



# Flooded electrical equipment — Tips for post-flood evaluation and recovery

While electrical system components damaged by clean water might be salvageable, floodwaters can be especially destructive to such equipment. Don't assume water-damaged electrical equipment can be simply dried, cleaned and reused. Flood waters are likely to contain contaminants that include chemicals, petroleum products and sea water and leave damaging corrosive and conductive residues on electrical equipment. These contaminants can cause shock, fires or electrocution hazards upon re-energization immediately — or remain a hazard in the future.

Electrical protective devices designed to prevent damage to equipment or personnel can fail to provide any protection after contact with or damage by water.

**De-energize electrical equipment** – As soon as safely possible after the flood, all sources of electricity must be disconnected and de-energized prior to entering sites with flooding, and fail proof methods to prevent re-energization must be made. The utility should be contacted to shut off power to the site, and the utility will need formal authorization prior to restoring service. Ideally, prior to a flood, a risk management plan was in place that included steps for safely isolating and de-energizing electrical systems and equipment.

**Qualified electrical personnel** – Only qualified electrical personnel should isolate and de-energize supply sources and perform post-flood equipment inspections, assessments, and work on electrical equipment for removal, repair, installation, maintenance and testing. Consult equipment manufacturers to determine which electrical equipment can be restored and how, if at all, after being flooded. Emergency or temporary power for such things as lighting during recovery should remain completely isolated from the site's normal power distribution system; a hazard assessment must be made to ensure safety and compliance requirements are met.

**Evaluation and replacement process** – While electrical equipment damaged from fresh water might be restorable, equipment damaged by contaminated water, salt water, sewage or chemicals are likely to require replacement. Molded case circuit breakers and electrical distribution equipment operating at 600 volts or less will typically need to be replaced. All fuses that were submerged should be replaced, and general use dry type transformers are likely to require replacement. While some motors might be salvageable, complete disassembly should be planned for all to replace oil and bearings contaminated with flood waters. Many cables will require replacement. Equipment refurbishment will likely require the services of a qualified electrical shop or the original manufacturer, and acceptance testing of equipment should be conducted, including functional testing of safety and protective devices.

**Business Continuity Plans (BCP)** - A timely and incident free recovery and restart of shuttered plants following a flood will depend on having a tested flood recovery plan in place. Many plants have a pre-flood plan in place that includes shutting down in advance of a threat such as from a Hurricane. Often missing from BCPs are the post-flood steps necessary to address how to recover from a flood damaged electrical distribution system. Many components will require replacement, and those that can be refurbished are likely to strain the parts and services supply chain with staffing and shop capacity constraints due to the size of this event. BCPs that are annually reviewed and improved can help expedite these obstacles.

For further information on business continuity management [click here](#)

**Useful guides** – Once personnel hazards are corrected, waters recede, sites are free of standing water and the recovery process begins for buildings and facilities, there are several useful guides available to help, in addition to the original equipment manufacturer.

- The National Electrical Manufacturers Association or NEMA has two useful documents available at <http://www.nema.org/pages/default.aspx>, using the search bar with the titles as noted below:
  - “Evaluating Water-Damaged Electrical Equipment” has tables that show which equipment likely needs replacement and which might be reconditioned per the manufacturers’ guidance
  - “Guidelines for Handling Water-damaged Electrical Equipment”
- Square D by Schneider Electric’s Data Bulletin titled “Water Damaged Electrical Distribution and Control Equipment” at [http://www2.schneider-electric.com/resources/sites/SCHNEIDER\\_ELECTRIC/content/live/FAQS/177000/FA177865/en\\_US/Water%20Damage%200110DB0401.pdf](http://www2.schneider-electric.com/resources/sites/SCHNEIDER_ELECTRIC/content/live/FAQS/177000/FA177865/en_US/Water%20Damage%200110DB0401.pdf)
- From Buildings – Smarter Facility Management’s article, “6 Steps for Evaluating Water-Damaged Electrical Equipment” at <http://www.buildings.com/article-details/articleid/5856/title/6-steps-for-evaluating-water-damaged-electrical-equipment->

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