



<b>WATER INCURSION AND MOLD REMEDIATION SAFETY PROGRAM</b>		
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## 1.0 Purpose

The purpose of this SOP is to outline proper methods for cleanup and disposal following an indoor water release (incurSION), which may result in damaged building materials. The prompt cleanup of water is necessary to minimize property loss and prevent microbial growth. This SOP also details proper methods for mold remediation if cleaning and drying was not successful or if mold is identified during initial inspection. It is also essential to identify and eliminate the source of moisture that has contributed to water damage or mold growth as part of the remediation process.

## 2.0 Scope

The procedures outlined in this document are provided as general guidance for use throughout university buildings. Many situations involving water incurSIONs and microbial growth require incident specific judgment and expertise to ensure successful restoration. Whenever the following conditions are present or suspected, Case Western Reserve University (CWRU) Department of Environmental Health and Safety (EHS) must always be contacted for consultation and cleanup assistance, prior to, or concurrent with initiating response activities outlined in this SOP:

- If the source of the water is NOT clean (e.g., not potable) or is suspected of being contaminated (i.e., with chemical, radiological, or biological sources), such as sewage, wastewater from food preparation or other similar areas, drainage from sinks or toilets, and/or effluent from laboratory and/or medical settings.
- Areas of visible mold growth
- Substantial water leaks, such as those that impact more than a localized, limited area.

- Events that occur in occupied areas, particularly in situations that involve concerned occupants or where spaces may need to be vacated for remediation/restoration.
- Any water leak or mold growth situations in sensitive indoor environments, including all healthcare settings, research laboratories and other research spaces.
- If water and/or mold-damaged building materials are suspected to contain asbestos or other regulated materials.
- If the water and/or mold remediation work presents the potential for physical or other health and safety concerns.
- If the extent of wet and/or mold-impacted materials may not be fully characterized, such as when situations where damage could be present in inaccessible areas (e.g., inside walls) or when the appropriate remediation/restoration strategy may not be clear.
- Any events or conditions that may require the use of outside resources (i.e., remediation contractors or environmental consultants).
- Events where specific documentation and/or testing (i.e., moisture or relative humidity levels) may be required to verify effectiveness of the response action, such as insurance claims.

Although the items listed above require EHS involvement, there may be other instances where EHS should be consulted.

### **3.0 Responsibilities**

It is the responsibility of all CWRU Facilities and Maintenance employees who respond to indoor water incursions to review and follow guidelines established in this SOP and share it with all other responders.

### **4.0 Procedures**

4.1 HEALTH & SAFETY: Water damaged buildings and materials and the investigation and performance of water damage restoration work can create and expose workers to a wide range of health and safety concerns. Potential hazards include, but are not limited to: exposure to microbial contaminants, chemicals, lead and asbestos; electrical shock and slip-and-fall hazards. Appropriate safety procedures and personal protective equipment (PPE) shall be used to protect employees. Building occupants should be notified of, and protected from, similar health and safety issues.

4.2 INSPECTIONS: Upon initial inspection, the affected area should be evaluated documenting the source and time of the water release, visible material deterioration, pre-existing damage and suspect mold. EHS must always be contacted to evaluate and document the extent of water migration. This may involve the use of moisture-detection equipment.

4.3 WATER RELEASE AND LEAK CLEANUP STRATEGIES: The following Table 1 presents strategies to respond to water damage. These guidelines are designed to help avoid the need for remediation of mold by taking quick action before growth starts. **It is essential that water-impacted materials be dried and/or removed as soon as possible following a leak event to minimize the possibility for mold growth. The EPA suggests materials be dried and/or removed within 48-hours following a water release event to minimize the potential for mold growth.** It is also important to visually monitor materials for mold growth during the drying period. Depending on the size of the area involved and resources available, professional assistance may be needed to dry an area quickly and thoroughly.

**Table 1**  
**Water Damage – Cleanup and Microbial Growth Prevention**  
**(<http://epa.gov/mold/table1.html>)**  
**Guidelines for Response to Clean Water Damage within 24 – 48 Hours to Prevent Mold Growth\***

Water-Damaged Material†	Actions
Books and papers	<ul style="list-style-type: none"> <li>* For non-valuable items, discard books and papers.</li> <li>* Photocopy valuable/important items, discard originals.</li> <li>* Freeze (in frost-free freezer or meat locker) or freeze-dry.</li> </ul>
Carpet and backing – dry within 24 – 48 hours	<ul style="list-style-type: none"> <li>* Remove water with water extraction vacuum.</li> <li>* Reduce ambient humidity levels with dehumidifier.</li> <li>* Accelerate drying process with fans.</li> </ul>
Ceiling tiles	* Discard and replace.
Cellulose insulation	* Discard and replace.
Concrete or cinder block surfaces	<ul style="list-style-type: none"> <li>* Remove water with water extraction vacuum.</li> <li>* Accelerate drying process with dehumidifiers, fans, and/or heaters.</li> </ul>
Fiberglass insulation	* Discard and replace.

