

National Cancer Institute at Frederick

Emergency Preparedness Plan

Appendix G – Hazard Specific Plans

Annex A – Power Outage Plan

Revised: May 28, 2014

Power Outage Plan

Power outages cause disruption and potential threats to personal safety and to the research mission. Many areas have backup power capability, either battery powered uninterruptible power supplies (UPS), or emergency generators. Most electrical systems, however, are not connected to backup power. For clarity, electrical outlets which are generator powered should be labeled. Emergency circuits are intended for mission essential loads only. Do not overload electrical circuits; overheating, loss of power, or fire may result. Power outages have distinct durations and associated impacts:

- A **power bump** is defined as a short term outage lasting five minutes or less. While most alarms will self-correct upon restoration of power, a power bump will cause multiple alarms for ventilation, scientific equipment, and utilities. Normally unlocked doors may lock and card access may be delayed.
- A **phase power outage** is power loss to one or two phases of a three-phase circuit. This causes three-phase motors, typically air handlers, to overheat and release smoke. In order to protect large motors, phase protection controls are designed to de-energize all three phases if one or two phases have power loss. Newer buildings have phase protection; however, phase protection is not installed in all buildings.
- A **short term power outage** is defined as all electrical phases are without power for a period between five minutes and 4 hours. Hazardous operations must be suspended due to loss of ventilation controls. Battery operated emergency lights last about 90 minutes and then windowless areas will be dark. Freezer contents will remain frozen if the freezer is not opened. Air conditioning will not be available.
- An **extended power outage** is longer than 4 hours. Windowless areas without backup generator power will be dark after batteries are exhausted. Fire alarm system battery backup is designed to last 24 hours. Connectivity for scientific alarms, building automation systems, and access control is lost when UPS batteries become exhausted. Generator fuel is planned to last 24 hours and will be monitored by FME.

At the onset of a power bump or power outage Protective Services will survey the campus to assess the general areas impacted. FME will assess the extent of the outage and verify that each generator has started. Additional radios for FME use are available to be picked up at Protective Services.

Safety Warnings and Required Actions Prior to a Power Outage

With advance notice of a planned outage or severe weather event, such as an ice storm or hurricane, some advance preparation for an extended outage is possible. The Crisis Response Team should be notified of the impending storm and Emergency Preparedness Plan Incident Level should be elevated to support coordination and awareness of the status of preparation activities. Power outages can occur without notice, however, major storm warnings provide advance notice to take steps to prepare for a power outage:

- Building ventilation system outages are to be expected. Therefore, all hazardous work must be suspended. Chemicals inside a chemical fume hood must be covered. Solvents can go into a flammable storage cabinet. Bulk chemicals can go back on the shelves once covered. Biological samples must be covered, and if possible, placed into a refrigerator or freezer with power.
- Essential frozen research materials should be relocated to a freezer repository which is powered by a backup generator, or in a freezer connected to circuits known to be powered by a backup generator. To prevent catastrophic loss of research, materials should have backup samples stored in multiple locations.
- Dry ice, or packages containing dry ice, shall not be stored inside a walk-in freezer or walk-in refrigerator due to lack of ventilation. As dry ice sublimates, gaseous carbon dioxide is released and may accumulate to dangerous levels. Carbon dioxide toxicity and oxygen depletion can cause life threatening consequences. Do not place dry ice in airtight or sealed containers as an explosion may result. Use well-insulated gloves to handle dry ice to prevent cold burns. If a freezer has failed for any reason, to include loss of power, AND a decision is made to use dry ice to maintain temperature, employees must contact Protective Services at 301-846-1091 to obtain warning signs to place on the freezer and room entrance before placing dry ice into the freezer. Prop open doors to freezer rooms while building ventilation is out of service in order to minimize the build-up of carbon dioxide gas.
- Liquid nitrogen will displace oxygen if sufficient amounts are present in areas with inadequate ventilation. Suspend operations involving liquid nitrogen to prevent the displacement of oxygen by nitrogen gas.
- Leaks of inert compressed gases such as nitrogen and argon may displace oxygen in a room. Close the valves on all compressed gas cylinders before leaving the building.
- Refrigerators and freezers for human food will also be an issue due to the long outage. After about four hours, frozen samples may be at risk. Red Cross

- guidance for power outages indicates refrigerators for human food are good for two to four hours. Remove items from refrigerators intended for human consumption. Save data and shut down computers and scientific equipment to avoid data loss due to power outage or voltage fluctuation.
- FME will pre-position a portable generator on the roof of Building 535 to power the two-way radio repeater in the event of battery failure or an extended power outage.
 - Check cords and fuel on hand for use with approved portable generators, such as Buildings 324, 1050, and animal production buildings.

Safety Warnings and Required Actions During a Power Outage

- Protective Services will survey the campus in order to determine the extent of the outage. Once the extent of the outage is determined, a Send Word Now message will be sent to employees on the Power Outage List.
- Additional Protective Services personnel will be called in to make rounds throughout the campus with increased attention to buildings affected by the outage.
- Do not enter buildings without electrical power unless using flashlights or portable lighting. Emergency light units and exit signs will lose battery power in approximately 90 minutes. Egress access will be illuminated only by windows or lighting powered by an emergency generator.
- Telephones on the campus system will not work unless telephone equipment in the building is connected to a generator. Emergency (blue light) phones are direct-wired and will function as long as the telephone equipment in Building 350 is working.
- The card access system will be de-energized which disables card reader functions. The doors will default to a locked condition and can be opened by Protective Services using a metal key. If emergency access to the building is needed during the outage, employees should contact Protective Services at 301-846-1091 for escorted entry.
- FME will check emergency generators and connected equipment, secure non-electrical utilities, and monitor building conditions.

Safety Warnings and Required Actions After a Power Outage

- Protective Services will send a message using Send Word Now to notify employees on the Power Outage List that power has been restored.
- Protective Services will monitor alarms as equipment begins to return to normal and FME will begin to make rounds to start equipment which requires manual restarting.