



**Standard Operating Procedure**  
**for**  
**Water Intrusion**

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# The University of Memphis

## Water Intrusion Standard Operating Procedure

### Purpose

The purpose of this document is to provide easily understandable information to those with roles responding to flooding events. It is the intent of Environmental Health and Safety (EH&S) that all water intrusion events receive a timely, successful response.

### Scope and Application

The scope of this Standard Operating Procedure is applied when a flood event has occurred. Floods are intrusive water release events that result in the presence of unwanted water and moisture. This can include “clean” potable water, sewage, steam condensate, high ambient humidity, rain, ground water, and surface run-off. Such events can create range of physical and health hazards such as slips and trips, shock or electrocution, or mold growth. Water can also cause serious damage to equipment and building materials.

Successful flood response may require close cooperative interactions with many University departments and contractors. Regardless of the source, prolonged moisture conditions can create an environment suitable for the growth of micro-organisms, such as mold and mildew. If these flood conditions continue to persist, organisms such as termites, mosquitoes, other nuisance insects, and animals may be encouraged to occupy the area.

The severity, event, and duration of such impacts are largely based on the extent of the water intrusion and the speed with which the moisture intrusion is remediated.

This standard operating procedure applies to all University of Memphis facilities.

### Responsibilities

#### *University Employees*

University employees should contact Physical Plant when a water intrusion event is observed.

#### *Environmental Health and Safety (EH&S)*

EH&S personnel have the following responsibilities:

- Respond to reported water-related incidents involving suspected mold growth, or other safety and health concerns.
- Assist Physical Plant with assessing the extent of moisture intrusion / flooding.
- Respond to complaints from employees and investigate potential cause of physical and/or health concerns.
- Respond to events involving sewage backflows or other Category 2 or Category 3 water intrusions.
- Assess conditions for occupancy after water restoration or mold remediation activities.
- Communicate with building occupants, Physical Plant, and Campus Planning and Design.
- Follow [Standard Operating Procedure for Mold Remediation](#) if applicable.

### *Physical Plant (Zone Maintenance)*

Zone Maintenance employees have the following responsibilities:

- Provide trained professional tradespersons for response to building floods.
- Assist in the evaluation and repair of damage to building materials and furnishings, and post-event return to normal operating condition.
- Coordinate various entities response (EH&S, Custodial Employees, Campus Planning and Design, contractors, etc.) to water intrusion and flooding.
- Provide routine maintenance on critical building systems to ensure appropriate indoor conditions and to help prevent water infiltration and floods. This may include clearing indoor plumbing and drainage systems, window repairs, roof and gutter inspections and repairs.
- Ensure proper Personal Protective Equipment to employees responding to water and/or mold conditions. Follow [Standard Operating Procedure for Mold Remediation](#) if applicable.

### *Physical Plant (Building Services)*

Custodial employees have the following responsibilities:

- Provide prompt clean-up to various emergencies, including floods and other water intrusion events using approved methods and personal protective equipment.
- Assist Physical Plant Zone Maintenance in the cleaning and drying process using wet/dry vacuums, water extractors, fans, and industrial de-humidifiers. Disinfectants may also be used to clean up small areas of mildew and other microbial contaminated surfaces and objects. Follow [Standard Operating Procedure for Mold Remediation](#) if applicable.

### *Contractor*

Mold Remediation Contractors have the following responsibilities:

- Designate a project leader, representing the contractor, to work with Physical Plant and/or Campus Planning and Design during the entire project.
- Notify contracting department of situations that may require deviation from the original action plan.
- Record and document all activities and services performed in response to the problem.
- Complete the project in a manner which complies with all government regulations and University procedures.
- Follow [Standard Operating Procedure for Mold Remediation](#) if applicable.

## **Procedures**

### *First 48 Hours*

In the event of water infiltration into building areas, remediation within 24 to 48 hours is critical in prevention of mold growth. The following steps should be taken:

1. **Identify the source of the moisture:** Following the discovery of water intrusion into building spaces, identify what category the water source is. Category 1 water generally requires the least amount of personal protective equipment and has the best potential to salvage damaged building materials and furnishings. Categories 2 and 3 require additional personal protective equipment, disinfectants, and are much more difficult to salvage damaged materials.

