Mold Awareness Training

What All Staff Members Need to Know and Do

By

Colorado School Districts Self Insurance Pool

CSDSIP™

Trainer Guide

CSDSIP™

Mold Awareness Training

Introduction

Water damage to buildings, often from broken water pipes, flooding and accumulation of snow and ice, can be a leading contributor to the growth of mold that can spread beyond the original damaged areas. Common moisture sources found in schools and districts can be caused by a variety of conditions, including roof and plumbing leaks, condensation and excess humidity.

Mission

The Mission of The Colorado School Districts Self Insurance Pool (CSDSIP) is to provide a user-friendly format to help develop guidelines to identify and prevent mold damage in schools.

CSDSIP Support

For assistance, please review the following:
CSDSIP Moisture Intrusion and Mold Prevention Plan

Coverage for mold claims under our Pollution & Remediation Legal Liability Coverage Form is contingent upon compliance with the Moisture Intrusion & Mold Prevention Plan.

Training Objectives

After completing Mold Awareness training, you will be able to:

- ✓ Know about problems associated with mold
- ✓ Understand how mold growth occurs
- ✓ Know how to respond to moisture and mold growth
- ✓ Understand your organization's Moisture Intrusion and Mold Prevention Plan

Administrator Guide

The following concepts will be covered:

Mold Basics

Mold is naturally present in all indoor and outdoor environments. Mold is a type of fungi that grows from spores. There are over one million strains of mold. We are exposed to mold daily in the air we breathe.

Mold has a unique ability to grow on almost any surface. Carpet, wallboard, acoustical ceiling panels, furniture, and various insulation materials can easily support the growth of mold because they are a food source. Conditions for mold growth are:

- One of these food sources
- Water or moisture
- Oxygen

The level of airborne molds increase when moisture problems arise in buildings creating mold growth on building materials. The objective of this training is to use prevention techniques to minimize the potential for mold growth.

Health Effects Associated with Mold Exposure

The most common health effects of mold is allergic reaction. Irritant effects include burning of eyes, skin, nose, throat and lungs. Individuals with existing respiratory conditions such as allergies, chemical sensitivities, or asthma are at greater risk when exposed to mold.

Hypersensitivity pneumonitis can also occur. This resembles bacterial pneumonia; symptoms include tightness in the chest, difficulty breathing, cough and fever.

Water Damage Clean Up

Mold cleanup should be done only by individuals with specialized training on techniques and protective measures.

The key to mold growth prevention is eliminating the moisture source and clean up of materials within 24-48 hours. If water is removed and materials are dried within that time period, mold remediation is usually not necessary. In all situations, the underlying cause of water accumulation must be corrected, or the growth will recur.

To the extent possible, maintain low indoor humidity, below 60% relative humidity, ideally 30-50%. Lower relative humidity promotes evaporation and drying.

It is imperative that schools and districts use the Moisture Intrusion and Mold Prevention Plan (Plan). The Plan was prepared for Colorado School Districts Self Insurance Pool for use at schools and their associated facilities. Refer to the Plan for details on responsibilities and procedures related to mold and moisture intrusions.

This Plan outlines:

- best practices for the prevention of mold problems
- describes the conditions under which remediation must be implemented
- special considerations for water -damage restoration and mold remediation

Document inspections, incident response, remediation and training.

Learning Objectives Review

After the participation in the Mold Awareness training module, administrators may use these questions as material review to evaluate the participant's comprehension and understanding.

Question and Answer Session

1. Mold is:
   (A) An Animal
   (B) A Plant
   (C) Man Made
   (D) Fungi (correct answer)

2. Which of the following is the most effective method for controlling mold?
   (A) Select furnishings with natural fabrics
   (B) Reduce heating at night
   (C) Control water leaks and other moisture (correct answer)
   (D) Use wood framing rather than steel

3. Potential adverse health effects of mold include:
   (A) Diabetes
   (B) Hearing loss
   (C) Allergic reaction (correct answer)
   (D) Depression

4. Factors that influence how likely a person is to have a health effect as a result of mold exposure include all of the following **except**:
   (A) Individual susceptibility
   (B) Health conditions of people exposed
   (C) Indoor lighting level (correct answer)
   (D) Extent of exposure

5. The Moisture Intrusion and Mold Prevention Plan only applies to the maintenance department; building occupants don't play a role.
   (A) True
   (B) False (correct answer)

6. Elements of the Program include all of the following **except:**
   (A) Procedures for responding to floods
   (B) Responsibilities for inspections
   (C) Training
   (D) Smoking policy (correct answer)

7. If a building occupant observes mold growth, they should immediately call the Designated Person.
   (A) True (correct answer)
   (B) False

8. HVAC systems may be a source of microbial contamination in a building if:
   (A) They are kept dry and clean
   (B) They are properly maintained
   (C) The outdoor intake ins near stagnant water (correct answer)
   (D) The filters are changed regularly

9. HVAC inspections should ensure the following to prevent mold growth:
   (A) Drip pans drain properly (correct answer)
   (B) Filters are not present in summer
   (C) Duct lining is wet
   (D) Debris is present in only some components

10. HVAC systems should be periodically inspected to ensure that there are no accumulations of dust and debris, no microbial growth and no water leaks.
   (A) True (correct answer)
   (B) False

11. During renovation or construction projects, mold prevention can be accomplished by:
   (A) Installing drywall as soon as possible
   (B) Storing all wood products together
   (C) Water washing framing immediately before drywall installation
   (D) Waiting to install finish materials until building is weather tight (correct answer)

12. What category of water potentially has the most infectious agents?
   (A) Category 1
   (B) Category 2
   (C) Category 3 (correct answer)
   (D) Category 4

13. What is an appropriate response action to take immediately following a Category 1 water event:
   (A) Call the fire department
   (B) Wait until the weekend to clean it up
   (C) Stop the source of water if this can be performed safely (correct answer)
   (D) Scrape mold off walls if you see it

