



Flood events can emanate from a variety of sources including severe weather, tropical windstorm, and stalled or prolonged weather fronts. Locations exposed to these type events are more at risk from flooding impact, but flooding can occur in almost any area with minimal notice. The risk is exacerbated when facilities are located nearby and within low elevation of flooding sources such as rivers, creeks and basins, and may impact a wide area disrupting key infrastructure and creating business interruption potential. The following are some general suggested tips and actions to consider taking, before, during, and after a flood strikes.

ACTIONS TO TAKE BEFORE FLOOD SEASON

- Prepare, or locate, and maintain a scaled plan or diagram of the facility that clearly shows the location of all fire protection and other emergency equipment.
- Obtain and review applicable flood maps for each location and evaluate flood susceptibility of each building.
- Obtain multiple suppliers for critical building components, equipment and stock necessary to resume operations/business.
- Understand your energy needs and make arrangements for backup utilities and fuel sources where possible. Consider emergency generators, alternative fuels and the like.
- Identify alternative means of transportation and alternative routes for all critical personnel, services, suppliers, contractors, etc.; and establish relationships with lease and rental companies.

PLAN FOR FACILITY SECURITY AFTER A STORM

- Review the structural integrity of each building and structure foundation including physical damage, etc.
- Check any flood doors, gates, shields or barriers for proper operation and water tightness including latches and hardware. Where possible, brick up lower building openings susceptible to flooding.
- Evaluate the need for floodwalls, levees or dikes.
- Have plywood and sandbags available to barricade floodwaters.
- Make arrangements for several forms of emergency communications, including cellular phones, two-way radios, ham radio operators, etc.

Plant management/emergency team recovery operations:

- The site should be secured and a Command Center should be established to direct the recovery operation.
- Survey for safety hazards such as downed electrical wires, leaking gas or flammable liquids, poisonous gasses, etc. Look for undermining and damage to foundations or underground piping, etc. Notify appropriate utility companies of damage as soon as possible. Use care around downed power lines and leaking fuel lines and consider providing barriers or watches.
- Begin salvage as soon as possible to prevent further damage. Items to consider include:
 - Fill eroded land areas, especially around building and structure foundations.
 - Remove standing water in buildings, yard areas, etc.
 - Clean and dry equipment with most critical objects receiving priority.
 - Clean roof drains, storm drains, retention ponds, etc. and remove any debris.
- Inspect all electrical equipment including exposed insulators, bus bars, conductors, and motors before reenergizing electrical distribution systems and equipment.
- Contents of tanks, piping, reservoirs, boilers, process equipment, cooling towers and the like should be tested for contamination before use.
- Mechanical equipment should be dried and cleaned and casings inspected. Shafts should be checked for alignment and lubricating systems flushed.

ACTIONS TO TAKE ONCE A FLOOD WARNING HAS BEEN ISSUED

Plant Management/Emergency Team:

- Assemble the Plant Emergency Organization and supplies and equipment at a designated safe location onsite. Consider the following: emergency lighting, generators, portable pumps and hoses, sandbags, fans, dehumidifiers, etc.
- Establish emergency communication methods.
- Monitor weather and flood reports through the National Weather Service (NWS) and the National Ocean and Atmospheric Administration (NOAA).
- Release non-essential staff, or direct to a designated safe location.
- Shut off all flammable and combustible liquid piping and gas lines at the source or entry into the property to reduce the likelihood of release if pipes are broken.
- Turn off non-essential lighting, machinery and equipment. Anticipate power outages and surges; be prepared to shut down susceptible systems such as computers. De-energize equipment which may become submerged.
- Back up important computer data and records and store backups in a safe, elevated location not subject to flooding.

Buildings and Structures:

- Close and secure any flood doors, gates, shields or other flood barriers. Close any valves in building drains or plumbing to prevent back up into the buildings.
- Place sandbags at lower building openings such as doors and other openings susceptible to flooding, and around important outdoor equipment, to divert floodwaters.
- Fill aboveground and underground tanks with product or water to improve stability and minimize damage from flooding waters. Check tanks for proper anchorage and extend vent lines above level of expected flooding. Anchor and secure all portable containers of flammable or combustible liquids.
- Anchor and tie down all small structures, equipment, and storage in the yard, trailers, conveyors, lumber, process equipment, etc. to prevent movement by floodwaters.
- Brace unsupported structural members and foundations for structures/buildings under construction.
- Secure electrical power to buildings in imminent danger of flooding.

Emergency Equipment:

- Ensure emergency generators, water and sump pumps, etc., are operational and fuel tanks are full.
- Clean all catch basins, drains, and drainage ditches. Lower the levels of retention ponds. Ensure all sump pumps are operational and connected to emergency power.
- Inspect all fire protection equipment and leave in service. All fire protection equipment should be adequately anchored and protected from flooding and floating debris.