# AP 8C – Natural Event

# Hurricane / Tropical Storm

# AP Summary:

This Action Plan applies to Hurricane / Tropical Storm events. In general, these events occur with reasonable lead times, and it is possible to take proactive measures, as outlined below. Response and recovery can be time consuming during such events, and they can involve loss of electrical power supply, damage of structures and equipment, disruptions of service, and injuries to utility personnel.

## Initiation and Notification

Initiation of the hurricane/ tropical storm AP will occur when the NWS has determined a “Hurricane Watch” is in effect. The general terminology they utilize is as follows, in order of increasing severity:

* Advisory: Hurricane and storm information is disseminated to the public every six hours.
* Special Advisory: Information is disseminated when there is significant change in storm-related weather conditions.
* Gale Warning: Sustained winds of 35-54 mph and strong wave action are expected.
* Storm Warning: Sustained winds of 55-73 mph are expected.
* Hurricane Watch: There is a threat of hurricane conditions within 24-36 hours.
* Hurricane Warning: A hurricane is expected to strike within 24 hours or less, with sustained winds of 74 mph or more and dangerously high water.
* Tropical Disturbance: A moving area of thunderstorms is in the tropics.
* Tropical Depression: An area of low pressure, rotary circulation of clouds and winds up to 38 mph is identified.
* Tropical Storm: A storm characterized by counterclockwise circulation of clouds and winds 39-73 is brewing.

The Atlantic and Caribbean hurricane season runs from June 1 through November 30, with the Eastern Pacific hurricane season running from May 15 through November 30.

Click on the following NHC link to access the National Hurricane Center website: [NHC](http://www.nhc.noaa.gov/index.shtml)

Notification phone numbers can be obtained from the Organization Contact List in the Appendices as well as from Section III.D of the Emergency Response Plan.

### Equipment Identified

Equipment: (enter list of equipment needed)

Location: (enter location of equipment)

This equipment is available to assist in the execution of this AP.

#### Specific Activities: (the following are specific activities to be performed)

#### Assess the Problem

It is expected that the Local Emergency Planning Committee (LEPC) will carefully and continually monitor meteorological conditions and forecasts. During such events, the Local Emergency Planning Committee (LEPC) shall be in constant contact with the National Weather Service (NWS) and disseminate information to agencies via conference call, e-mail and broadcast fax.

##### Isolate and Fix the Problem

In preparation for the hurricane, the following general steps are to be followed, as per the US EPA’s Water Security Division:

General:

1. Line up and schedule emergency operations and clean up crews.
2. Notify State and Federal Agencies (FEMA and others) of location and telephone numbers of the emergency operating center or command post for the utility. For public water systems, be sure to line up contacts to request emergency water supply, if necessary.
3. Notify media where to access information and press advisories.
4. Arrange for food and water for the crews.
5. Notify and set up clear lines of communication with local authorities, such as police and fire in case of an injury or other emergency.
6. Make arrangements with the local power utility to be prepared to disconnect power to the plant if plant is evacuated or if power lines are downed and to restore power as a primary customer.
7. Make arrangement with local companies to purchase materials and supplies and to borrow/lease heavy equipment needed to make repairs to the plant.
8. Make arrangement with local companies to have materials and chemicals delivered to the plant as soon as it is safe and units are repaired and ready for operation.

Grounds and Common Areas:

1. Check inventory of emergency repair equipment and supplies (i.e., sand and sand bags, hand shovels, power equipment, fuel, batteries, flashlights, portable radio, first aid kits, etc.). Resupply if possible.
2. Stock service vehicles with equipment and supplies.
3. Fuel all vehicles and emergency generators.
4. Move service vehicles to high ground (above expected flood crest).
5. Check all communications equipment and charge or replace batteries (i.e., two way radios, cell phones, walkie-talkies, pagers, etc.).
6. Sand bag critical areas.
7. Board up critical windows and doors to prevent wind damage.
8. Shut down exposed pipes at river crossing to prevent discharge of raw sewage or to prevent loss or contamination of potable water, if the pipes brake.

Administration and Laboratory Buildings:

1. Remove portable electrical equipment and small motors from the flood zone.
2. Remove all sensitive laboratory equipment from the flood zone, where possible.
3. Remove or store computers in a safe area.
4. Remove or store all important records in a safe area.
5. Move vital records such as built drawings, wiring diagrams, etc. to the emergency operations center or command post.
6. Remove or store furnishings in a safe place, when practical.
7. Disconnect electrical power to the building, if it is evacuated.

Treatment Plant and Pumping Stations:

1. Fill empty tanks with water to prevent floating.
2. Disconnect power to all units in the flood zone. Have the power utility disconnect power to the entire plant, if ordered to evacuate the facility.
3. Remove or move chemicals to a safe area. If chemicals are removed from an underground or above ground tank, fill the tank with water to prevent floating.
4. Remove fuel from under ground tanks to prevent contamination of the fuel and to protect the environment. If possible move above ground fuel storage tanks to a safe area (fuel will be need for emergency and plant vehicles until new supplies arrive). If it is not practical to move above ground fuel storage tanks, remove the fuel and fill tanks with water.
5. Remove electrical motors, where possible.
6. When it is not practical to remove large motors, wrap the motors in plastic and seal as tight as possible. This will not keep the motor from getting wet, but will protect the motor from silt, mud, and dirt getting into the windings. Submerged motors can be washed with clean water and dried, and in most case restored to service.
7. Remove shop tools and electrical hand tools to the emergency operations center or command post.
8. For drinking water systems, as appropriate try to have elevated storage at full capacity.

