

1.0 BACKGROUND

Mold is one of nature's primary decomposers of organic materials. Many different types of mold feed on grass, leaves, wood, deceased animals and other organic materials found in nature. Because of this, mold spores are a naturally-occurring component of the air we breathe. The quantity of mold spores found in the air varies dramatically based upon the availability of nutrients, weather conditions - especially with respect to precipitation/humidity, and by other conditions such as wind, temperature and snow cover. Since mold spores are a component of outdoor air, they are also a component of indoor air. Mold spores enter buildings through open windows and doors, air handling systems and we transport spores that settle on our clothes, shoes, and hair.

It is key to maintain the indoor environment so the conditions are not favorable for mold growth that can increase the spore counts beyond the wide range typically found in outdoor air. Since mold spores are a normal component of the air, dampness/moisture is the most important parameter to control indoors. If building materials or contents become saturated, it is imperative to dry them as soon as possible, and eliminate the source of moisture before mold is given the opportunity to grow.

It is important to recognize that small areas of mold typically associated with minor leaks such as a localized spot on a wall or on a ceiling tile are not likely to result in mold-related exposure beyond that typically experienced outdoors.

Penn's policy is to promptly correct the conditions that make the indoor environment favorable for mold growth and promptly remediate mold that is observed indoors.

2.0 PROGRAM OBJECTIVE

The purpose of the Mold Remediation Procedure is to define the responsibilities, methods, procedures, and training required to safely and effectively remove or clean mold-contaminated building materials and contents in Penn facilities.

3.0 SCOPE

This procedure covers facilities owned or operated by the University of Pennsylvania.

4.0 DEFINITIONS

- 4.1 **Approved Contractor** - A contractor who has been approved by Environmental Health & Radiation Safety (EHRS) and Facilities & Real Estate Services (FRES) to perform mold remediation work.
- 4.2 **Level 1 Mold Remediation Project** - A project requiring the remediation of less than ten square feet of mold-contaminated materials. Examples include wiping surface mold, replacing a ceiling

tile or removal of a small area of wall or ceiling gypsum board impacted by a leak. This is typically completed by trained FRES personnel including housekeepers or the trades. EHRS notification is optional.

- 4.3 **Level 2 Mold Remediation Project** - A project involving remediation of greater than ten square feet of mold-contaminated materials. An example is the removal of larger sections of wall or ceiling gypsum board. The project shall be completed by an approved contractor. EHRS notification is required.
- 4.4 **Moisture Assessment** - Inspection of materials by infrared thermography and/or penetrating and non-penetrating moisture detectors to identify those with elevated moisture content capable of supporting mold growth.
- 4.5 **Mold-Contaminated Materials** - Materials determined to be mold-contaminated through visual inspection, odor detection or other sampling methods.
- 4.6 **Post-Remediation Verification** - A post-remediation inspection performed by EHRS industrial hygienists or by industrial hygiene consultants selected or approved by EHRS. The inspection may include a moisture assessment, visual/odor inspection, or sampling as deemed appropriate. The purpose of the verification is to ensure that the remediation has been properly executed and that the area has been restored to what would be considered a normal indoor environment fungal ecology.
- 4.7 **Trained Individual** - An individual who has completed mold remediation training provided by EHRS or an EHRS-approved provider.

5.0 RESPONSIBILITIES

- 5.1 **Environmental Health and Radiation Safety (EHRS)** shall be responsible for:
 - 5.1.1 Assessing suspected areas of mold contamination and coordinating the appropriate University response.
 - 5.1.2 In conjunction with Facilities & Real Estate Services (FRES), identifying the underlying causes of mold contamination and the required measures to prevent recurrence.
 - 5.1.3 Performing or coordinating mold remediation project oversight for level 2 projects.
 - 5.1.4 Providing or coordinating mold remediation training for appropriate FRES or other employees.
 - 5.1.5 Performing periodic reviews of the overall effectiveness of the Mold Remediation Procedures and updating the program as required.
 - 5.1.6 Maintaining all sampling, training and post-remediation verification documentation.

5.2 **Facilities & Real Estate Services (FRES)** shall be responsible for:

- 5.2.1 Notifying EHRS of observed mold growth of ten square feet or more.
- 5.2.2 Notifying EHRS of leaks or other sources of increased indoor moisture and humidity that could be expected to increase potential for mold growth.
- 5.2.3 Performing or contacting EHRS or an approved vendor to complete moisture assessments.
- 5.2.4 Performing, or coordinating with outside vendors, mold remediation as outlined in this procedure.
- 5.2.5 Working in conjunction with EHRS to pre-qualify remediation contractors for level 2 mold remediation projects.
- 5.2.6 Ensuring that employees participate in the appropriate training and follow the remediation work practices presented in the training.

6.0 GENERAL MOLD REMEDIATION INFORMATION

6.1 General Rules

- 6.1.1 Moisture assessments are an integral part of mold remediation. A moisture assessment of impacted materials should be completed to identify if mold growth is active or the result of a past incident. The assessment should identify all damp materials so that they can be removed or if appropriate, targeted for aggressive drying.
- 6.1.2 Only non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound can be cleaned and reused. If a cleaning agent is used, only those that have been reviewed and approved by EHRS shall be used. All materials that will be reused shall be dry and visibly free from mold.
- 6.1.3 Porous materials such as ceiling tiles, insulation, and gypsum board may not be cleaned and should be removed and discarded as described in this procedure.
- 6.1.4 The use of biocides and other chemicals is typically not recommended. The removal of moldy materials and control of the source of moisture that enabled the growth is sufficient to prevent recurrence of mold growth.
- 6.1.5 The use of gaseous, vapor-phase or aerosolized biocides or odor suppressants for remediation purposes is not permitted without specific approval from EHRS.
- 6.1.6 Air sampling for molds is typically of little value. Mold spores are ubiquitous in air. The number of spores captured on a sample cassette during the sampling period can be influenced by numerous factors, which makes meaningful interpretation of the results difficult. Furthermore, there are inadequate recognized health-based standards related to mold spore counts versus onset of adverse health effects. There is no defined “safe” or “unsafe” spore count value that can be used to interpret the sampling results. In lieu of sampling, in most cases, the appropriate course of action is to perform a thorough inspection documenting that the source of moisture has been controlled and that impacted materials are adequately dry, the ambient relative humidity is maintained below 60% and that there are no remaining visual indications of mold growth or odors of dampness or microbial volatile organic compounds.

