

Risk Control Bulletin

Equipment Exposures - Before & After the Flood

RISK CONTROL



- Your basement is now filled with water.
- Your production floor is now inundated with flood waters.
- Heavy rain has raised the water level to the first floor.

In all three cases, your facility is at risk for equipment damage. Flooding can cause moisture related damage and deposit foreign debris inside equipment.

Pre-emergency planning prior to a natural disaster and the subsequent recovery is critical. Prior to flooding, critical resources should be catalogued. Critical vendor information should also be identified. Spare parts, lubricants, tools and OEM procedural manuals should be stored above high flood stage. Equipment should be secured and hazardous materials, oils and fuels should be moved to a safe location.

Where possible, moving critical equipment or process out of flood zones or to higher elevations should be considered. Where this is impractical, steps should be considered to protect equipment from flooding. Every business needs a pre-emergency plan and equipment needs to be a part of that plan.

With a forecast for flooding, all equipment should be shut down. Turn off all electrical power to your equipment. Some simple steps can mitigate the risk of equipment failure upon startup after a flood.

- **Identify and inspect** all of the equipment affected by the flood. Everything from underground services to electrical circuit breakers above flood stage that may have tripped should be inspected. Equipment foundations should be inspected. Oil sumps and piping that are at or below flood stage will need to be stripped and cleaned, as well as fuel tanks. Ground level emergency generators can have both fuel and lubricating oil tanks/sumps. Gear boxes and hydraulic equipment will need to be inspected. Air tanks and other pressure vessels can shift during floods or be

contaminated. Both dry and oil cooled transformers must be inspected. Underground conduit can be filled with water or shift during floods. Conduit inspection as conditions allow should be conducted. Check fresh air intakes and flues for blockage or damage. Piping support should also be inspected as equipment and supports can shift during a flood. Some equipment will need to be opened. Lock-out/tag-out procedures must be followed. Short cuts can lead to compounding the issues already faced due to the flood.

- **Cleaning and drying of equipment** is the next critical step. In many cases this will require trained personnel. Dry type transformers and motors will require qualified electrical shops to properly clean and dry windings. Improper drying of windings can lead to insulation failures. The same is true of switchgear and circuit breakers. Boiler refractory should be cleaned and dried properly. Boiler refractory with high moisture content can be ruined if subjected to high temperature. Insulation on boilers and piping should be thoroughly dried to prevent corrosion of the underlying metal. It can take several days for water tables to fall below underground services before cleaning and drying can take place. Underground condensate, steam or other medium systems should be flushed if breached.
- **Testing of equipment**, especially electrical equipment and controls will be required. Both oil cooled and dry type transformers will be contaminated and must be tested. Testing the oil in the transformer and testing the insulation on all electrical equipment will prevent insulation failures from destroying equipment in the circuit. Grounding systems can be altered or damaged by flooding and should be tested. The same is true of underground electrical conduit. A shift in the conduit can stress cable insulation and cause a failure when re-energized. Simple testing can identify damaged insulation in need of repair. Boiler refractory moisture testing should be completed.



Pressure testing of underground piping may be needed. All controls and safety devices, including relief valves that were contaminated, should be tested before returning to service.

- **Restoration** should be in increments. One system at a time. Only trained personnel should be restarting equipment and care should be taken to monitor parameters during start up. Only partial loads should be applied during the start up phase. Rushing equipment back to service may result in failures occurring.

CNA is a recognized major underwriter of Equipment Breakdown, and backs its coverages with a highly trained staff of risk control consultants and engineers. CNA's capabilities include risk evaluations, equipment installations, maintenance programs and practices, operator training and procedures, spare parts inventories and contingency planning. Additionally, the CNA field staff maintains certifications and commissions to perform all required statutory inspections of boilers and pressure vessels within the United States.

To learn more about CNA's Risk Control services, visit:
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