14. A moisture meter is used to check the moisture content of a material.
    (A) True (correct answer)
    (B) False

15. If the amount of mold is more than _____sf then a mold remediation contractor should do the remediation
    (A) 1
    (B) 10 (correct answer)
    (C) 50
    (D) 100

16. When do you contact your Designated Person?
    (A) When visible mold growth is discovered
    (B) To determine how mold remediation will be performed
    (C) To ensure that there is appropriate internal and external communication
    (D) All of the above (correct answer)

17. What other health and safety considerations need to be taken into account before starting a mold cleanup:
    (A) Asbestos
    (B) Lead
    (C) Structure safety
    (D) All of the above (correct answer)

18. What regulations must be followed to protect workers during mold remediation?
    (A) OSHA (correct answer)
    (B) AMA
    (C) CDC
    (D) DNA

19. Small amounts (<10 SF) of mold may sometimes be cleaned up by trained maintenance employees.
    (A) True (correct answer)
    (B) False

20. Which of the following remediation practices is considered acceptable?
    (A) Mold growth can be disinfected and painted over
    (B) Occupants don't need to leave during large remediation projects
    (C) Remediation work areas should always be under a positive pressure
    (D) Respirators worn during mold remediation should have HEPA filters (correct answer)

21. Types of documentation that should be kept regarding water damage and mold growth include all except the following:
    (A) Photographs of mold growth
    (B) Records of inspections conducted
    (C) Logs of water damage reported
    (D) Samples of actual mold (correct answer)

22. When a building occupant reports a water leak, the actions taken to respond to the concern should be documented even if no mold growth resulted.
    (A) True (correct answer)
    (B) False

Resources

CSDSIP Water Intrusion and Moisture Prevention Plan

Limits of Liability (Disclaimer)

The authors and publishers of this training module (document) assume no risk or liability for incidents arising from the application of this information in any way.

Participant Handouts

CSDSIP™

MOISTURE INTRUSION AND MOLD PREVENTION PLAN

Colorado School District Self Insurance Pool
6857 South Spruce Street
Centennial, CO 80112

PREPARED FOR:

Colorado School District Self Insurance Pool (CSDSIP)

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PREPARED BY:

ESIS, Inc.
Health, Safety & Environmental Services

1936 E. Deere Avenue
Suite 115
Santa Ana, CA 92705
(949) 242-6950 – tel
(949) 242-6951 – fax
www.esis.com

1.0 MOISTURE INTRUSION AND MOLD PREVENTION PLAN INTRODUCTION

This moisture-intrusion and mold prevention plan (Plan) was prepared for Colorado School Boards Self Insurance Pool (CSDSIP) for use at their schools and associated facilities in Colorado. In the event of water infiltration, in-house staff must take necessary steps to prevent and/or remediate mold growth in order to protect the health of current of students, faculty and staff, and first responders. This Plan outlines best practices for the prevention of mold problems, describes the conditions under which remediation must be implemented, and special considerations for water-damage restoration and mold remediation. The goal of the Plan is to eliminate moisture in less than 48 hours to prevent mold growth or destroy it if the duration of moisture infiltration is unknown or greater than 48 hours.

Mold has the unique ability to grow on almost any surface. Materials within a commercial building, such as carpet, wallboard, acoustical ceiling panels, furniture, and various insulation materials can easily support the growth of mold because they are a “food source.” Primary components essential for mold to grow are a food source and moisture (in the form of water intrusion or even excess humidity). Because there are an abundance of food sources in commercial buildings, including buildings utilized as educational facilities, controlling moisture is the primary means by mold growth can be limited. This Plan provides the means to accomplish this objective by establishing procedures to control external sources of moisture (e.g., properly sealing roofs and windows, and maintaining grading), and control internal moisture, such as excess humidity and leaks (e.g., by properly maintaining HVAC and plumbing systems).

For the purposes of this Plan, water intrusion events are classified as either minor or major. A minor event is one that requires a minimum amount of time and resources to repair and is generally considered to be a mold growth area less than 10 square feet (SF). A major event is generally considered to be a mold growth area greater than 10 square feet (SF) and is defined as one of the following: significant cost to repair the damage, or damage to a building owner’s existing premises or to an occupied space. The water-intrusion response diagram (Figure 1) on the following page describes the steps to be taken when moisture intrusion is discovered. Basic response procedures for water-intrusion events are summarized in this Plan.

