level (MCL) violation. We are now conducting additional sampling to determine the extent of the problem and are conducting a thorough investigation to determine the source of the contamination.

Corrective action being taken includes:

We will inform you when tests show no bacteria and you no longer need to boil your water. We anticipate resolving the problem within _____ (estimated time frame). For more information, please contact

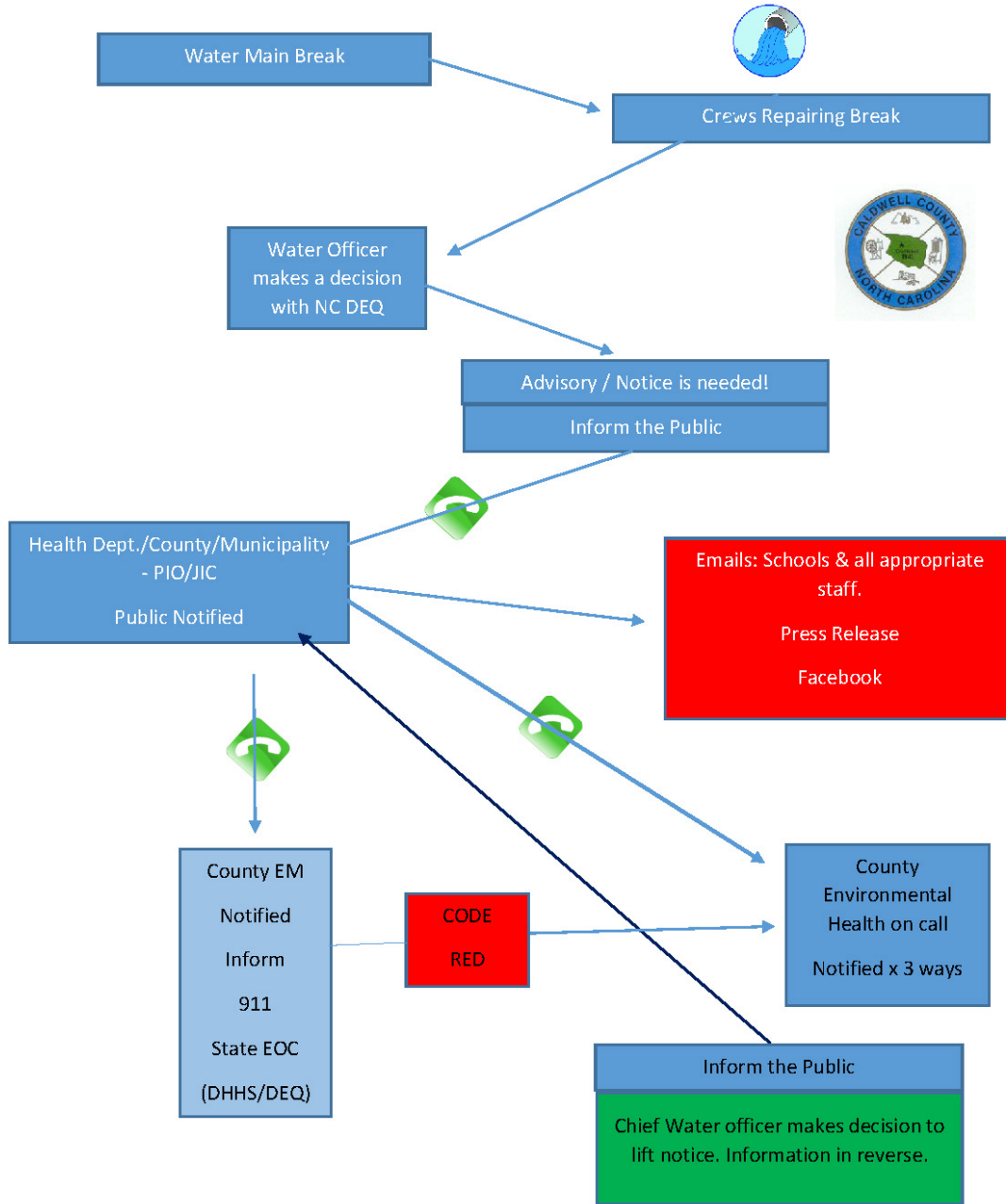
_____ (name of contact) at _____ (phone number) or
_____ (mailing address).

