Flood Response and Mold Prevention Program

Prepared by the Berea College Department of Environmental Health and Safety

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I. Introduction

Successful flood responses and mold mitigation require the close interactions between the Berea College Facilities Department and the Department of Environmental Health and Safety. Response begins with the prompt recognition of a problem, timely notifications to appropriate responders, corrective actions and follow-up. Response also includes individuals from the affected location or department.

The purpose of this document is to provide those with responsibilities for flood and mold prevention and response with ready guidelines and information about these events and the steps that are needed to help prevent them as well as successfully and safety respond to them. This document is meant to be a "living" one and will be periodically reviewed and updated. Please direct any comments or suggestions to the Department of Environmental Health and Safety.

II. Flood and Mold Hazards

Floods are water release or intrusion events that result in the presence of water in unwanted locations. They include all forms of water: "clean" potable water, drain water, sewage, steam condensate, high ambient humidity, process chilled water, rain, ground water, and surface run off. The uncontrolled presence of water can create a range of potential physical hazards, from minor slips, or trips from unseen submerged objects, to short circuiting of electrical devices and equipment with the potential for electrocution. Water can cause serious damage to porous and non-porous objects, equipment, and building materials. It can also dissolve or otherwise transport contaminants from one location to another, whether naturally occurring or from laboratory or other operations. The water source itself can be potentially harmful, especially if it is sewage related. Floods and/or water intrusion is disruptive to all buildings, but are especially damaging in buildings with residential, healthcare, laboratory, library, and museum occupancies.

Regardless of source, prolonged moisture conditions can create an environment suitable for the rapid growth of molds and mildews. If these conditions persist long enough, other organisms may develop, bringing even more extensive problems like termites and mosquitoes. The severity, extent, and duration of the impact is largely based on the extent of the water intrusion and the speed with which water is removed.

III. Roles and Responsibilities

<u>Facilities maintenance group</u>
Manages overall work order process for routine and emergency services and repairs, including customer service notification and dispatching, providing trained technicians and managers, assisting in the evaluation of damages to building materials and furnishings, and post-event return to normal operating conditions. The Facilities Department also provides routine maintenance on critical building systems to ensure

appropriate indoor conditions and prevent water infiltration and floods. Examples of this type of maintenance are, clearing indoor plumbing and drainage systems, window repairs, roof and gutter inspection and repairs and HVAC system service and repairs.

Custodial Services
Provides routine cleaning and housekeeping, as well as prompt emergency clean-up to various emergencies including floods and other water intrusion events, using applicable techniques and personal protective equipment. For water events, custodial services are equipped with wet/dry vacuum cleaners, fans, and dehumidifiers along with pre-approved disinfectants and cleansers. The staff is trained and equipped to clean up small areas of mildew and other minor microbial contaminated surfaces and objects.

Grounds Maintenance
Provides routine and emergency landscaping and exterior building grounds services, snow and ice removal, and other weather related services. Grounds Maintenance also provides routine maintenance services to avoid water infiltration and flooding from exterior sources, including clearing catch basins and below-grade window wells, leaf and debris removal and street and sidewalk clearances.

Paint Team
Provides routine surface painting for both exterior and interior building surfaces. The Paint Team is the primary group in the Facilities Department that is trained to identify possible mold or mildew contamination and is responsible for small area remediation. The paint team works directly with the EHS Department to determine scope of work and remediation procedures.

Project Management
Prepares, reviews, and implements capital renovation and new constructions projects. Efforts are made to identify pre-existing building conditions, including those involving water and moisture problems. During actual construction and renovation work, project managers periodically monitor work areas to ensure that applicable water management measures are implemented, including any temporary site dewatering requirements. Project management is also responsible for making sure that all storm water construction permit applications are submitted to the State if applicable.

Environmental Health and Safety
Provides training as well as response to water intrusion events that may directly impact the safety and health of building occupants. Works with the Paint Team group to identify possible mold and mildew formation and develops plans of action for remediation.