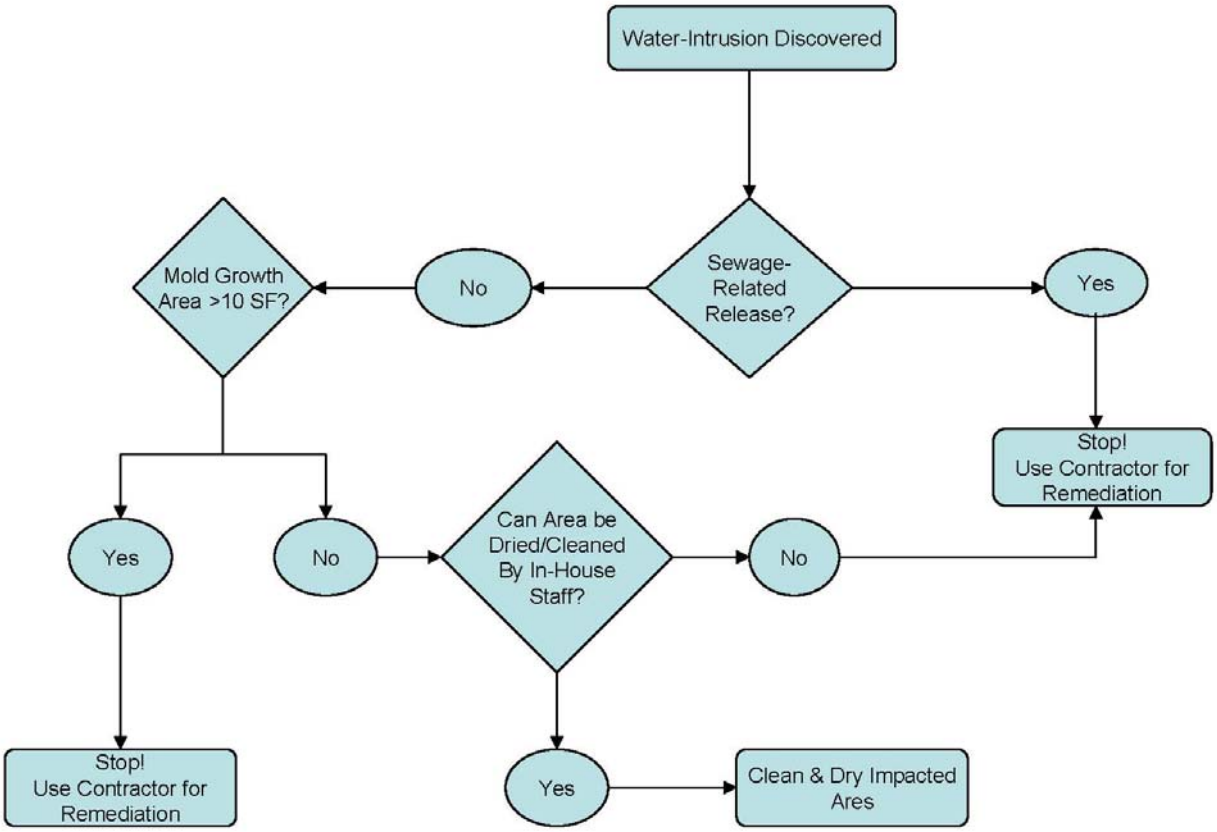
1.1 Mold Basics

Mold is naturally present in all indoor and outdoor environments. Where excessive moisture or relative humidity is present for a sufficient period of time, mold will grow on surfaces, and, if left to populate, spores will discharge into the air. Drying will eventually stop mold growth, however, previous growth can become airborne if disturbed and settle on other surfaces that can sustain growth. Mold growth in buildings can have structural, aesthetic, or health implications. Sustained wet conditions can create wood rot. Active mold growth generates musty odors and unsightly surface staining.

While the majority of occupants generally do not react with health problems to minor building mold growth, hypersensitive individuals may exhibit allergies, and immune compromised individuals may be subject to infection. Although mold growth is not regulated in most jurisdictions, preventative or remedial measures are generally encouraged.

Mold can gradually damage building materials and furnishings. If left unchecked, mold may eventually cause structural damage to wood components of a building, weakening floors and walls as it feeds on moist wooden structural members.

FIGURE 1: WATER-INTRUSION RESPONSE DIAGRAM



Mold can gradually damage building materials and furnishings. If left unchecked, mold may eventually cause structural damage to wood components of a building, weakening floors and walls as it feeds on moist wooden structural members.

Since the underlying cause of all mold growth problems is moisture, understanding the sources and controls of moisture associated with a building's construction is essential. Conditions which may lead to indoor air quality problems (musty odor, spore release) include the following:

- demolition/renovation of materials subject to previous mold growth;
- the use of building materials (during renovations or new construction) with visible mold growth. Note: Some discoloration is normally present on many wood products. Inadequate protection during stockpiling could promote mold growth;

- normally moist materials, such as concrete, which emit moisture for an extended period of time after installation;
- the presence of uncontrolled hot, humid air prior to activation of air conditioning, leading to condensation on cooler surfaces;
- defective moisture barriers in the building envelope (flashing, membranes, etc.);
- ongoing roof, window, or facade leaks;
- drainage problems around or on the building;
- releases from plumbing, sprinkler, process systems;
- application of inherently wet products (e.g., concrete, plaster);
- HVAC controls not operating as intended (e.g., humidification, temporary air-conditioning/dehumidification);
- blocked condensate drains in air-handling units; and
- Sub-floor air distribution systems subject to moisture problems from leaks or condensation near a poorly insulated exterior wall.

In general, materials which remain damp may promote mold growth. Moisture levels can be measured with a moisture meter.

1.2 Health Effects

Currently, there are no federal standards or regulations, (e.g., OSHA, NIOSH, EPA), however, the EPA, American Industrial Hygiene Association, New York City Department of Health, and Institute of Inspection, Cleaning and Restoration Certification (a.k.a. The Clean Trust) have guidelines available for remediation for water intrusion events or mold growth. Scientific research on the relationship between mold exposure and health effects is ongoing. This section provides a brief overview, but does not describe all potential health effects related to mold exposure.

There are many types of mold. Most typical indoor air exposures to molds do not present a risk of severe adverse health effects. Molds can cause adverse effects in sensitive persons by producing allergens (substances that can cause allergic reactions). Potential health concerns are important reasons to prevent mold growth and to remediate existing problem areas. The onset of allergic reactions to mold can be either immediate or delayed. Allergic responses include hay fever-type symptoms such as runny nose and red eyes.

Mold can also trigger asthma attacks in some individuals who are allergic to mold. In addition, exposure to mold can irritate the eyes, skin, nose and throat in certain individuals. Symptoms other than allergic and irritant types are not commonly reported as a result of inhaling mold in the indoor environment.

2.0 GENERAL PREVENTION STRATEGY

A proactive approach to preventive maintenance is key to preventing mold growth. By identifying components of buildings that are susceptible to moisture intrusion, and conducting routine inspections and preventive maintenance on these systems, CSDSIP will be able to manage their properties in a manner that:

- results in fewer mold incidents,
- reduces potential liability, and
- protects the value of the assets.