General guidelines on ways to lessen the risk of infection by microbes are available from the EPA Safe Drinking Water Hotline at 1-800-426-4791.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

APPENDIX G: SAMPLE COMMUNICATION PROTOCOL

Caldwell County - Joint Information Center JIC
Flow Sheet on Water Main Breaks



Caldwell County JIC Protocol– Water Main Break with Advisory or Notice – 1/22/2018

HANDOUTS AND FORMS



North Carolina Shelter Assessment Form
 For Environmental Health Assessment in Shelters and Evacuation Centers
Complete one form for each facility



Assessing Agency:	Assessing Agency: <input style="width:90%;" type="text"/>	Emergency contact # <input style="width:90%;" type="text"/>
Shelter Information:	Shelter Type: <input type="checkbox"/> Community/Recovery <input type="checkbox"/> Special Needs <input type="checkbox"/> Other: _____	
	American Red Cross Facility? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk/NA ARC Code: <input style="width:200px;" type="text"/>	
Current Census # <input style="width:50px; height:20px;" type="text"/>	<u>Location Name and Description OR Designated Name of Facility</u> <input style="width:90%;" type="text"/>	
	<u>Street Address</u>	<u>City(County)</u> <u>Zip Code</u> <u>GPS</u>
Staff # <input style="width:50px; height:20px;" type="text"/>	Date Shelter Opened: <input style="width:50px;" type="text"/> / <input style="width:50px;" type="text"/> / <input style="width:50px;" type="text"/>	Date Assessed: <input style="width:50px;" type="text"/> / <input style="width:50px;" type="text"/> / <input style="width:50px;" type="text"/> Time: <input style="width:50px;" type="text"/> am <input type="checkbox"/>
	Reason for Assessment: <input type="checkbox"/> Preoperational <input type="checkbox"/> Initial <input type="checkbox"/> Routine <input type="checkbox"/> Other _____	

I. FACILITY				V. FOOD and WATER					
1	Structural damage	Y	N	U	28	Preparation on site	Y	N	U
2	Security/law enforcement available	Y	N	U	29	Served on site	Y	N	U
3	Water system operational	Y	N	U	30	Safe food source	Y	N	U
4	Hot water available	Y	N	U	31	Adequate supply	Y	N	U
5	HVAC system operational	Y	N	U	32	Proper storage	Y	N	U
6	Adequate ventilation	Y	N	U	33	Appropriate food temperatures	Y	N	U
7	Adequate space per person	Y	N	U	34	Hand-washing facilities available	Y	N	U
8	Free of injury/ occupational hazards	Y	N	U	35	Safe food handling	Y	N	U
9	Free of pest or vector issues	Y	N	U	36	Dish washing facilities available	Y	N	U
10	Acceptable level of cleanliness	Y	N	U	37	Clean kitchen area	Y	N	U
11	Electrical grid system operational	Y	N	U	38	Adequate water supply	Y	N	U
12	Generator in use (type: _____)	Y	N	U	39	Adequate ice supply	Y	N	U
13	Indoor air temperature adequate	Y	N	U	40	Safe water source	Y	N	U
					41	Safe ice source	Y	N	U
II. SANITATION				VI. SOLID WASTE					
14	Adequate laundry services	Y	N	U	42	Adequate number of collection receptacles	Y	N	U
15	Adequate number of toilets	Y	N	U	43	Appropriate separation	Y	N	U
16	Adequate number of showers	Y	N	U	44	Appropriate disposal	Y	N	U
17	Adequate number of hand-washing stations	Y	N	U	45	Appropriate storage	Y	N	U
18	Hand-washing supplies available	Y	N	U	46	Timely removal	Y	N	U
19	Toilet supplies available	Y	N	U	47	Hazardous waste generated	Y	N	U
20	Acceptable level of cleanliness	Y	N	U	48	Medical waste generated	Y	N	U
21	Sewage system type: _____				VII. SLEEPING and CHILDCARE				
III. HEALTH and MEDICAL				49	Adequate number of beds/cots/mats	Y	N	U	
22	Medical care services on site	Y	N	U	50	Adequate supply of bedding	Y	N	U
23	Mental health care services on site	Y	N	U	51	Bedding changed regularly	Y	N	U
IV. COMPANION ANIMALS				52	Adequate spacing	Y	N	U	
24	Companion animals present	Y	N	U	53	Clean diaper-changing facilities	Y	N	U
25	Animal care available	Y	N	U	54	Adequate toy hygiene	Y	N	U
26	Designated animal area	Y	N	U	55	Safe toys	Y	N	U
27	Acceptable level of cleanliness	Y	N	U	56	Clean food and bottle preparation area	Y	N	U
					57	Adequate child care supervision	Y	N	U

VIII. CRITICAL NEEDS or COMMENTS (write on back if necessary)

North Carolina Shelter Assessment Form Instructions

Shelter type: "Community/Recovery": general public. "Special Needs": population with specific medical requirements. "Other": relief workers base camp, etc.