If the water source is Category 2 or Category 3, contact Environmental, Health and Safety (EH&S) at 901-678-2740 or 901-678-4672 for guidance on cleanup strategies and personal protective equipment. If mold growth is believed to have been found, refer to the [Standard Operating Procedure for Mold Remediation](#).

2. **Prevent further moisture intrusion:** Repair the water leak.
3. **Document damage:** Conduct an assessment and document all water damaged areas, building materials, and furnishings. Pay special attention to identifying wet carpet under cabinets, desks, and other furnishings.
4. **Determine whether materials are “dry”:** Response equipment will include moisture monitoring and evaluation equipment. If materials are wet, restorative drying equipment like dehumidifiers and air movers (like fans) should be used. Water intrusion clean-up strategies for common materials are summarized in Appendix 2 of this document.

The sooner repair, clean up, and drying are accomplished, the likelihood of preventing mold growth is increased. If EH&S consultation is needed, contact 901-678-2740 or 901-678-4672.

#### *Personal Protective Equipment (PPE)*

When cleaning areas with Category 1 water, no specialized PPE is necessary. Normal PPE (i.e., gloves, appropriate footwear) should be worn during cleaning activities. For areas with Category 2 or Category 3 water, employees should contact their supervisor or EH&S.

#### *Post-Restoration Verification*

Forty-eight (48) hours following the initial remediation, Physical Plant should ascertain the level of damage to building surfaces and materials, and determine if replacement or repairs are immediately needed. EH&S may be requested to assist with this assessment and provide moisture readings. For clean water intrusions, removal and replacement of damaged surfaces and materials can be minimized by drying the affected area within 24-48 hours, depending upon the time of year and ambient humidity levels. It is particularly important to remove water completely from carpeting within this time frame, because mold will begin to form. However, if this is not possible or if the carpeting and/or backing is damaged from mold, then it may need to be removed and replaced. Where building materials and surfaces require removal or more aggressive cleaning, it is essential to communicate the work needs with occupants and provide temporary relocation.

#### *Guidance on Moisture Intrusion After 48 Hours*

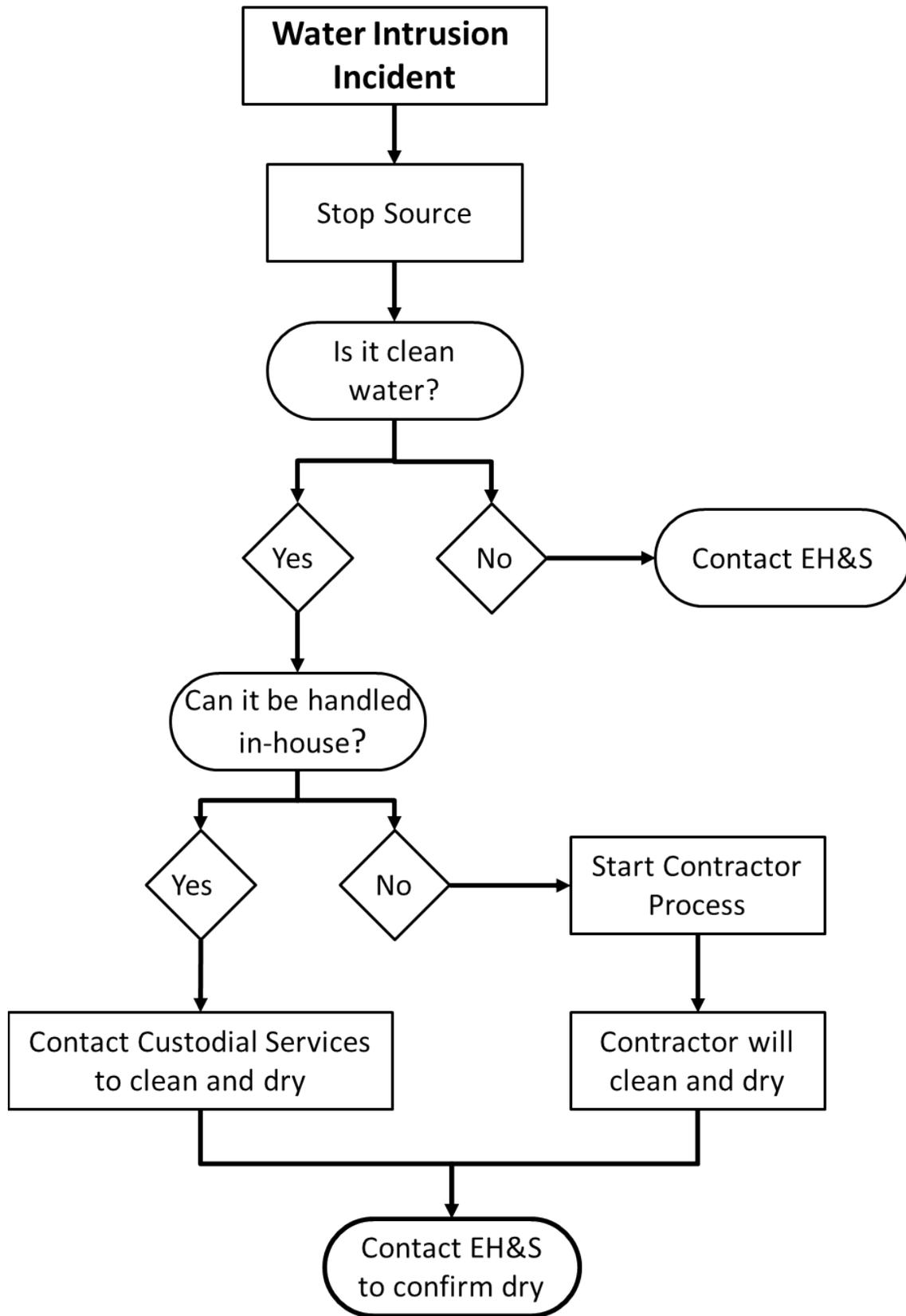
When water intrusion has remained uncorrected or building materials are not “dry” after 48 hours, mold growth may have begun. There may be visible evidence of growth or a moldy, damp smell.