Risk Management Function
Interfaces with college insurers on underwriting, emergency pre-planning, and recovery efforts. Facilitates claims for damages.

Public Safety

Responsible for overall campus emergency preparedness, management, and response, including convening the Emergency operations Center for significant emergency events. In addition to other surveillance activities, provides regular campus notifications about sever weather forecasts and preparedness needs.

Health Services
Provides medical services and advice to both students and staff concerned about allergies, sensitivities, and other medical conditions potentially associated with floods, molds, and other water intrusion events.

IV, **Emergency Response Procedures**

Floods and Water Intrusion events
Most flood events on campus originate from fresh water supply line breaks, ground water/rainwater infiltration, roof leaks, and drain leaks. Most are quickly reported and identified by Facilities or Custodial Services. There is a small potential for water infiltration to impact laboratory materials resulting in contamination. The Environmental Health and Safety Department would need to be involved in assessing potential hazards for this type of event. The following response actions need to be taken in the event of a flood:

1. Upon identification of a flooded area or water intrusion event, individuals should contact Facilities during normal working hours (8am -5pm M-F) ext. 3827 and Public Safety at ext. 3333 during non-work hours.
2. Responders should identify the potential source of the water and work to safely stop the flow if possible. It is important to determine the source of the water (i.e. clean water, sewage, rainwater,)
3. Evaluate water migration route and determine if any additional hazards exist. (i.e., possible infiltration into a hazardous material storage area or impact an area serviced by electrical power)
4. Identify potential dangers such as soggy/falling ceiling tiles, electrical shorts, wet walking areas, chemical reactions. Contact appropriate response staff as necessary.
5. Cover or remove valuable equipment, objects, and supplies with plastic sheeting if safely possible.
6. Ensure occupant representatives are notified of the event. Be aware of special areas that may need additional attention such as:
    a. Libraries
    b. Museums and galleries
    c. Animal housing area
    d. Residential settings
    e. Health care facilities

f. Sensitive/high value equipment areas

7. Most flood or water intrusions can be cleaned up with wet vacuums and absorbent materials. Unless verified as clean water, clean up crews should wear personal protective equipment that includes safety glasses, goggles, or face shield, impermeable gloves, shoe covers or impermeable boots and additional external garments as needed to minimize contact with liquid.
8. Soap or detergent and water are good for final cleaning of most flooded areas. Additional cleaning materials include Virex 256, 10% bleach or other disinfectants may be necessary if dealing with possible biological materials and sewage.
9. Prompt removal of water and thorough area drying is essential to avoid mold/mildew growth and minimize long term damage to the building. Use portable fans, dehumidifiers, increase area ventilation if possible and consider special cleansers and deodorants that can be tolerated by building occupants if necessary.
10. As soon as possible the assigned project manager should ascertain the level of damage to building surfaces and materials and determine if replacement or repairs are immediately needed. Drying the area within 24 to 48 hours will minimize damage to many materials. Failure to dry out areas and remove water damaged materials within approximately 72 hours based on environmental conditions can result in mold and mildew growth. This is especially true of carpet where mold can grow on the backing material. If carpet or backing is damaged by mold, it should be removed. Please contact EHS before removing carpet to determine if there is any asbestos containing material in the mastic or floor tiles below.
11. Ceiling tiles damaged by water should be removed and replaced. They not only stain but also lose integrity and strength after being wet.
12. Follow up to make sure the area is drying out and contact EHS if additional monitoring needs to be conducted.
13. Where building materials and surfaces require removal or more aggressive cleaning, it may be necessary to relocate building occupants to a temporary relocation.
14. Maintain a documented inventory of response supplies stored in a centralized area so they are readily available when needed.

Mold Impacted Spaces

Mold, mildew, and other microorganisms will grow on continuously wet or damp surfaces. This is especially true of porous organic materials like dry wall, plaster, particle

board, carpeting, and wood materials. They can also colonize HVAC air conditioning drain pans, insulation, and ceiling tiles. While molds are always present outdoors, their visible presence indoors indicates excessive moisture and water infiltration. Some molds produce toxins and allergens that can trigger allergic and hypersensitivity reactions or asthma attacks in some people. These symptoms can range from eye and respiratory irritation and allergic reactions to asthma and other potentially serious respiratory illnesses.