Reason for Assessment: "Preoperational": before opening. "Initial": first assessment after opening. "Routine": assessments occurring on a regular basis (e.g., daily, weekly). "Other": occurrence such as an outbreak or a complaint.

Current Census: Estimated number of persons, including workers, in shelter at the time of inspection.

Number of Staff/Volunteers: Number of persons working in the facility at the time of assessment.

I. Facility

- 1 Structural damage: note damage to physical structure (e.g., roof, windows, walls, etc).
- 2 Security/law enforcement available: security guards or police officers available at facility site.
- 3 Water system operational: self-explanatory.
- 4 Hot water available: self-explanatory.
- 5 HVAC system operational: self-explanatory.
- 6 Adequate ventilation: facility well-ventilated and free of air hazards such as smoke, fumes, etc.
- 7 Adequate space per person in sleeping area:
 - a. evacuation shelters, 20 ft² per person;
 - b. general shelters, 40 ft² per person;
 - c. special needs shelters, 60–100 ft² per person.
- 8 Free of injury/occupational hazards: With regard to general safety, some examples include:
 - a. Is the facility free of frayed or exposed electrical wires, carbon monoxide hazards, hazardous materials, etc.?
 - b. Are on-duty staff and members wearing PPE?
- 9 Free of pest/vector issues: note presence of mosquitoes, fleas, flies, roaches, rodents, etc.
- 10 Acceptable level of cleanliness: self-explanatory.
- 11 Electrical grid system operational: self-explanatory.
- 12 If generator in use: check for appropriate location, capacity, adequate fuel and ventilation.
 - a. If yes, indicate fuel type: gas, diesel, solar, etc.
- 13 Indoor temperature (°F): temperature measurement from random inside location (ASCE standard for temperatures in buildings).

II. Sanitation

- 14 Adequate laundry services: provided with separate areas for soiled and clean laundry.
- 15 Adequate # operational toilets: minimum 1 per 20 persons or as specified by sex.
- 16 Adequate # operational showers/bathing facilities: 1 per 15 persons.
- 17 Adequate # operational hand-washing stations: 1 per 15 persons.
- 18 Hand-washing supplies available: water, soap, and paper towels; if water is unavailable, hand sanitizers (at least 60% alcohol).
- 19 Toilet supplies available: toilet paper, feminine hygiene supplies, and diapers/pads for children and adults.
- 20 Acceptable level of cleanliness: self-explanatory.
- 21 Sewage system type: self-explanatory.

III. Health and Medical

- 22 Medical care services available: If yes, list type of care available in comments section.
- 23 Counseling services available: If yes, list type of mental/social services available in comments section.

IV. Companion Animals

- 24 Companion animals present: animals in facility.
- 25 Animal care available: animals have clean, fresh water and food.
- 26 Designated animal area: animals located away from people and separately housed.
- 27 Acceptable level of cleanliness: self-explanatory.

V. Food and Water

- 28 Preparation on site: self-explanatory.
- 29 Served on site: self-explanatory.
- 30 Safe food source: food source from licensed contractor or caterer.
- 31 Adequate supply: self-explanatory.
- 32 Appropriate storage: food stored according to safe storage practices to prevent contamination or spoilage – refer to local code or US Food Code.
- 33 Appropriate temperatures: hot food kept above 135 °F; cold food kept below 40 °F. Or refer to local code or US Food Code.
- 34 Hand-washing facilities available: fixed or portable, as long as they are operational.
- 35 Safe food handling: food preparers are using gloves, avoiding cross contamination, using appropriate utensils, etc. – refer to local code.
- 36 Dishwashing facilities available: place to wash, rinse and sanitize kitchen utensils and cooking equipment.
- 37 Clean kitchen area: self-explanatory.
- 38 Adequate water supply: drinking water in range of 1–2 gallons/person/per day, for all uses 3-5 gallons/per person/per day.
- 39 Adequate ice supply: sufficient to maintain cold food temperatures.
- 40 Safe water from an approved source.
- 41 Safe ice from an approved source.