Recommendations by EH&S for cleanup or remediation will depend on the extent of the damage, the types of materials affected, and the presence/type of mold growth. EH&S will make recommendations on whether current occupants should be relocated, on the containment/cleanup methods to be used, and on the types of personal protective equipment required for clean-up. In the event that mold growth is suspected or discovered, refer to the [Standard Operating Procedure for Mold Remediation](#).

## Definitions

<b>Flood</b>	Water released in intrusive events that result in the presence of water in unwanted locations.
<b>Category 1</b>	<p>Water that originates from clean source that poses the lowest health risk to building occupants and clean-up crews. Water in Category 1 may include:</p> <ul style="list-style-type: none"><li>• Broken water supply lines</li><li>• Tub or sink overflows</li><li>• Melting ice/snow</li><li>• Rain water</li></ul>
<b>Category 2</b>	<p>Water that contains a significant degree of contamination due to its source, from microbial growth, or from contamination after the initial release. Category 2 water presents a higher risk of infection to people who come into direct contact with the contaminated area. Water in Category 2 may include:</p> <ul style="list-style-type: none"><li>• Storm drain backups</li><li>• Treated cooling water</li><li>• Fire suppression systems</li></ul> <p>Category 1 water left for more than 24-48 hours will have increased microbial growth that will lower the water quality to Category 2.</p>
<b>Category 3</b>	<p>Water that is highly contaminated and will likely contain infectious viruses, bacteria, and parasites. Category 3 water has the highest risk for causing disease or infection from direct or indirect contact. Water in category 3 may include:</p> <ul style="list-style-type: none"><li>• Sewage</li><li>• Flooding containing silt and organic matter</li><li>• Water contaminated with pesticides, heavy metals, or toxic organic substances</li></ul>
<b>Mold</b>	Any of various fungi that can cause disintegration of organic matter. In the event that mold growth is suspected or discovered, refer to the <a href="#">Standard Operating Procedure for Mold Remediation</a> .
<b>Mildew</b>	A superficial coating or discoloration of organic material, caused by fungi, especially under damp conditions.

Appendix 1: Mold Response Plan Flow Chart



## Appendix 2: Guidelines for Water-Damage Cleanup (Category 1)

This Appendix accompanies the Methods Section of the Standard Operating Procedure. These guidelines are ONLY for response to water intrusions that can be verified as originating from Category 1 (clean) water sources\*.

