1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide guidelines for personnel to follow when a power failure/outage affecting building operations occurs, to ensure the safety of all individuals, the protection of equipment, and the integrity of ongoing experiments and samples.

2. Scope

This document applies to all laboratory personnel, certain campus employees, faculty, staff, students, and visitors who work in laboratory or research facilities.

3. Personnel Qualifications and Responsibilities

A. Laboratory Personnel

Laboratory Personnel (i.e., researchers, lab coordinators, students, staff, etc.) will follow this SOP during power outages, report power outages promptly to the appropriate supervisors and/or personnel and will identify/report any resulting damage to equipment, personnel injury, or other incidents resulting from power outages.

B. Facilities Services

Facilities Services will promptly restore power to critical systems after a power outage. They will notify the appropriate end-user(s) (i.e., researchers, lab coordinators, lab managers, technicians, staff, etc.) or appropriate person that may communicate with the College and/or Departments in advance of any planned power outages for maintenance while providing a timeline for restoring power.

C. Environmental Health and Safety (EHS)

EHS will assess building ventilation and/or chemical fume hood functionality and will investigate any incidents which occurred after a power outage event.

4. Environmental Health & Safety Hazards

Power outages, whether planned, caused by accidental damage to electrical systems, or as a result of adverse weather events can affect normal building operations by interrupting power to lighting, ventilation systems, safety controls, and equipment, creating potentially unsafe conditions for personnel within research laboratories, lab support areas, or other areas where hazardous materials are stored/used, or where hazardous processes are at work. Due to these potentially unsafe conditions, normal occupancy and/or research operations are prohibited in these areas during power outages regardless of emergency generator status or ventilation.

5. Power Outage Pre-Event Preparations

Prior to power outages, lab personnel should be prepared to safely shut down and secure equipment and/or active experiments. **ONLY ESSENTIAL EQUIPMENT** should be connected to emergency power circuits powered by emergency generators, as the supply of back-up power is limited based on generator load capacity. These emergency power circuits are generally marked by red electrical outlet plugs or cover plates. Emergency power circuits are designed to run for only a limited time and do not provide unlimited power to all internal equipment.

Lab personnel should identify and clearly label hazardous materials for easy identification in low-light situations such as during a power outage. Hazardous chemical containers and specimens should always be kept closed and properly stored (in appropriate temperature-controlled environments when appropriate) when not immediately in use to minimize hazards when power outage occurs. These containers should not be left open on bench tops, shelves, desks, other work surfaces, or inside chemical fume hoods.

6. Procedures for Response to Power Outage Event

When a power outage occurs, ensure that emergency lighting has been activated, and if not, use flashlights, glowsticks, etc. for light sources. Emergency lighting is not meant for the continuity of operations, only safer evacuation of the building; therefore, evacuation should be done regardless of the activity. Candles and other sources of open flames should not be used as light sources during a power outage, as they are prohibited inside the building.

Evacuate laboratory areas immediately by following marked evacuation routes and lighted exit signs. All experiments must be shut down during the power failure, and prior to evacuating the lab area, if possible. Instructional laboratories performing "dry" lab experiments (i.e., no chemicals present) should also evacuate laboratory areas immediately during a power outage event. Starting new experiments involving hazardous materials and/or re-entering buildings after evacuation is not permitted unless the all-clear has been given or unless expressly permitted by authorized personnel. Colleges and/or Departments may set a time limit as to how long students should wait before classes and/or labs will be canceled due to a power outage.

If working inside chemical fume hoods (CFH), biosafety cabinets (BSC), glove boxes, gas cabinets, or with solvent stills, take appropriate precautions such as carefully shutting down equipment, stopping experiments or reactions, and/or operations that may emit hazardous air contaminants when the fume hoods are not functional, if possible. Close the sashes on CFHs and/or BSCs before exiting the laboratory area. Follow any SOPs regarding air-sensitive chemical experiments being conducted inside gloveboxes or inert atmosphere apparatuses during a power outage event.

Check for proper set-up and safety of -80°C freezers, refrigerators, cell storage Dewars, and other equipment that uses liquid nitrogen. Turn off all heat sources such as hot plates, heating mantles, sterilizers, water baths, ovens, etc. If possible and if time permits during the outage, laboratory instruments and/or equipment should be powered down and/or manually switched off to prevent

any electrical damage when power has been restored (i.e., power spikes to instrument on start-up, etc.). Individuals, lab personnel, professors, and/or instructors should follow the procedures outlined above in the event of a power outage occurring after hours. Procedures for evacuating faculty and/or staff offices during a power outage event, especially for buildings connected to research and teaching laboratories, should be developed by the College and/or Departments.

For individuals working in animal care facilities, immediately return all animals to their assigned cages/enclosures and follow vivarium protocols regarding animal care during the power outage.

7. Procedures for Post-Power Outage Event

Once the all-clear has been given, it is permitted to re-enter the building/work area. Colleges and/or Departments may develop a contact tree (e.g., Department Chairs, Lab Managers, Lab Coordinators, Faculty, etc.) for notifying laboratory personnel when power has been restored, and building re-entry is permitted. Before resuming experiments or normal work activities, confirm with Facilities Services whether ventilation has been restored to the building and is functioning properly. Notifications should be sent to the faculty and staff in the affected college(s), including information about the amount of time power was off, which buildings were affected, and that EHS has checked fume hoods and/or ventilation system to allow experiments to proceed. Confirm proper operation of exposure control devices (e.g., CFHs, BSCs, gloveboxes, snorkels, etc.) by checking the airflow indicators and conducting visual airflow tests (e.g., Kimwipes®, tissue, powder, etc.). Ensure that sashes are at the correct height before checking for proper air flow. Biosafety cabinets should be turned on and allowed to run for at least 10 minutes. The surfaces inside the BSC should then be disinfected prior to resuming normal operations. Contact EHS for assistance with determining proper airflow inside containment devices, if needed.

After power has been restored, turn on equipment in a phased manner to prevent overloads. Check for hazards resulting from prolonged power outages such as defrosting of freezers (check for pooling water on the floor). Ensure refrigerators, freezers, or cold rooms return to safe working temperatures prior to opening any doors.

8. Debrief after Power Outage Event

After a power outage event, identify lessons learned, implement improvements, and make adjustments to action plans accordingly by assessing what went well and identifying any problems that occurred during the power outage event. Seek input for research groups, faculty, and staff that may contribute to positive feedback for future events and mishaps.