VI. Solid Waste

- 42 Adequate collection receptacles: minimum 1 (30-gal) container for every 10 persons.
- 43 Appropriate separation between medical/infectious waste and general refuse.
- 44 Appropriate disposal and labeling in approved containers.
- 45 Appropriate storage and separation from common areas.
- 46 Timely removal of waste – collected regularly.
- 47 Check all types of waste generated at facility (e.g., solid, hazardous, medical).
- 48 Check all types of waste generated at facility (e.g., solid, hazardous, medical).

VII. Sleeping and Child Care

- 49 Adequate cots/beds/mats for each resident/staff.
- 50 Adequate bedding for each cot, bed, or mat.
- 51 Clean bedding available: self-explanatory.
- 52 Adequate spacing: at least 3 ft between cots/beds/mats.
- 53 Clean diaper-changing facilities: self-explanatory.
- 54 Adequate toy hygiene: toys cleaned with a nontoxic, approved disinfectant. Refer to local code.
- 55 Safe toys: should adhere to applicable age group standards.
- 56 Clean food/bottle preparation area: self-explanatory.
- 57 Adequate child/caregiver supervision ratio: a. birth-12 mos (3:1); b. 13-30 mos (4:1); c. 31-35 mos (5:1); d. 3 years (7:1); e. 4-5 years (8:1); 6-8 years (10:1); 9-12 years (12:1).

VIII. Critical Needs or Comments

List any critical needs requiring public health follow-up or comments.

Food Safety After a Storm:

Do's and Don'ts for Food Service Establishments

Do:

- Plan ahead and stay up-to-date on potential storm emergencies
- Keep refrigerator and freezer doors closed as long as possible during power outage
- Voluntarily close if there is a loss of water and/or electricity
- Thoroughly clean and sanitize equipment, utensils after any flooding or storm damage
- Discard any TCS foods that have been out of temperature for >4 hours
- Stay in contact with your local environmental health specialist for guidance

Don't:

- Rely on sight or smell to determine whether food is safe
- Taste food that has been contaminated to determine safety
- Save food that has gotten wet from flood waters unless it is sealed, in a water proof container, and properly handled
- Use any potentially contaminated water for ice, fountain drinks or washing produce
- Risk serving food or using utensils that may have been contaminated
- Donate food that has been temperature abused or otherwise contaminated

Questions?

Veronica Bryant
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Food Safety After a Storm:

Do's and Don'ts for Food Service Establishments

Do:

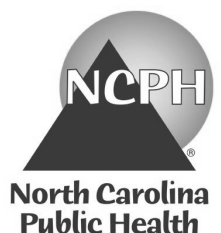
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Food Safety After a Storm:

A Guide for Environmental Health Specialists

Assessing Facilities

- **DO NOT ENTER** a building that has severe damage, contact local building authorities if there is a question about structure safety
- **Avoid walking through flood waters or into areas without adequate lighting**
- **Check refrigerators and freezers for proper temperature, get voluntary disposal of TCS foods that have been out of temperature**
- **Check for signs of defrosting and refreezing in freezers (excess ice build-up, moisture on boxes)**
- **Ensure adequate hot and cold water is available for cleaning and handwashing**
- **Discuss cleaning/sanitizing procedures and make sure all food contact surfaces and utensils are sanitized if there is flooding or damage**
- **Make sure all ice machines and automatic beverage dispensers are emptied and sanitized if water interruption or contamination occurred**
- **Assess storage rooms for damaged packaged foods or single service**

Questions?

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Food Safety After a Storm:

Information for Food Service Establishments

Plan Ahead

- Check refrigeration and freezers for working thermometers
- Store canned food and single service on higher shelves to avoid flood waters
- Freeze any food that is not immediately needed before a big storm

When to Close

- No electricity and/or water
- Insufficient water pressure for cleaning and/or handwashing
- Wastewater back-up or damage to septic system
- Damage to walls or roof that cause potential for food contamination
- Flood waters present inside food establishment

Cleaning up

- When in doubt, **THROW IT OUT**
- Clean and sanitize utensils, equipment, and food contact surfaces
- Discard food or single service utensils that contacted flood water
- Check food temperatures and discard time/temperature control for safety (TCS) foods that have been out of temperature for >4 hours

Questions?

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Food Safety After a Storm:

Information for Food Service Establishments

Plan Ahead

- **Check refrigeration and freezers for working thermometers**
- **Store canned food and single service on higher shelves to avoid flood waters**
- **Freeze any food that is not immediately needed before a big storm**

When to Close

- **No electricity and/or water**
- **Insufficient water pressure for cleaning and/or handwashing**
- **Wastewater back-up or damage to septic system**
- **Damage to walls or roof that cause potential for food contamination**
- **Flood waters present inside food establishment**

Cleaning up

- **When in doubt, THROW IT OUT**
- **Clean and sanitize utensils, equipment, and food contact surfaces**
- **Discard food or single service utensils that contacted flood water**
- **Check food temperatures and discard time/temperature control for safety (TCS) foods that have been out of temperature for >4 hours**

Questions?