The key to mold prevention is **moisture control**. The most important initial step in prevention is a visual inspection. Frequent checks of the building envelope, interior spaces, and drainage systems should be made to assure that they are in working order. Identify and, to the extent possible, eliminate sources of dampness, high humidity, and moisture to prevent mold growth. Wet or damp spots and wet non-moldy materials should be cleaned and dried as soon as possible (preferably within 24 to 48 hours of discovery). Moisture due to condensation may be prevented by increasing the surface temperature of the material where condensation is occurring, or by reducing the moisture level in the air (humidity). Indoor relative humidity should be maintained below 70% (25-60%, if possible). Mechanical ventilation systems should be checked regularly, particularly for damp filters and overall cleanliness.

Resolving moisture issues before they become mold issues is in the best interest of CSDSIP. The following are tips on preventing moisture issues:

- Fix leaky plumbing as soon as possible.
- Fix any leaks in the building envelope (windows, walls and roof) as soon as possible.
- Watch for condensation and wet spots.
- Fix source(s) of moisture intrusion as soon as possible.
- Prevent moisture due to condensation by increasing surface temperature or reducing the moisture level in air (humidity). To increase surface temperature, insulate or increase air circulation. To reduce the moisture level in air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid).
- Keep heating, ventilation, and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
- Change filters regularly.
- Perform HVAC maintenance on a regular basis in accordance with the specific manufacturers' instructions.
- Vent moisture-generating equipment to outside, where possible.

- To the extent possible, maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%. The use of a dehumidifier is warranted in certain situations.

- The HVAC system should continue to operate even in buildings temporarily not in-use (i.e., summer vacation).

- Repair loose or lost roofing material.

- Keep roof gutters clean and direct downspout discharge away from the building.

- Repair damaged or missing flashing at roofs, windows, and other interfaces or penetrations of the envelope.

- Clean and dry wet or damp carpets in less than 48 hours.

- Do not allow foundations to remain wet.

- Provide drainage and slope the ground away from the foundation.

- Monitor sprinkler and irrigation systems to avoid spraying onto building surfaces or creating pooling or excess / standing water near the buildings.

- Keep landscaping ground cover sloped away from the building.

- Do not cover exterior wall weep holes.

3.0 WATER-DAMAGE RESTORATION/MOLD REMEDIATION

In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration should be stopped and cleaned immediately. The potential for of mold growth is greatly reduced by removal of moisture within the first 48 hours. If water is removed and materials are dried within that time period, mold remediation is usually not necessary.

3.1 Water-Damage Restoration

The following procedures describe actions to be undertaken by in-house personnel upon discovering a moisture-intrusion event.

Step 1: The first step in water-damage restoration, after eliminating the moisture source, is to determine the Category of water. The Categories of water refer to the range of contamination in water, considering both its originating source and its quality after it contacts materials present inside the building. Time and temperature can also affect the quality of water, thereby changing its Category.

Category 1 Water originates from a sanitary water source and does not pose substantial risk from dermal, ingestion, or inhalation exposure. Examples of Category 1 water sources include: broken water supply lines; tub or sink overflows with no contaminants; appliance malfunctions involving water-supply lines; melting ice or snow; falling rainwater; broken toilet tanks, and toilet bowls that do not contain

contaminants or additives. However, once clean water leaves the exit point, it may not remain clean once it contacts other surfaces or materials.

The cleanliness of Category 1 water may deteriorate to Category 2 or 3 for many reasons, including but not limited to: contact with building materials, systems and contents; mixing with soils and other contaminants. Some factors which influence the potential organic and inorganic load in a structure include the age and history of the structure, previous water losses, general housekeeping, the type of use of the structure (e.g., nursing home, hospital, day care, warehouse, veterinary clinic), and elapsed time or elevated temperature. Odors can indicate that Category 1 water has deteriorated.

Category 2 Water contains significant contamination and has the potential to cause discomfort or sickness if contacted or consumed by humans. Category 2 water can contain potentially unsafe levels of microorganisms or nutrients for microorganisms, as well as other organic or inorganic matter (chemical or biological). Examples of category 2 water include: discharge from dishwashers or washing machines; overflows from washing machines; overflows from toilet bowls on the room side of the trap with some urine but no feces; seepage due to hydrostatic pressure; broken aquariums and punctured water beds.

The cleanliness of Category 2 water can deteriorate for many reasons, including but not limited to: contact with building materials, systems, and contents; mixing with soils and other contaminants. Factors that influence the potential organic and inorganic load in a structure include the age and history of the structure, previous water losses, general housekeeping, the type of use of the structure, and elapsed time or elevated temperature.

Category 3 Water is grossly contaminated and can contain pathogenic, toxigenic or other harmful agents. Examples of Category 3 include: sewage; toilet backflows that originate from beyond the toilet trap regardless of visible content or color; all forms of flooding from seawater; ground surface water and rising water from rivers or streams, and other contaminated water entering or affecting the indoor environment, such as wind-driven rain from hurricanes, tropical storms, or other weather-related events. Such water sources may carry silt, organic matter, pesticides, heavy metals, regulated materials, or toxic organic substances.

Care should be exercised if the water infiltrating a building area is polluted (i.e., blackwater). Following repairs to prevent any further infiltration, any contaminated ceiling tiles, carpet, upholstered furniture, paper products, or similar materials must be disposed of in sealed containers by a water restoration contractor. The contractor must disinfect the entire area before build-back occurs.

Special Situations - If a regulated or hazardous material is part of a water damage restoration project, then a specialized expert may be necessary to assist in damage assessment, and government regulations apply. Regulated materials posing potential or recognized health risks may include, but are not limited to: arsenic, mercury, lead, asbestos, polychlorinated biphenyls (PCBs), pesticides, fuels, solvents, caustic chemicals, radiological residues. For situations involving visible or suspected mold, contact the facilities manager for further direction.

The Category of water initially determined can change during the course of the project. To prevent amplification of microorganisms, prompt response is necessary for all Categories of water intrusion.

It is important to note that in cases of moisture-intrusion involving Category 3 and special situations, a qualified water-damage restoration or hazardous material removal contractor should be used to remove water-damaged building materials in lieu of in-house personnel.