Hard surface, porous flooring (Linoleum, ceramic tile, vinyl)	<ul style="list-style-type: none"> <li>* Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.</li> <li>* Check to make sure underflooring is dry; dry underflooring if necessary.</li> </ul>
Non-porous, hard surfaces (Plastics, metals)	<ul style="list-style-type: none"> <li>* Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.</li> </ul>
Upholstered furniture	<ul style="list-style-type: none"> <li>* Remove water with water extraction vacuum.</li> <li>* Accelerate drying process with dehumidifiers, fans, and/or heaters.</li> <li>* May be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration/water damage professional who specializes in furniture.</li> </ul>
Wallboard (Drywall and gypsum board)	<ul style="list-style-type: none"> <li>* May be dried in place if there is no obvious swelling and the seams are intact. If not, remove, discard, and replace.</li> <li>* Ventilate the wall cavity, if possible.</li> </ul>
Window drapes	<ul style="list-style-type: none"> <li>* Follow laundering or cleaning instructions recommended by the manufacturer.</li> </ul>
Wood surfaces	<ul style="list-style-type: none"> <li>* Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. (Use caution when applying heat to hardwood floors.)</li> <li>* Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry.</li> <li>* Wet paneling should be pried away from wall for drying.</li> </ul>

4.4 MOISTURE CONTROL: Moisture problems should be identified, located and corrected or controlled as soon as possible.

4.5 REMOVE EXCESS WATER: Excess water should be collected and removed from structural components, contents and systems at the beginning of the restoration process.

4.6 REMOVING WET MATERIALS: After excess water is cleaned-up, remove unsalvageable wet materials from the affected areas. If this process may create dust and/or debris in occupied or sensitive areas (e.g., wallboard removal), measures should be taken to control and isolate the work areas from surrounding spaces. Intact wet building materials must first be determined not to be asbestos containing before removal/disturbance is performed. CWRU EHS will facilitate the testing of affected building materials to determine asbestos content.

4.7 DRYING STRATEGIES: The objective of drying is to minimize the amount of time materials spend in an abnormally wet state and to return affected materials to an acceptable level of dryness as quickly and safely as practical. Once excess water is

collected and removed, evaporation of the remaining water in materials should be promoted (Table 1).

4.8 DEHUMIDIFICATION / VENTILATION / AIR CIRCULATION: To avoid secondary damage, moisture evaporating into the air should be exchanged with less humid air from other sources, and/or it should be collected and removed from the air through dehumidification. Fans should also be used to direct air towards wet materials to circulate air and promote drying. Consider opening small holes along the bottom of walls (e.g., behind the cove base) to promote air circulation inside wall cavities. In addition, consider operating air-conditioning equipment serving the areas being dried continuously (i.e., 24-hours a day) to promote dehumidification and ventilation. Care should be taken to protect openings to HVAC-equipment in any area when dust generating activities may occur as a result of restoration work. Temperatures in the drying environment should be maintained to enhance the evaporation rate and effectiveness of dehumidification.

4.9 DOCUMENTATION: Upon initial evaluation and throughout the restoration project, notes should be kept documenting all steps taken to correct the problem. Pictures should be taken prior to, during and after all cleanup procedures. In many instances, more extensive or specific documentation may be required or warranted; EHS should be contacted with any questions regarding documentation requirements.

4.10 MOLD GROWTH: Water damaged building materials, especially those that are porous such as wallboard and/or ceiling tiles, that have been wet for an extended period or have been chronically wet can develop mold contamination. If mold growth is encountered during the restoration project, water damage restoration activities should stop until such time that the area of existing or suspected mold contamination is contained. CWRU EHS remediation guidelines are for building materials that have or are likely to have mold growth. These guidelines are designed to protect the health of occupants and cleanup personnel during remediation and are based on the type of material affected by water damage and/or mold growth. If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

In cases when extensive or hidden mold is expected, when remediation may involve demolition of moldy materials that could generate elevated airborne mold sources, or when sensitive individuals are present, a more cautious approach to remediation may be required. Always ensure the safety and protection of remediators and building occupants from exposure to mold. In all of these cases, among others (refer to section 2.0), EHS must be involved to evaluate the nature and extent of damage; to help determine the appropriate response actions and control methods; and to document the effectiveness of remediation.