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North Carolina Department of Health and Human Services

Division of Public Health

Roy Cooper
Governor

Dempsey E. Benton
Interim Secretary

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Division Director

Initial Restoration of Flood Damaged Buildings

This guidance is intended to assist building owners and occupants on the first actions to assist in restoring buildings flooded rivers, storm surge and other types of rising water. Water from these sources is unsanitary and contains a variety of biological, organic and inorganic contaminants. When it enters a building, mud, silt and other contaminants are deposited onto hard surfaces, absorbed into porous building materials and contents, and remain behind when the water recedes. Many porous and organic-based materials such as drywall, particle board, and plywood paneling will disintegrate when wet for more than several days. Other wood products may swell, warp or rot. Insulation may trap contaminants and will never again perform as intended. Wet electrical parts and equipment become corroded, short out or malfunction. Air conditioning systems and ductwork may become contaminated. Persistently damp buildings create an environment suitable for mold or mildew growth on almost any type of porous organic material.

Take these actions to promote drying the structure, removal of contaminants from remaining building materials, and to limit secondary microbial (mold and mildew) growth. In addition, remove contents and sort them into piles of things to save and things to dispose of. This will assist the drying, cleaning and restoration process. Spoiled food (garbage) from refrigerators and freezers that lost power need to be disposed of promptly. Make an inventory and take photographs of things to be disposed of and garbage to document the losses. As materials to be disposed of and garbage are torn out or removed sort them into separate piles to make disposal easier. Garbage needs to be placed in sealed plastic bags in rigid containers. There are often more frequent trash and garbage pickups during recovery from a disaster. Any household hazardous wastes to be disposed of such as old gasoline, pesticides, paints, and other household chemicals should be separated. Many communities will pick up and safely dispose of these materials.

Actions to be taken:

- Vinyl tiles or linoleum over wood and concrete in contact with flood water must be removed so that wood and concrete be cleaned and dried.
- Kitchen cabinets, bathroom vanities, and other built-in furnishings in contact with flood water must be removed. Decisions about whether to keep or dispose of built-in furnishings may be made later. Materials behind built-in furnishings must be also removed and disposed of or cleaned and dried.
- Soft, porous, organic-based materials such as gypsum wallboard (sheetrock™), wall paper, plaster, particleboard, plywood, paneling, oriented strand board, insulation, carpet and padding that in contact with floodwater must be removed.

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Initial Restoration of Flood Damaged Buildings

- Soft, porous and organic-based contents as, mattresses and box springs, rugs, and upholstered furniture that were in contact with flood water must be removed.
- Any part of electrical systems including wiring, junctions, fuses, circuit breakers, switches and receptacles direct contact with flood water must be disconnected and removed.
- If the water level in the living area was less than 2½ feet high, drywall and plaster walls needs to be removed to a height of 4 feet. Installation of new materials is easier because drywall panels are standardized to multiples of 4 feet. If the water level was higher than 2½ feet, wall materials need to be to a height of 8 feet or the ceiling junction, whichever is higher. Electrical outlets, switch plates, door and window moldings, and baseboards must be removed as during tear out of the wall materials.
- All non-porous and inorganic materials such as metal, plastic, and glass; porous and inorganic materials such as concrete and brick, must be cleaned to remove all sediment, debris, deposited organic material, mold and microbial growth.
- Solid wood and other structurally sound and semi-porous materials must be cleaned to remove sediment, debris, deposited organic material, mold and microbial growth remain.
- All remaining soft, porous, organic-based materials and contents that were not saturated by flood water such as ceiling tiles, gypsum wallboard, cardboard, paper, plywood, particle board, oriented strand board, and insulation must be clean and dry or need to be removed.
- Gross (solid) contamination and liquid water must be removed from crawlspaces. Vapor retarders on the ground in crawlspaces must be removed. Vents must be opened to allow air circulation. The underlying support structure of wood floor joists, and sub-floors must be allowed to dry. Later these materials must be cleaned and dried. Wood preservatives may be used after cleaning and drying protection against fungi and wood destroying organisms. These products should be applied by Pest Control Professional with a License for Wood Destroying organisms.
- Concrete slabs and foundation walls must be inspected for signs of heaving or cracking due to water pressure. When in doubt, about structural integrity, contact the local building inspector, a structural engineer or other appropriate professional. Mud and gross contamination on concrete must be removed.