7.0 MOLD REMEDIATION PROCEDURES**7.1 Level 1: Limited Areas of Mold Contamination (10 square feet or less of mold-contaminated materials)**

- 7.1.1 EHRS notification is optional.
- 7.1.2 A moisture assessment may be required if the source and extent of moisture that allowed the mold to grow is not known. EHRS can assist with this if needed.
- 7.1.3 Trained FRES employees including housekeepers or the appropriate trades may complete the remediation.
- 7.1.4 Personal protective equipment including at minimum, gloves and eye protection shall be worn.
- 7.1.5 Building occupants should be temporarily relocated during the remediation project.
- 7.1.6 Containment of the remediation area is not required. A polyethylene drop cloth should be installed in the immediate area of the remediation activity.
- 7.1.7 Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag or wrapped and sealed in polyethylene sheeting and disposed of in the trash. There are no special requirements for the disposal of moldy materials.
- 7.1.8 Hidden mold - If additional mold contamination is discovered during the remediation project, contact EHRS to reevaluate the project.
- 7.1.9 At the completion of the remediation project, all surfaces, including carpeting, in the vicinity of the remediation area shall be HEPA vacuumed. Additionally, non-porous surfaces shall be damp wiped, and the floors mopped with a standard cleaning agent.
- 7.1.10 All areas should be left dry and visibly-free from contamination and dust/debris. A final moisture assessment of building materials in the vicinity of the impacted area may be required to ensure that the materials are adequately dry and not capable of supporting mold growth.

7.2 Level 2: Mid to Large Areas (greater than 10 square feet of mold-contaminated materials)

- 7.2.1 EHRS must be notified of the intent to remediate as soon as possible.
- 7.2.2 Remediation shall be completed by an approved contractor selected by FRES/EHRS. Remediation work practices shall be consistent with nationally accepted standards such as the Institute of Inspection Cleaning and Restoration (IICRC) S500-Standard and Reference Guide for Professional Water Damage Restoration and IICRC S520-Standard and Reference Guide for Professional Mold Remediation.
- 7.2.3 Contractor must submit a work plan detailing methods and procedures used to complete the remediation project to EHRS for approval, preferably at least two working days in advance of the project.

- 7.2.4 Contractor must submit Safety Data Sheets (SDS) for chemicals used on the project to EHRS for review and approval, preferably at least two working days in advance of the project.
- 7.2.5 EHRS shall review the work plan and SDSs, request changes if necessary, and authorize contractor to proceed.
- 7.2.6 EHRS shall perform project oversight to include periodic inspections to ensure that the project is completed in compliance with the work plan and complete post-remediation verification.
- 7.2.7 EHRS shall provide a written post-remediation verification report to FRES and the occupants of the remediation area.

8.0 TRAINING

- 8.1 Employees involved with mold remediation shall receive training consistent with their duties. Employees will receive training in order to acquire the understanding, knowledge and skills necessary for the safe performance of the duties assigned under this program.
- 8.2 Training shall be provided to each employee who performs mold remediation:
 - 8.2.1 Before the employee is first assigned duties.
 - 8.2.2 Whenever the employer has reason to believe that there are deviations from the Mold Remediation Procedure or that there are inadequacies in the employee's knowledge or use of these procedures.
- 8.3 The training shall establish employee proficiency in the duties required and shall introduce new or revised procedures, as necessary, for compliance.
- 8.4 Training content shall include:
 - 8.4.1 Methods & Procedures for mold remediation to include:
 - 8.4.1.1 Isolation of HVAC systems.
 - 8.4.1.2 Installation of isolation barriers and protection of non-contaminated materials within the remediation area.
 - 8.4.1.3 Remediation, cleaning and disposal of mold-contaminated materials.
 - 8.4.1.4 Final cleaning of remediation area.
 - 8.4.2 Personal protective equipment including OSHA Respiratory Protection Standard (29 CFR 1910.134).

9.0 RECORDKEEPING

- 9.1 Training documentation shall be maintained for all employees who complete mold remediation training. Training rosters shall include the name of the trainer, name of trainee, Penn Id number, and the date of training. EHRS shall maintain all training rosters and a copy of the training curriculum. The most current training record shall be maintained for each employee.
- 9.2 EHRS shall maintain copies of all work plans.
- 9.3 EHRS shall maintain all sampling data.
- 9.4 EHRS shall maintain all post-remediation sampling reports.

10.0 REFERENCES

- 10.1 Institute of Inspection Cleaning and Restoration Certification - IICRC S500 – Standard and Reference Guide for Professional Water Damage Restoration.
- 10.2 Institute of Inspection Cleaning and Restoration Certification IICRC S520 – Standard and Reference Guide for Professional Mold Remediation.
- 10.3 Centers for Disease Control and Prevention – [Facts about Mold](#) & [Dampness and Mold Assessment Tool – General Buildings](#)
- 10.4 US Environmental Protection Agency – [Mold and Dampness](#)
- 10.5 American Industrial Hygiene Association – [Facts About Mold](#)
- 10.6 University of Pennsylvania EHRS – [Mold Information Sheet](#)