Step 2: This step involves performing a visual inspection to identify possible mold growth by in-house personnel. The extent of any mold growth should be visually assessed. Ceiling tiles, gypsum wallboard (Sheetrock®), cardboard, paper, and other cellulosic surfaces should be given careful attention during a visual inspection. If mold is observed, in-house personnel should contact facility management and, if possible, isolate the area to prevent unauthorized access. Facility management is responsible for retaining a Remediation Contractor to perform any required mold remediation.

Step 3: If mold is not present, in-house personnel should determine the extent of water-damaged building materials, and begin the drying process using air movers, extraction units, and dehumidifiers. The guidelines in **Table 1** below are designed to help avoid the need for remediation of mold growth by taking quick action before growth starts. It is important to communicate the discovery of water-intrusion to the appropriate facility management personnel so that the appropriate action can be taken as the nature and extent of water restoration activities can vary.

Table 1: Water Damage - Cleanup and Mold Prevention	
Guidelines for Response to Clean Water Damage within 24-48 Hours to Prevent Mold Growth*	
Water-Damaged Material†	**Actions**
Books and papers	• For non-valuable items, discard books and papers. • Photocopy valuable/important items, discard originals. • Freeze (in frost-free freezer or meat locker) or freeze-dry.
Carpet and backing - dry within 24-48 hours§	• Remove water with water extraction vacuum. • Reduce ambient humidity levels with dehumidifier. • Accelerate drying process with fans.
Ceiling tiles	• Discard and replace.
Cellulose insulation	• Discard and replace.
Concrete or cinder block surfaces	• Remove water with water extraction vacuum. • Accelerate drying process with dehumidifiers, fans, and/or heaters.
Fiberglass insulation	• Discard and replace.

Hard surface, porous flooring§ (Linoleum, ceramic tile, vinyl)	• Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary. • Check to make sure sub-flooring is dry; dry sub-flooring if necessary.
Non-porous, hard surfaces (Plastics, metals)	• Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.
Upholstered furniture	• Remove water with water extraction vacuum. • Accelerate drying process with dehumidifiers, fans, and/or heaters. • 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.
Wallboard (Drywall and gypsum board)	• May be dried in place if there is no obvious swelling and the seams are intact. If not, remove, discard, and replace. • Ventilate the wall cavity, if possible.
Window drapes	• Follow laundering or cleaning instructions recommended by the manufacturer.
Wood surfaces	• Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. (Use caution when applying heat to hardwood floors.) • Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry. • Wet paneling should be pried away from wall for drying.

* If mold growth has occurred or materials have been wet for more than 48 hours, consult **Table 2** guidelines on the following page. Even if materials are dried within 48 hours, mold growth may have occurred. Items may be tested by professionals if there is doubt. Note that mold growth will not always occur after 48 hours; this is only a guideline.

These guidelines are for damage caused by clean water. If you know or suspect that the water source is contaminated with sewage, or chemical or biological pollutants, then Personal Protective Equipment and containment are required by OSHA. An experienced professional should be consulted if you and/or your remediators do not have expertise remediating in contaminated water situations. Do not use fans before determining that the water is clean or sanitary.

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

§ 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.

Water Restoration Equipment

To be able to perform the response actions listed in Table 1 above, in-house personnel must have an adequate supply of basic drying equipment, which must be maintained and in good working order. Without this equipment, the drying process could be delayed or prolonged and the potential for mold growth increased. The required equipment is described below and includes moisture meters, water extraction units, air moving equipment, and dehumidification equipment.

Moisture Meters: Abnormal moisture in building materials, systems and contents often cannot be detected by human senses. In-house personnel should use a moisture meter to: establish dry standards and drying goals; determine moisture levels in the affected building materials; and determine when the drying goals have been achieved. Moisture meters either measure moisture on a relative (qualitative) scale or in actual percentage of moisture content (quantitative).

Water Extraction Units: Extraction equipment with sufficient vacuum capability (lift and airflow) can be used to efficiently remove water from structures, systems and contents. Extraction units can be used as pumping equipment for removing deep standing water when pumps are not available.

Air Moving Equipment: Air moving equipment or fans can be used to direct airflow at or across wet materials to promote evaporation or to create a pressure differential between two areas. Many of the devices described below can also be fitted with flex duct or temporary ducting to direct airflow to other areas. Air moving equipment has various airflow and static pressure capabilities. In-house personnel should follow the safety, operation and maintenance instructions provided by the manufacturer where applicable.

Dehumidification Equipment: Dehumidification is the process of removing moisture from air. There are two methods of dehumidification common in the drying process:

1. Refrigerant dehumidification involves cooling the air below its dew point. Cooling air increases RH, thereby decreasing the air's ability to hold moisture. Excess moisture is condensed from the air onto the dehumidifier's chiller coils.

2. Desiccant dehumidification, which places air in contact with a desiccant material, and removes moisture by direct sorption and vapor pressure differences.

3.2 Mold Remediation

If moisture has not been removed within 48 hours of moisture infiltration, mold growth is likely to have begun and mold remediation may be necessary. **Table 2** below presents remediation guidelines for building materials that have are likely to have mold growth. Remediation efforts are more intensive than prevention, and they must be designed to protect the health of building occupants and remediation personnel. The nature and extent of remediation will depend on the extent of the damage, the types of materials affected, and the presence/type of mold growth.