The prevention of mold growth and the immediate remediation of mold growth is necessary to prevent building occupants from experiencing these potentially serious health effects. Molds require water to grow so it is important to prevent water infiltration when possible and respond immediately to infiltration when it does occur. Take the following steps to prevent or respond to mold in building.

1. Identify the potential source of the water and take immediate steps to stop it and make necessary repairs
2. If mold or mildew develops or is present, determine if the impacted area is small (less than 10 square feet) or large (greater than 10 square feet)
3. Small areas can be remediated by simply disinfecting the surface with mold killing disinfectant. Make sure to follow directions for the product you are using.
4. For larger areas or if you are not sure of the total area impact contact EHS to assist in determining the scope of the work and amount of remediation necessary. The EHS Department will follow the guidelines established by EPA for ***"Mold Remediation in Schools and Commercial Buildings"*** when developing a mold remediation plan.
5. EHS can conduct air monitoring and site testing if this information is necessary to help identify problem areas or determine the presence of mold not readily visible (i.e. back of carpet or wall paper)

Large areas of mold contamination may require relocation of occupants and the installation of filtered exhaust air and the erection of plastic barriers to isolate the impacted area. It also may involve the shutting down of the supply and exhaust air systems to prevent the spread of mold spores until remediation is complete. The college may determine that an outside contractor specializing in mold remediation should be used to address larger areas of contamination.

V**. Preventative Measures**

New Construction and Renovation

Designs for new construction and renovation of existing building should incorporate water management and control steps keeping in mind the regional and local water influences as well as the planned occupancy of the building. Planning efforts should be directed at minimizing possible impacts from leaks, breaks, backups and overflows. Basic design guidance includes:

- Assessment of hydrogeologic and surface water runoff, including identification of unusually high groundwater table and recognizable surface water issues.
- Permitted site dewatering, erosion control and groundwater diversion if possible or permitted.
- Basement exterior wall water-proofing and installation of applicable foundation drain systems
- Installation of permanent sump pumps if necessary with accessible means of inspection and repair.
- Avoid the installation of floor carpeting and wall paper in lieu of other less porous materials especially in basement areas
- Roof, gutter, and building systems that reflect the Central Kentucky rain, wind, snow and ice conditions.
- Installation of overhead piping and other potential water sources with efforts to divert piping from passing directly over sensitive storage areas, occupancies, and water sensitive equipment and utilities. Work with building occupants to determine the vulnerable areas.
- Installation of floor drains for emergency drainage especially in laboratory areas for emergency showers.
- Installation and labeling of shut off valves for water supply and process supply lines. Shut-off should be easily assessable.

Preventative maintenance

- Periodic removal of leaves and other debris from drains, window wells
- Periodic inspection and cleaning of AC condensate pans
- Routine filter replacement on all HVAC systems and routine checks of refrigerant levels
- Develop a sampling and monitoring program of cooling towers and related non-potable water sources on campus for *Legionella* and other bacteria to verify chemical disinfection regime used by outside contractors hired to maintain these systems
- Routine safety inspections of all laboratories on campus and many non-laboratory locations on campus by EHS
- Develop an aggressive cleaning program for areas that normally have elevated humidity like gymnasium locker rooms and indoor pool areas.

- Room by room inspection of dormitories and other buildings on campus prior to extended breaks (holidays) to ensure windows are closed, heat/cool levels are appropriate, and water sources are turned off.
- Prepare for possible extreme weather emergencies by increasing on-call staff.

In addition Facilities annually develops lists of buildings requiring additional in-house and contracted inspections, maintenance, repair, or construction to ensure overall good condition. This work would include roof inspections and repairs, gutter and downspout clearing, and exterior drainage systems. Building inspection can be based on historical issues related to problems involving water infiltration and exterior drainage problems.