Flood Checklist

The following may serve as a checklist when preparing for a flood. This checklist should be tailored to processes/operations, flood protection equipment and flood potentials at your specific plant. The time required to complete each item should be determined in advance to allow proper planning.

ACTION TO BE TAKEN BEFORE THE FLOOD SEASON

SECTION A - PLANT MANAGEMENT/EMERGENCY TEAM:

☐ Develop a Flood Emergency Response Team as part of the Plant Emergency Organization.
☐ Review the Flood portion of the Natural Hazard Property Loss Control Program and make any updates as required.
☐ Prepare, or locate, and maintain a scaled plan or diagram of the facility which 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.
☐ Pre-qualify and pre-commit as many repair and service contractors as possible, including both local and national firms.
☐ Obtain multiple suppliers for critical building components, equipment and stock necessary to resume operations/business.
☐ Obtain the home telephone numbers of executives of all committed contracting firms, utilities, and other services critical to resumption of operations.
☐ Establish good credit with service providers, suppliers and contractors. Good credit and cash speak loudly in difficult times.
☐ Establish and maintain good relationships with local police and fire departments.
☐ 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.
☐ Develop a phone directory for critical suppliers, contractors, services, etc. Obtain phone books from surrounding major cites in the event you need to obtain services and supplies from surrounding areas.

SECTION B - BUILDING AND STRUCTURES

☐ 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.
☐ Inspect the following to ensure they can withstand erosion and heavy water flow conditions:

- Anchorages
- Conveyors
- Cables
- Guy Wires
- Stack Supports
- Other
SECTION C – EMERGENCY EQUIPMENT:

☐ 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.

ACTION TO TAKE ONCE A FLOOD WARNING HAS BEEN ISSUED:

SECTION A - PLANT MANAGEMENT/EMERGENCY TEAM:

☐ Assemble the Plant Emergency Organization and supplies and equipment at a designated safe location on site. Consider the following:

1. Emergency lighting
2. Emergency generators
3. Portable pumps and hoses
4. Lumber and nails
5. Grease or other metal protection
6. Tape for windows, doors and other openings
7. Sandbags
8. Squeegees and mops
9. Fans and dehumidifiers
10. Caulking compound
11. Tarps
12. Manual and power tools
13. Shovels, axes, etc.
14. Saws and chain saws
15. Emergency telephone list(s)
16. Ensure that the Plant Emergency Organization has the following:
   a. Nonperishable food
   b. First aid equipment
   c. Lighting
   d. Two-way communication equipment
   e. Stored drinking water
   f. Blankets
   g. Appropriate clothing including rain gear and boots

☐ Establish emergency communications methods.

☐ A designated member of the Plant Emergency Organization should monitor weather and flood reports from National Sources. In the USA the Army Corps of Engineers can provide predictions of river levels and status of dams and levees. The National Weather Service (NWS) is a good source of weather information.


☐ Equipment repair and/or replacement suppliers are placed on alert.

☐ If necessary, shut down operations and processes safely in accordance with OEM recommendations. Drain open tanks of combustible, flammable or hazardous liquids to approved, sealed containers.

☐ 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. When equipment or processes must be kept in operation, service to all other areas of the plant should be secured using isolation valving. Pipes should be properly supported and protected from floating debris.
☐ 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. Take care not to impair emergency equipment such as electric motor driven fire pumps or fire alarms.

☐ Back up important computer data and records and store backups in a safe, elevated location not subject to flooding.

☐ Protect important paper records from flooding, rain, and debris and relocate to an elevated location not subject to flooding.

☐ When possible, move important equipment (including mobile equipment) and stock to higher elevations not subject to flooding. Use past flood history to select “safe” areas. If equipment and stock cannot be relocated or elevated, sandbags, tarps, or waterproof coatings, such as grease, may be applied to help protect exposed metal surfaces.

☐ The Flood Emergency Team should remain on site until the emergency has passed.

SECTION B - 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. Move smaller objects inside if possible.

☐ Ensure all traveling cranes and bridges are secured in accordance with the manufacturers’ instructions including setting all rail clamps and securing with wedges and cable anchors. Barricade important outdoor equipment with sandbags to provide protection against floating debris. Move mobile equipment to higher elevations.

☐ Brace unsupported structural members and foundations for structures/buildings under construction.

☐ Secure electrical power to buildings in imminent danger of flooding.

SECTION C – 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.

Fire Protection:

☐ Inspect all fire protection equipment and leave in service. All fire protection equipment should be adequately anchored and protected from flooding and floating debris.
- Ensure that electric driven fire pumps and fire alarms are not removed from service when any electricity is de-energized. When required, back-up diesel driven fire pumps should be considered for reliability.
- Ensure all fire water tanks and reservoirs are full.
- Verify all fuel tanks are full.

**Recovery Action after a Flood**

**SECTION D – PLANT MANAGEMENT/EMERGENCY TEAM RECOVERY OPERATIONS:**

- The Plant Emergency Organization Plant Emergency Organization should be prepared and trained in recovery efforts specific for each location.
- The site should be secured and a Command Center should be established to direct the recovery operation.
- Damage should be surveyed and, as soon as possible, notification of fire protection impairments should be reported to the local fire department Damage should be reported to the insurance company as appropriate.
- 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.
- Designated key personnel and emergency contractors should be called to coordinate and start repairs and salvage. Ensure that all contractors are familiar with Company Policy Programs and share responsibility for fire safe conditions at all times.
- Begin salvage as soon as possible to prevent further damage. Items to consider include:
  - ii) Relocating property to higher elevations to prevent further damage.
  - iii) Cover building contents with tarps when exposed to rain and weather.
  - iv) Separate damaged goods from undamaged goods.
  - v) Make temporary repairs to prevent further damage.
  - vi) Fill eroded land areas, especially around building and structure foundations.
  - vii) Remove standing water in buildings, yard areas, etc.
  - viii) Clean and dry equipment with most critical objects receiving priority.
  - ix) Consider dehumidification of most areas, especially moisture sensitive equipment.
  - x) 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. Electrical equipment may absorb large amounts of water even if not submerged which may reduce its insulation resistance to dangerously low levels.
- Inspect steam and process lines for wet insulation, which requires drying or replacement.
- Contents of tanks, piping, reservoirs, boilers, process equipment, cooling towers and the like should be tested for contamination before use.

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Mechanical equipment should be dried and cleaned and casings inspected. Shafts should be checked for alignment and lubricating systems flushed.

Fire Protection:

- Repair and return to service as soon as possible all fire protection including sprinklers, water supplies, fire pumps, special extinguishing systems, alarms and supervisory service, etc.

- Ensure that all Company Policy Programs, such as Hot Work (cutting & welding) and Smoking etc. are properly supervised and enforced during salvage and repair operations. If automatic protection is impaired, arrangements for special fire watches should be made and notice to the fire department and the insurance company should be made promptly.