Completing these actions in a timely manner should protect the structure from further damage. Completely drying out a flooded structure may take weeks to months depending on the initial moisture content of remaining materials, the amount of porous materials remaining in the structure and the drying techniques. When power is restored, and weather conditions permit use fans to force air dry outdoor air through the building can speed drying. The best time to use fans is when the outdoor humidity is less than the indoor humidity and the sun is shining. It is possible to sense humidity differences, use temperature and humidity gauges or obtain weather data for the location to determine the best time to ventilate.

In some cases, for small poorly ventilated spaces using dehumidifiers and desiccants may speed drying. Some water damage restoration contractors have very large fans and dehumidifiers capable to drying a building within a few days. Be wary of contractors who may inflate prices and out of town contractors who request payment in advance.

Initial Restoration of Flood Damaged Buildings

Local building inspection departments may have specific requirements for flood damaged electrical systems and equipment such as heating, ventilation and air-conditioning systems. Generally, disconnect components of electrical equipment that were in contact or submerged by flood water and use a qualified electrician to replace them. Air conditioning equipment submerged by flood water needs to be removed. If equipment was not flooded but water entered air ducts, do not operate equipment as it may spread contaminants. Air ducts submerged by flood water need to be removed. Even if no water entered the air ducts the insulation on the exterior is no longer functional.

Guidelines on cleaning

Cleaning is the physical process of identifying, extracting, collecting and disposing contaminants in a manner that leaves minimal residues of contaminants, cleaning agents and moisture. Clean hard non-porous and inorganic surfaces by scrubbing or wiping surfaces with brushes, sponges or rags along with household all-purpose cleaners (detergents) used following the label instructions. Change the cleaning solution frequently. Rinse surfaces with clean water and allow to dry completely.

During the initial stage of restoring a flooded building, bleach or Other surfaces and materials are disinfected or sanitized, a process that uses chemicals or other agents to kill, inactivate or retard microbial growth. *Do Not disinfect or sanitize materials and contents without prior cleaning.*

Work practices and personal protective equipment (PPE) should be used to limit skin contact, eye contact or inhalation of biological contaminants on surfaces, mold particles, and cleaning solutions. Appropriate PPE for restoration of flood damaged and moldy buildings may include, gloves, eye protection, coveralls or dedicated work clothes and a NIOSH-approved N-95 respirator depending on the specific work tasks. Hand washing facilities including a source of clean running water, soap and hand towel or paper towels should be available. Alcohol-based hand sanitizers are an option if soap and clean water are unavailable. used. Follow label instructions when using cleaning/disinfecting products.

System Pressure Advisory

A System Pressure Advisory can be issued during periods of low pressure or outages in the distribution system. Periods of low or no pressure in the distribution system increases the potential for introduction of bacteria into the water system. At this time, we have not detected any harmful bacteria in the system.

As a precaution, until additional testing can confirm the absence of harmful bacteria, **you are advised to boil all water used for human consumption.** Bring all water to a boil, let it boil for one minute, and let it cool before using. As an alternative, you may use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice. Boiling kills bacteria and other organisms in the water. If you have a severely compromised immune system, have an infant, are pregnant, or are elderly, you may be at increased risk and should seek advice from your health care providers about drinking this water. Additional precautions you should take are detailed below.

- Thoroughly wash hands with soap and rinse with boiled or bottled water.
- It is recommended that you use pre-washed packaged produce, frozen or canned fruits or vegetables that do not require washing. Foods that do not get cooked, such as raw vegetables, salads, or fruits, should be washed with boiled water before consuming.
- Frozen foods should be thawed in the refrigerator or as part of the cooking process.
- Dishwashers that use hot water for sanitizers can be used to clean and sanitize any affected utensils. Single service articles should be used during extended periods of system pressure advisory.
- Use ice from an alternate source such as ice purchased from a vendor that is not in the affected area of the System Pressure Advisory
- Boiled or bottled water should be used for all beverages made by mixing with water such as instant tea, instant coffee, auto drip coffee makers, powdered drink mixes, etc.
- You may use the water for bathing and showering.
- You may use the water for pets.
- Water filters are not a substitute for using boiled or bottled water.
- If you have already consumed the water, monitor your health and if you experience symptoms of diarrhea, vomiting, etc., contact your physician.