Table 2: Guidelines for Remediating Building Materials with Mold Growth Caused by Clean Water*			
Material or Furnishing Affected	Cleanup Methods† (see below)	Personal Protective Equipment (see below)	Containment (see below)
SMALL - Total Surface Area Affected Less Than 10 square feet (ft^2)			
Books and papers	3	Minimum N-95 respirator, gloves, and goggles	None required
Carpet and backing	1, 3		
Concrete or cinder block	1, 3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1, 2, 3		
Non-porous, hard surfaces (plastics, metals)	1, 2, 3		
Upholstered furniture & drapes	1, 3		
Wallboard (drywall and gypsum board)	3		
Wood surfaces	1, 2, 3		
MEDIUM - Total Surface Area Affected Between 10 and 100 (ft^2)			
Books and papers	3	Limited or Full Use professional judgment, consider potential for remediator exposure and size of contaminated area	Limited Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area
Carpet and backing	1,3,4		
Concrete or cinder block	1,3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1,2,3		
Non-porous, hard surfaces (plastics, metals)	1,2,3		
Upholstered furniture & drapes	1,3,4		
Wallboard (drywall and gypsum board)	3,4		
Wood surfaces	1,2,3		
LARGE - Total Surface Area Affected Greater Than 100 (ft^2) or Potential for Increased Occupant or Remediator Exposure During Remediation Estimated to be Significant			
Books and papers	3	Full	Full

Carpet and backing	1,3,4	Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area	Use professional judgment, consider potential for remediator exposure and size of contaminated area
Concrete or cinder block	1,3		
Hard surface, porous flooring (linoleum, ceramic tile, vinyl)	1,2,3,4		
Non-porous, hard surfaces (plastics, metals)	1,2,3		
Upholstered furniture & drapes	1,2,4		
Wallboard (drywall and gypsum board)	3,4		
Wood surfaces	1,2,3,4		

*Use professional judgment to determine prudent levels of Personal Protective Equipment and containment for each situation, particularly as the remediation site size increases and the potential for exposure and health effects rises. Assess the need for increased Personal Protective Equipment, if, during the remediation, more extensive contamination is encountered than was expected. Consult **Table 1** above if materials have been wet for less than 48 hours, and mold growth is not apparent. These guidelines are for damage caused by clean water. If you know or suspect that the water source is contaminated with sewage, or chemical or biological pollutants, then the Occupational Safety and Health Administration (OSHA) requires PPE and containment. An experienced professional should be consulted if you and/or your remediators do not have expertise in remediating contaminated water situations.

†Select method most appropriate to situation. Since molds gradually destroy the things they grow on, if mold growth is not addressed promptly, some items may be damaged such that cleaning will not restore their original appearance. If mold growth is heavy and items are valuable or important, you may wish to consult a restoration/water damage/remediation expert. Please note that these are guidelines; other cleaning methods may be preferred by some professionals.

Table developed from literature and remediation documents including Bioaerosols: Assessment and Control (American Conference of Governmental Industrial Hygienists, 1999) and IICRC S500, Standard and Reference Guide for Professional Water Damage Restoration, (Institute of Inspection, Cleaning and Restoration, 1999.

Please note that Table 1 and Table 2 contain general guidelines. Their purpose is to provide basic information for building or facility managers to first assess the extent of the damage and then to determine whether the remediation should be managed by in-house personnel or outside professionals. The building or facility manager can then use the guidelines to help design a remediation plan or to assess a plan submitted by outside professionals.

Although this document has a residential focus, it is applicable to other building types.

Cleanup Methods

- **Method 1**: Wet vacuum (in the case of porous materials, some mold spores/fragments will remain in the material but will not grow if the material is completely dried). Steam cleaning may be an alternative for carpets and some upholstered furniture.

- **Method 2**: Damp-wipe surfaces with plain water or with water and detergent solution (except wood —use wood floor cleaner); scrub as needed.

- **Method 3**: High-efficiency particulate air (HEPA) vacuum after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.

- **Method 4**: Discard - remove water-damaged materials and seal in plastic bags while inside of containment, if present. Dispose of as normal waste. HEPA vacuum area after it is dried.

Personal Protective Equipment (PPE)

- Minimum: Gloves, N-95 respirator, goggles/eye protection

- Limited: Gloves, N-95 respirator or half-face respirator with HEPA filter, disposable overalls, goggles/eye protection

- Full: Gloves, disposable full body clothing, head gear, foot coverings, full-face respirator with HEPA filter

Containment

- Limited: Use polyethylene sheeting ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit. Block supply and return air vents within containment area.

- Full: Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA filtered fan exhausted outside of building. Block supply and return air vents within containment area.

The goal of mold remediation is to remove the mold and prevent human exposure and damage to additional building materials and furnishings. Remediation should clean up mold contamination, not just kill it. Even after it is dead, remaining mold fragments may still be allergenic, and some are potentially toxic. The use of biocides is not routinely recommended during remediation. However, there may be some instances when the use of a biocide may be justified, such as when immune compromised individuals are present. It is not possible to get rid of all mold spores in a building environment. Spores will be present, but they will not grow if the moisture problem in the building is fixed.

As previously mentioned, this mold prevention and remediation program allows for in-house personnel to conduct remediation for water intrusion events considered minor. Procedures for cleaning small isolated areas are provided below:

- Remediation can be conducted by in-house personnel under limited circumstances. Such persons should receive training on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

- Best practices suggest that at a minimum first responders should don N95 disposable respirator when performing mold remediation. Gloves and eye protection should be worn.

- The work area should be unoccupied. Vacating people from spaces adjacent to the work area is not necessary but is recommended in the presence of infants (less than 12 months old), persons recovering from recent surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).

- Consider all wet wiring, light fixtures, and electrical outlets to be shock hazards until they have been checked by a building inspector and/or electrician. Until then, turn the power off in the area of the water damage. (Note: only persons knowledgeable about electrical shock hazards should shut the power off.) All electrical conduit breakers, GFI's (Ground Fault Interrupters), and fuses that have become wet need replacing. Switches and outlets that were wet can be cleaned and reused but, when in doubt, should be replaced.

- Containment of the work area for minor mold growth areas is not necessary. Dust suppression methods, such as misting (not soaking) surfaces prior to remediation, are recommended.

- Contaminated materials that cannot be cleaned should be removed from the building in a sealed plastic bag. There are no special requirements for the disposal of moldy materials. The work area and areas used by remedial workers for egress should be cleaned with a damp cloth and/or mop and a detergent solution.

- All areas should be left dry and visibly free from debris.