Water Damaged Material <sup>1</sup>	Recommended Action(s)
Books & Papers	<ul style="list-style-type: none"> <li>• For non-valuable items, discard books and papers.</li> <li>• Photocopy valuable / important items and discard originals.</li> <li>• Freeze (in frost-free freezer or meat locker) or freeze-dry.</li> </ul>
Carpet & Backing (dry within 24-48 hours)	<ul style="list-style-type: none"> <li>• Remove water and water extraction vacuum.</li> <li>• Reduce ambient humidity with dehumidifiers.</li> <li>• Accelerate drying process with fans.</li> <li>• Ensure the subfloor (under the carpet) is clean and dry.</li> </ul>
Ceiling Tiles	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
Cellulose Insulation	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
Hard surface, non-porous flooring <sup>2</sup> (e.g., 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>• If suspected to be in need of attention, check to make sure sub-flooring is dry; dry sub-flooring 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>• These may be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration / water damage professional that specializes in furniture.</li> </ul>
Wallboard (drywall and gypsum board)	<ul style="list-style-type: none"> <li>• May be dried in place if small in area, there is no obvious swelling, and seams are intact. If not, remove, discard, and replace.</li> <li>• Ventilate wall cavity, if possible and safe to do so. Do not direct fans toward contaminated (i.e., asbestos, mold, etc.) building materials.</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 the wall for drying.</li> </ul>

\* If mold growth has occurred, refer to the [Standard Operating Procedure for Mold Remediation](#). If you know or suspect that the water source is contaminated with sewage, chemical, or biological pollutants, consult EH&S at 901-678-2740 or 4672.

1. If a particular item(s) has high monetary or sentimental value, you may wish to consult a restoration/water damage specialist.

2. The subfloor under the carpet or other flooring material must also be cleaned and dried. See the appropriate section of this table for recommended actions depending on the composition of the subfloor.

### Appendix 3: Guidelines for Water-Damage Cleanup (Category 2 and Category 3)

This Appendix accompanies the Methods Section of the Standard Operating Procedure. These guidelines are ONLY for response to water intrusions that can be verified as originating from Category 2 or Category 3 water sources\*.

Water Damaged Material <sup>1</sup>	Recommended Action(s)
Books & Papers	<ul style="list-style-type: none"> <li>• Discard books and papers.</li> <li>• Photocopy valuable / important items and discard originals.</li> </ul>
Carpet & Backing (dry within 24-48 hours)	<ul style="list-style-type: none"> <li>• Remove water.</li> <li>• Discard carpet and backing.</li> <li>• Ensure the subfloor (under the carpet) is clean and dry.</li> <li>• Replace carpet and backing</li> </ul>
Ceiling Tiles	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
Cellulose Insulation	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
Concrete or cinder block surfaces	<ul style="list-style-type: none"> <li>• Remove water.</li> <li>• Accelerate drying process with dehumidifiers, fans, and/or heaters.</li> </ul>
Fiberglass insulation	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
Hard surface, non-porous flooring <sup>2</sup> (e.g., 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>• If suspected to be in need of attention, check to make sure sub-flooring is dry; dry sub-flooring if necessary.</li> <li>• Remove and replace 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>• Discard and replace.</li> </ul>
Wallboard (drywall and gypsum board)	<ul style="list-style-type: none"> <li>• Remove and replace.</li> </ul>
Window drapes	<ul style="list-style-type: none"> <li>• Follow laundering or cleaning instructions recommended by the manufacturer.</li> <li>• Discard and replace if necessary.</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 the wall for drying.</li> <li>• Discard and replace if necessary.</li> </ul>

\* If mold growth has occurred, refer to the [Standard Operating Procedure for Mold Remediation](#). If you know or suspect that the water source is contaminated with sewage, chemical, or biological pollutants, consult EH&S at 901-678-2740 or 4672.

1. If a particular item(s) has high monetary or sentimental value, you may wish to consult a restoration/water damage specialist.
2. The subfloor under the carpet or other flooring material must also be cleaned and dried. See the appropriate section of this table for recommended actions depending on the composition of the subfloor.