Restaurants, meat markets, and other permitted facilities may remain open provided there is adequate water to safely sustain the operation. If inadequate pressure or no water is available, permitted establishments must close.

Recovery:

- Once the advisory has been lifted, we recommend that you flush the lines in your establishment for a few minutes.
- Dispose of any ice or beverages made during the advisory.

E. coli Boil Water Notice

Fecal coliform bacteria have been detected in water samples collected from the Public Works Commission water system. **Do not drink the water without boiling it first.** Bring water to a boil, let it boil for one minute, and let it cool before using. Vigorous boiling for one (1) minute should kill any disease-causing organisms that may be present in the water. As an alternative, you may use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, and food preparation until further notice.

Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. The symptoms above are not caused only by organisms in contaminated drinking water. If you experience any of these symptoms that persist, you may want to seek medical advice. Additional precautions you should take in a home setting are detailed below.

- Thoroughly wash hands with soap and rinse with boiled or bottled water.
- Use pre-washed packaged produce, frozen or canned fruits or vegetables that do not require washing. Foods that do not get cooked, such as raw vegetables, salads, or fruits, should be washed with boiled or bottled water before consuming.
- Discard any food prepared with water prior to the discovery of the contamination.
- Ice should not be consumed unless it is from an alternate source such as ice purchased from a vendor that is not in the affected area of the boil water advisory
- Boiled or bottled water should be used for all beverages made by mixing with water such as instant tea, instant coffee, auto drip coffee makers, powdered drink mixes, etc.
- You may use the water for bathing and showering but do not ingest the water.
- Use boiled or bottled water for pets.
- Water filters are not a substitute for using boiled or bottled water.
- If you have already consumed the water, monitor your health and if you experience symptoms of diarrhea, vomiting, etc., contact your physician.

Recovery:

- Flush lines in your house by turning on faucets and outdoor spigots and run for at least 5 minutes.
- Run your dishwasher through a cycle prior to using.
- Replace all filters you may have, including filters in your refrigerator.
- Dispose of any ice made prior to the lifting of the notice. Make ice for 24 hours and dispose of the first batch of ice. Sanitize ice reservoir prior to returning to normal operation.

Restaurants, meat markets, and other permitted facilities may not operate during an *e. coli* boil water notice. Permitted facilities must close until safe water supply is verified by the water authority. Thorough cleaning and sanitizing must take place before reopening.



HOW TO DISINFECT YOUR WATER WELL

Water Well Disinfection or Chlorination

For many of us, a water supply well represents the sole source of water for our home. Disinfecting your water supply well and piping system is an effective way to ensure that your water is sanitary and safe to drink. Disinfection of a water supply well is necessary if test results indicate bacterial contamination. Chlorination of your well, piping system, and water heater is also necessary if your well is contaminated by flood water. Disinfection may be used to control iron and sulfur bacteria to a limited degree. You may also wish to chlorinate your well as part of an annual well maintenance practice. In addition, all water wells are required to be disinfected upon completion of construction, maintenance, repairs or pump installation and testing.

The standard method of disinfection produces a 100 parts per million (or 100 milligrams per liter) chlorine concentration in your water. Another type of chlorination termed “shock chlorination” uses the same methods to introduce chlorine but achieves at least a 200 parts per million residual chlorine or more. Shock chlorination is typically recommended when test results indicate the presence of bacteria.

REMEMBER! The only people allowed to break a well seal are the well owner, plumbers installing or repairing well pumps, and certified well contractors.

How to Chlorinate Your Water Supply Well

To safely chlorinate your well, you should use safety goggles, gloves and appropriate clothing. Follow chlorine product manufacturer’s instructions. Concentrated chlorine can produce holes in clothing and skin burns. You can use household bleach or a solution made from high test calcium hypochlorite containing 65% - 75% available chlorine. High-test calcium hypochlorite, including trade names HTH and Chlor-Tabs, is available from home improvement stores, swimming pool product suppliers, and driller supply stores. Do not use stabilized chlorine tablets or any chlorine product that contains fungicides, algacides or other disinfectants; read the product label carefully. You

may wish to ask the well contractor that installed your well if they have these products available.