- Eating, drinking, and using tobacco products and cosmetics where mold remediation is taking place should be avoided. This will prevent unnecessary contamination of food, beverage, cosmetics, and tobacco products by mold and other harmful substances within the work area.

There may be instances when remediation work is outside the scope of in-house capability. A series of criteria have been developed to assist management in identifying those situations in which outside services should be called in to perform remediation or clean-up work. The criteria are presented in Section 5.0.

3.3 Asbestos Containing Materials

The United States Environmental Protection Agency promulgated a regulation to ban most asbestos use and manufacturing in the U.S. The National Emission Standards for Hazardous Air Pollutants (NESHAPs, 40 CFR 61, Subpart M) rule banned most spray applied surfacing ACM (used for fireproofing/ insulating and decorative purposes) as well as most forms of thermal insulation on pipes and boilers. In July 1989 the EPA, using the Toxic Substances Control Act (TSCA) Authority, established a rule commonly known as the Asbestos Ban and Phaseout Rule (40 CFR 763, Sec. 762.160 - 763.179). However, much of the original Rule was overturned by the U.S. Fifth Circuit Court of Appeals in 1991.

The use of asbestos was common in building materials used in the construction of buildings prior to 1989. In addition to the building products listed above, asbestos is known to have been used in plaster, wall board, joint compound, sheet flooring, vinyl floor tiles, flooring mastics, and acoustical ceiling tiles. If water-damaged/moldy building materials are not made of glass, wood, or steel; there is the potential for these materials to contain asbestos.

Prior to the removal of water and mold damaged building materials, it is necessary to determine if the materials to be handled contain asbestos by reviewing existing asbestos building surveys. If previous testing documentation is unavailable, the testing of suspect asbestos-containing water-damaged building materials should be performed to determine if asbestos is present. Water and mold damaged materials that are positive for asbestos will need to be removed in accordance with federal, state, and local regulations.

4.0 TRAINING

In conjunction with this Plan, in-house personnel should receive training as to the proper procedures for handling moisture-intrusion incidents and mold related concerns. In-house personnel will receive basic mold and asbestos awareness training. All mold growth indoors will be considered a priority and removed. Only personnel that have been properly trained will clean or remediate visible mold growth. Training will be conducted in the following areas pertaining to water intrusion/mold:

- Recognizing the presence of mold;
- Recognizing factors which could lead to water intrusion in the future;
- How to report mold related information and who to report this information to;
- Proper water-damage and remediation procedures (if applicable); and
- Recognizing the presence of suspect asbestos-containing building materials.

In-house personnel shall not attempt to remediate mold growth at medium and large areas (greater than 10 square feet). Subcontractors, who perform mold remediation on behalf of CSDSIP for areas greater than 10 square feet, must be qualified to perform the work and are required to follow the remediation guidelines presented herein.

5.0 IDENTIFICATION OF QUALIFIED CONTRACTORS

There may be instances when remediation work is outside the scope of in-house capability. A series of criteria have been developed to assist management in identifying those situations in which outside services should be called in to perform remediation or clean-up work. The criteria that would necessitate the use of outside professional help include:

- Staff makes a health-related complaint,
- Mold growth is more than 10 sq. ft.,
- The moisture or mold complaint is the third complaint for the same location,
- Odors with undetermined causes,
- Excessive humidity with undetermined causes,
- Complexity of the repair and construction element,
- Mold growth within the ductwork,
- Known asbestos materials and/or lead based paint are present.

The Plan requires that an outside contractor perform remediation of mold growth areas exceeding 10 square feet. The best way to qualify mold remediation contractors is to seek assistance from trained environmental health professionals. Contractors with remediation construction experience should be utilized.

5.1 Qualifications

- Obtain a statement of qualifications.
- Obtain a list of previous projects and the corresponding clients/references.
- Request a certificate of insurance.
- Inquire as to certification of workers and the company. Research the certification and the certifying body.
- Inquire which other companies the contractor is working for and obtain contacts at those companies.

5.2 Procedures

- Inquire about the company's approach to inspection of water losses and mold contamination claims in order to confirm the viability of the biological expert's remedial plan.
- Ask about the types of containment procedures/guidelines that are in place.
- Inquire about the company's philosophy and approach to source control.
- Inquire how the company will assure there will not be a reoccurrence of mold.

5.3 Equipment/Materials

- Ask the company to describe the performance capabilities of the equipment being recommended.
- Discuss how the restoration program incorporates available resources, such as existing HVAC systems.
- Obtain lists of which chemicals will be used on the project.
- Obtain MSDS material safety data sheets for all chemicals to be used on the project.

5.4 Communication/Responsiveness

- Ask how progress of the contractor's work will be communicated.
- Inquire which documentation is routinely maintained and provided to property owners and insurance carriers.

6.0 DOCUMENTATION

All water intrusion events must be documented from start to finish. Documentation should identify the water intrusion source, clean-up procedures, methods used to repair the leak and associated damage,

follow-up activities, and reports from an outside consultant (industrial hygienist), if water intrusion is a major event. All interested parties should be put on notice following moisture intrusion events considered major. These parties would include insurance carriers; and tenants especially if they are in any way affected or responsible for the water intrusion event.