##### Monitoring

1. Emergency power should be utilized to the extent necessary and available to maintain pressure within the distribution system.
2. Systems which have been flooded or otherwise had bacterial quality compromised must be disinfecting their water system and maintaining chlorine residuals throughout the water system.
3. Where such flooding, loss of pressure, or other damage has occurred resulting in potential bacterial compromise, [UTILITY ABBREVIATION] should Issue “Boil Water”, “Do not Drink”, or “Do not Use” orders and Press Releases as appropriate. See Section VIII.A.1 of ERP for Press Release Forms until further testing can be conducted and the situation normalizes. If necessary, a “Boil Water” notice must be announced as soon as possible, and realize that it may be necessary to issue a “Boil Water” notice before the Health Department can be reached.

###### Recovery and Return to Safety

In the aftermath of the hurricane, the following general steps are to be followed, as per the US EPA’s Water Security Division:

General:

1. For water utilities, the first priority should be restoring fire flow and pressure.
2. For wastewater utilities, the first priority should be to restore primary treatment and disinfection.
3. Line up and schedule emergency operations and clean up crews
4. Make arrangements with the local power utility to repair and restore power to the plant as a primary customer. Power should not be turned on to buildings or process units until the floodwater has been removed and the area is safe to occupy.
5. Notify State and Federal Agencies when the facility is back in operation.
6. The [IO] is to notify the media where to access information and press advisories, such as boil water orders, beach closures, and other public instructions.
7. Make arrangements with local companies to deliver materials and supplies and to provide heavy equipment needed to make repairs to the plant.
8. Make arrangements with local companies to deliver materials and chemicals as soon as it is safe, and facilities are prepared and ready for operation.
9. Contact State and local authorities to determine if there are any restrictions on disposal of materials and debris removed from the site or if a temporary discharge permit (NPDES or other) is needed for the water pumped from tanks and other flooded structures.

Grounds and Common Areas:

1. Inspect all service vehicles for water and wind damage.
2. Check site including remote locations for visible damage to power lines and above ground structures.
3. Inspect all sewage collection systems for damage and blockages. Most collection systems will require cleaning after a flood.
4. Inspect all exposed pipes, especially at river crossings, for leakage. Broken pipes can discharge raw sewage into rivers and streams. Broken water pipes including service connections to severely damaged structures can provide a source of contamination and/or pressure loss to the potable water system.
5. Check all remote control systems, including telemetering, telephone, and SCADA, etc.

Administration and Laboratory Building:

1. Check windows and doors for wind damage. Replace and repair as needed to prevent further damage and to provide security.
2. Check roofs for water and wind damage. Make repairs as needed to prevent further damage.
3. Pump out and remove silt, mud and sand from basements and other below grade areas.
4. Clean and disinfect masonry walls with bleach solution to prevent the growth of mold and mildew.
5. Remove all plasterboard, wallboard, and sheet rock that is wet or shows signs of water damage. Clean and disinfect all the interior studs and other support structures behind the damaged walls with bleach solution to prevent the growth of mold and mildew.
6. Inspect all switchgear, motor control centers, electrical boxes, junction boxes, and other electrical equipment in flooded areas for silt and sand or lose connections. Boxes should be cleaned and dried with portable or hand held dryers before the electrical power is restored.
7. Thoroughly clean all wet carpets. It is advisable to remove carpets for cleaning. If removing the carpets is not practical, carpets should be steam cleaned, disinfected and mechanically dried. The carpets also should be treated with an anti-bacterial agent to prevent the growth of mold and mildew.
8. Check and reset fire alarms, door alarms, clocks and other control and measurement devices.
9. Start sampling, monitoring and testing, including the water distribution system for coliform bacteria, as soon as the laboratory is operational.

Treatment Plant and Pumping Stations:

1. Pump out all tanks, wet wells, dry wells, channels, vaults and pits to remove silt, mud, sand, and debris. In some cases washing down walls will be necessary before returning to service. Make sure you have all the necessary permits to dispose of the collected material and for discharging the wastewater.
2. Inspect all equipment, clean and lubricate.
3. Inspect all switchgear, motor control centers, electrical boxes, junction boxes, and other electrical connections in flooded areas for silt and sand or lose connections. Boxes should be flushed with fresh water and dried before the electrical power is restored. Breaker boxes and other contacts may need additional cleaning to remove corrosion, especially if the damage was caused by salty or brackish water.
4. Inspect all electric motors. Generally, it is more cost-effective to replace small flood damaged motors than to try and repair them. In some cases, motors can be flushed with de-ionized water. Be sure the motor is thoroughly (oven dried) dry before restoring power. Starters and other electrical controls may also be damaged and will need to be replaced.
5. Large motors that were not removed but were wrapped in plastic should be inspected for damage. Be sure the motor is thoroughly dry before restoring power. However, having the motors cleaned and dried by motor or armature specialists is recommended. Starters and other electrical controls may also be damaged and need to be replaced.
6. Large horsepower motors that were not wrapped in plastic should be removed and sent out for cleaning and drying. Check with the motor or armature specialists in your area. They often have equipment to clean and ovens to dry motors under controlled temperatures.
7. Inspect and clean debris from all air intakes and vents.
8. Inspect all chemical storage and feed equipment to make sure that the equipment is undamaged and is properly calibrated.
9. Chemical and fuel tanks that were filled with water should be pumped out and restocked with fresh materials. Caution: Water from fuel tanks may still contain hydrocarbon residues and may require special handling and disposal.
10. Check and refuel emergency generators in the event of future power outages. If generators and diesel engines have been flooded, they will need to be overhauled or engines rebuilt. Getting emergency power capability resorted, should be a high priority. Renting portable generators or pumps should also be considered.

Report of Findings

Assemble relevant personnel to review effectiveness of action plan and reinforce lessons learned.

AP-8C Revision Dates