To determine the amount of chlorine or calcium hypochlorite needed to produce a 100 parts per million residual chlorine solution, you must follow these steps:

- 1) Determine the thickness of the water column in your well. To accomplish this, you must determine the depth to water from the ground surface and subtract this number from the total depth of the well. These numbers should be recorded by the well contractor on the well tag located on the well casing. If not, you can contact the well contractor that drilled the well. Example: The total well depth is 150 ft. and the water level is 20 ft. below ground surface. Therefore, the thickness of the water column is 130 ft.
- 2) Use the following table to determine how much chlorine compound is needed to dose 100 feet of a water-filled well to at least 100mg/l:

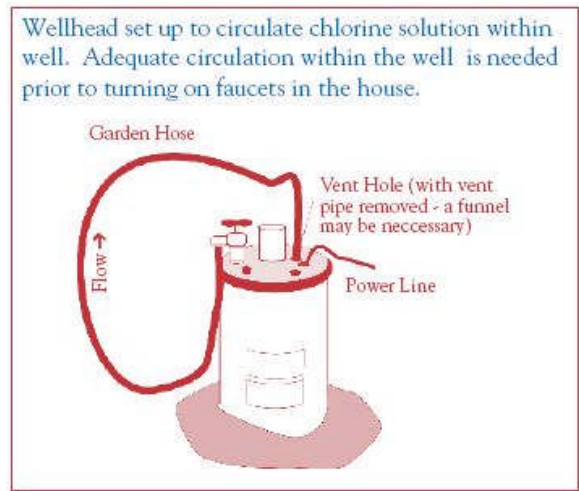
Borehole or Casing Diameter (inches)	Gallons of Water per 100 ft of Water Filled Well	Amount of Calcium Hypochlorite (65%-70% available chlorine)
2	16.3	0.5 oz.
4	65.3	2 oz.
6	146.9	4.4 oz.
8	261.1	7.8 oz.
10	408	12.2 oz.
12	587	1 lb. 2 oz.
18	1321	2 lb. 8 oz.
20	1632	3 lbs. 1 oz.
24	2350	4 lbs. 7 oz.
30	3672	6 lbs. 14 oz.
36	5287	9 lbs. 15 oz.

3) Begin by attaching a garden hose to the well's hose bibb or an outside faucet closest to your well. Fill a five gallon bucket about 3/4 full with water. Loosen the well seal at the top of your well. This is typically accomplished with a wrench and it may be necessary to bump the seal with a rubber mallet to loosen it. If you are unable to remove the well seal, you can introduce the chlorine solution through the vent hole using a funnel. The vent pipe is easily unscrewed. However, it is better to pour the chlorine solution directly into the well in order to wash down the sides of the casing with the chlorine solution.

4) Add the calculated amount of calcium hypochlorite to the five gallon bucket of water and mix to dissolve. Pour the chlorine solution into the vent opening using a funnel or in through the top of the well casing after removing the well seal. Special provisions will be required for introducing the chlorine solution into artesian wells (flowing well). Contact the appropriate regional office for more information. Place the end of the garden hose so the discharging water will flow into the well either through the top of the well casing or slowly through the funnel positioned in the vent hole. Turn the hose on and allow the water to run until a strong chlorine odor is noticed coming from the hose. Allow the hose to run water into the well for about an hour or enough time to thoroughly circulate the chlorinated water.

5) Once the chlorine has been placed in the well, turn on each discharge point of the system (faucet etc.) until a strong chlorine odor is noted then turn off the faucet. Let the chlorine solution sit in the system for at least 24 hours. Use chlorine test strips to determine the amount of residual chlorine in the system. Do not use the system during this time as chlorine will be flushed to your septic system. Before resuming use of your water system, you must rid the system of the chlorinated water. To flush the system, run water from an outside faucet until the chlorine odor no longer remains. When flushing the system, drain the chlorine water away from plants and animals.

Do not allow the chlorine rich water to enter any surface water body or storm sewer!



After Disinfection

If your well tested positive for bacteria before, it is important to get the water retested after disinfection. You can retest the well for bacteria about seven-to-ten days after disinfection. Remember that you must identify and remedy the source of the bacteria to keep the problem from recurring. The presence or absence of "indicator" bacteria such as total coliform determines if your water supply well is sanitary. Usually a properly constructed well can be effectively disinfected. However, if tests indicate that bacteria remain, you may need to have the well inspected. Foreign matter in the well such as animals, insects or bits of wood will have to be manually removed and the well disinfected again.

If you have questions about disinfection or other well issues, please contact your Department of Environment and Natural Resource (DENR) Aquifer Protection Section regional office.

For more information or a copy of the 15A NCAC 02C .0100 Well Construction Standards Criteria and Standards Applicable to Water Supply and Certain Other Wells, you can visit our webpage

<http://portal.ncdenr.org/web/wq/aps/gwpro>

or contact us at:

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