Any questions regarding this plan should be directed to:

_____ at _____

Designated Person **Phone Number**

CSDSIP WATER INTRUSION & MOLD INSPECTIONS

PROPERTY INSPECTION GUIDANCE

Purpose of Inspections

Facility inspections are intended to identify:

- Leaking plumbing systems, roof leaks, or other sources of moisture impacting the building
- Proper venting of moisture-generating processes
- Condition and operation of heating, ventilating and air-conditioning equipment
- Wet or damp spots, condensation, window leaks, and/or water stains
- Condition of the roof, exterior penetrations, and integrity of terraces, as applicable
- Proper site drainage
- Space management practices which may result in conditions conducive to indoor mold growth, such as poor housekeeping, mismanagement of indoor plants, or mismanagement of indoor relative humidity

Potential Sources of Moisture

- Direct leakage
- Plumbing, mechanical, or HVAC system malfunction
- Weather-induced water ingress (flooding, wind-driven rain, snow, ice damming, severe storm damage)
- Surface run-off or groundwater intrusion into sub-grade walls and floors
- Water infiltration through doors, windows, construction joints, cracks (due to wind and incorrect pressurization)
- Water vapor diffusion through building envelope materials (due to vapor pressure differentials or improperly located or installed weep holes or vapor barriers)
- Wet construction materials
- Occupant activities and management of their space
- Accidental spills
- Maintenance activities
- Elevated indoor relative humidity
- Poor maintenance of heating, ventilating and air conditioning equipment
- Uncontrolled condensation

Inspection Protocols

Routine walkthrough visual inspections should be performed when opportunities to inspect areas arise, such as during routine maintenance even when the presence of water intrusion or mold growth is not suspected. A comprehensive inspection should be performed periodically (monthly or quarterly). Inspections are also recommended following severe weather events and power outages. Frequency should be increased during construction/renovation projects. Development and use of an inspection form template tailored to site-specific property features is a best practice.

Inspections performed by Facilities and Maintenance should include all accessible areas of the property, concentrating on evidence of moisture intrusion and visible mold growth. Consider the building design, roof condition, and envelope condition to identify potential moisture ingress and/or failure points.

When inspecting for known or suspect water damage, look behind fixed items, move furniture away from walls, lift carpet to inspect the underside/padding, and look behind large pieces of furniture or wall hangings. Inspect for bubbled wallpaper or peeling paint, swollen wood trim, or discoloration. Carefully peel back affected impervious wallpaper to inspect underneath. Keep written records (photographs ideal) of the extent of all water damage and visible mold growth.

The following maintenance-related conditions may contribute to water damage and/or indoor mold growth:

- Heavy dust and dirt accumulations on surfaces and in soft furnishings or carpet
- Poorly maintained indoor plants or aquaria
- Accumulations of trash or refuse
- Mismanagement of indoor humidity
- Presence of impervious wallpaper on exterior walls
- Wall cavities that are under negative pressure with respect to the interior space
- Frequent wet carpet shampooing without immediate and effective drying
- Uninsulated or damaged insulation on cold pipes in humid locations
- Poorly-maintained caulking

Indoor Space

Ceiling materials, gypsum wallboard, ductwork, wood materials, wood floors, and other porous or semi-porous surfaces should be inspected.

Climate Control:	Management of indoor temperature, relative humidity
Walls:	Condition of finishes (plaster, paint, wall covering) Evidence of bubbled paint or surface treatments
Windows:	Evidence of water staining or water damage Evidence of leaks Evidence of poor drainage

Heating, Ventilating, and Air-Conditioning (HVAC) Systems

Complete HVAC inspections should be conducted during each routine maintenance activity. Mold growth is most likely to occur due to the buildup of dust, dirt, and debris and/or moisture retention in the system. When servicing HVAC systems, inspect for the presence of excess dust/dirt/debris, moisture, standing water, and microbial growth:

Elevated indoor relative humidity can be an indicator of moisture intrusion either through the building envelope or as a result of HVAC operational deficiencies. Assure through a qualified HVAC contractor that the building is operating in conformance with recommendations presented by the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) for the design and configuration of the facility.

Building Exterior

Inspect for the following on the building exterior where applicable:

Envelope:	Evidence of breaches or damage Condition of flashing Condition of caulking
Grading:	Adequate drainage Evidence of standing water Ponding of water near building
Roof:	Standing water Parapet condition (if applicable) Soft spots on roof Roof drains (location/discharge) History of blockage or ice dams Water stains and/or biological growth

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ROUTINE OR PERIODIC INSPECTION FORM

Space ID: _____

Site Address: _____

Contact: _____

_____

Inspect the following areas:

Location	Musty Odors?		Water Damage?		Visible Mold Growth?	
Restrooms	Yes	No	Yes	No	Yes	No
Kitchen/café area	Yes	No	Yes	No	Yes	No
Windows	Yes	No	Yes	No	Yes	No
Custodial Areas	Yes	No	Yes	No	Yes	No
Air Conditioners	Yes	No	Yes	No	Yes	No
Exterior Walls	Yes	No	Yes	No	Yes	No
Roof	Yes	No	Yes	No	Yes	No
Other						

Describe findings of either water staining, water damage, or visible mold growth:

Describe any repairs or remedial actions required:

Inspected By: _____

Signed: _____

Date: _____

Diagram of Area:

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PRE-WORK INSPECTION FORM		
Site Address:		
Contact:		
Telephone No.:		
Describe the Location Previous water damage reported?	**Y**	**N**
Describe the nature of the work to be performed: Start date and time:		
Water damage observed in work area?	_____ Yes	_____ No
Visible fungal growth observed in work area?	_____ Yes	_____ No
Air-conditioned?	Yes	No
Moisture meter readings: Photographs taken: Y N Signed _____ Date: _____	Diagram of Work Area	
Follow up:		

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MOISTURE/MICROBIAL INCIDENT FORM				
Site Address:				
Contact:				
Telephone No.:				
Describe the nature of the incident: Date and time of occurrence:				
Describe the area and materials affected: Square Feet:				
Contacted Insurance Agent	Date:		Time:	
Contacted Drying Contractor	Date:		Time:	
Moisture meter readings Photographs taken: Y N Signed _____ Date _____				
Follow up by: _____ Date _____				

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INCIDENT TRACKING LOG

Location	Reported By	Date	Condition Reported	Action Taken	Follow-up Date	Follow-up Action

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RECORD OF COMPLETION

Location				
Occupied Space/Room Number:				
The mold in the noted space was removed in accordance with the procedures required by ABC, Inc. The total area of mold comprised _____ square feet.				
Total Square Footage Removed:				
Remediation Contractor:				
Name:				
Title:				
Date				