## 5.0 HEALTH CONCERNS

If building occupants or remediators report health concerns, they should be advised to seek medical attention / advice from CWRU Health Services.

## 6.0 MICROBIAL REMEDIATION GUIDELINES

### 1. Remediation of Mold Growth

Evaluate the area of any mold growth or contamination and remediate according to the guidelines found in the “New York City Guidelines for the Remediation of Fungi in Indoor Environments”, New York City Department of Health and Mental Hygiene, November, 2008. The full text can be found at <http://www.nyc.gov/html/doh/downloads/pdf/epi/epi-mold-guidelines.pdf>. A summary of the remediation requirements is found below.

#### i. Small Isolated areas (<10 sq ft)

1. Remediation can be conducted by trained maintenance staff
2. The area should be unoccupied
3. Personal Protective Equipment (PPE) should include at a minimum, an N95 respirators in accordance with the CWRU Respiratory Protection Program, gloves, and eye protection.
4. Protect unaffected surfaces and materials as well as egress pathways with plastic sheeting and tape prior to disturbing mold contaminated materials.
5. Clean-up of small areas of mold contamination should be performed using appropriate work methods to reduce dust, such as wet wiping, misting surfaces, and the use of HEPA filtered vacuum equipment.
6. Non-porous materials and building surfaces with mold contamination should be cleaned with soap or detergent solution. The use of any chemicals (i.e. biocides, bleach, etc.) must be approved by EHS prior to use.
7. Porous materials which are contaminated with mold should be discarded.
8. The area should be inspected by EHS and determined to be dry, and free of visible mold, dust, debris, and water damaged materials prior to allowing reoccupancy of the affected area.

#### ii. Medium Isolated Areas (10-100 sq ft)

1. Implement all work procedures for a small isolated area and in addition, seal all ventilation ducts/grilles or other openings into the area. Shut down HVAC units during the clean-up.

#### iii. Large areas (>100 sq ft)

1. Implement all work procedures for a small isolated area and in addition, seal all ventilation ducts/grilles or other openings into the area.
  2. Contain the affected area using plastic sheeting sealed with duct tape. If feasible, install a HEPA filtered exhaust fan to achieve negative pressure within the containment area. If feasible, install an appropriate decontamination area. Remove all contaminated disposable clothing and respirators in the decontamination area.
  3. Shut down HVAC units during the clean-up.
  4. Remediation should be conducted by a properly trained and equipped mold remediation contractor.
  5. PPE should include a minimum of a half-face air purifying respirator fitted with P-100 filters in accordance with the CWRU Respiratory Protection Program, Full body coveralls (Tyvek suits), gloves, and eye protection.
  6. The area should be inspected by EHS and determined to be dry, and free of visible mold, dust, debris, and water damaged materials prior to allowing re-occupancy of the affected area. The need for environmental sampling following large mold remediation projects is not required and will be evaluated on a case by case basis.
- iv. Remediation of HVAC systems
1. The remediation of HVAC systems should be performed in consultation with the Facilities Department personnel familiar with each system and/or HVAC design professionals. All remediation within an air handling system, regardless of size, should be performed with the air handling equipment off. The use of chemicals in air handling systems is not recommended and the proposed use of any chemical in air handling systems needs prior approval of EHS.

## **7.0 REMEDIATION RESOURCES**

7.1 EPA 2001 *Mold Remediation in Schools and Commercial Buildings*. Washington, DC: U.S. Environmental Protection Agency Office of Air and Radiation, Indoor Environments Division. [http://www.epa.gov/mold/mold\\_remediation.html](http://www.epa.gov/mold/mold_remediation.html)

7.2 NYDOH 2008 *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*. New York City Department of Health, Bureau of Environmental & Occupation Disease Epidemiology. <http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.shtml>

7.3 OSHA 2003 Safety and Health Information Bulletin: *A Brief Guide to Mold in the Workplace*. SHIP 03-10-10. Washington, DC: U.S. Occupational Safety and Health Administration. <http://www.osha.gov/dts/shib/shib101003.html>

