

# Sample Operations & Maintenance Plan for Mold & Moisture Control in Public Housing Agencies



This plan is provided for informational purposes and is a suggested policy only, It should be reviewed and modified to meet the PHA's needs and address local and state regulations. Adherence to this suggested plan does not constitute compliance with any applicable laws or regulations or duty to provide care. You are urged research and monitor any applicable federal, state and local regulations regarding the subject of mold. Bernard J. Morosco is not responsible for errors and omissions regarding this plan and it is highly recommended that the advice of counsel and appropriate government agencies be sought prior to adopting this as an O & M Plan.

## GENERAL INFORMATION

Concern about Indoor Air Quality and specifically mold growth in public housing residences and common areas is increasing. As an industry there are many unanswered questions about potential health effects of mold, and it is considered to be proper and prudent for Public Housing Authority Staff

1. Repair any known conditions involving excessive moisture that could, under the right conditions, lead to mold growth and,
2. Clean and remove any mold growth when it occurs.

In order to accomplish this, it is important to establish a cooperative partnership between the housing management staff and residents so that conditions that require attention are identified and dealt with promptly.

## TRAINING

Currently there are no specific training requirements currently mandated by state and federal law for workers who may remediate mold as part of their responsibilities. This does not negate the importance of proper and qualified remediation and prevention training.

On-site staff should receive training necessary to carry out their responsibilities with respect to communicating with residents; cleaning, removing, and restoring damaged surfaces, and documenting all remediation efforts.

Although there are no currently established Permissible Exposure Levels (PELs) or Threshold Limit Values (TLVs) for mold, as part of the required training under OSHA's Hazard Communication Standard (29CFR 1910.1200), workers must be informed about safe work practices for using various chemicals, including disinfectants, and personal protective equipment, which may be a part of a mold response. Workers who may be involved in cleanup of extensive mold should be supplied with appropriate respirators, which may involve compliance with OSHA's Respiratory Protection Standard (29 CFR 1910.134).

Additional information on these regulations is available at [www.oshaslc.gov/dts/osta/oshasoft/hazexp.html](http://www.oshaslc.gov/dts/osta/oshasoft/hazexp.html) and [http://www.oshaslc.gov/SLTC/respiratory\\_advisor/mainpage.html](http://www.oshaslc.gov/SLTC/respiratory_advisor/mainpage.html) respectively.

On-site staff should be familiar with procedures to deal with water intrusion/excessive moisture and appropriate remediation techniques for water damaged surfaces. Workers should also review any company-specific policies and procedures and be familiar with the appropriate corporate/management contact person, should decisions need to be made concerning testing or activities beyond their scope of training or responsibility.

## ROUTINE MAINTENANCE

Routine maintenance and turnover activities provide on-site staff with the opportunity to monitor and correct any conditions involving moisture that could lead to the growth of mold.

Treatment of mold should be incorporated into general project maintenance activities. Staff should perform an inspection for mold as part of any type of unit inspection.

Any visual mold growth should be immediately and properly remediated as part of the requirements of the maintenance process. Follow the sample monitoring checklist. Staff should also be encouraged to monitor the property for signs of moisture, water damage or situations that may lead to conditions favorable for



mold growth (e.g., leaking faucets, broken sprinkler heads) when conducting other maintenance activities. Also be aware of situations such as carpet cleaning techniques, which may leave carpets too damp and run the risk of creating conditions favorable for mold growth.

## **INSPECTION**

A visual inspection is the primary step in identifying the extent of moisture damage, which may create conditions favorable for mold growth.

To the maximum extent possible ceiling tiles, gypsum wallboard, cardboard, duct liner, wood, carpet, paper, and other cellulose surfaces should be given careful attention during a visual inspection. Kitchens, bathrooms, windows, and HVAC systems should also be scrutinized.

An earthy or musty odor, may also indicate that mold is present.

The use of a moisture meter, to measure the saturation in building materials, is useful in evaluating the extent of water damage and determining when the appropriate moisture level has been restored.

Under further investigation, it may be necessary to look inside of wall cavities or filter areas to determine the extent of any water damage or mold growth.

Once mold growth is observed, the extent of any damaged area should be evaluated in order to determine appropriate remedial strategies based on EPA guidance. Consult list of materials and equipment that are needed to deal with water intrusion/mold remediation.



## **EPA's TIPS FOR MAINTENANCE PERSONNEL**

- Fix leaky plumbing and leaks in the building envelope 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.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible.
- Perform regular building/HVAC inspections and maintenance as scheduled.
- Clean and dry wet or damp spots within 48 hours.
- Don't let foundations stay wet. Provide drainage and slope the ground away from the foundation.

## **PROPER HVAC MAINTENANCE**

Improperly cycling HVAC systems, or improper use by the residents, can result in conditions of excessive humidity, which could lead to mold growth. Develop maintenance guidelines based on manufacturer's specifications for HVAC ventilation equipment (including appropriate settings, filter changes, and cleaning).

## SAMPLE GUIDELINES FOR PROCESSING A MAINTENANCE WORK ORDER

### Maintenance Work Order Office

1. Fill out a work order and in doing so, record the observations of the resident/maintenance personnel regarding the presence of conditions that may be favorable to mold growth, or whether they believe mold growth is present. If a health concern is expressed or property damage is reported, immediately contact **[NAME OF CONTACT]** and submit a damage report.
2. Treat the work order as a priority.
3. Complete the **Work Order Tracking Log**. Maintain the Log in the maintenance office.

### At the Work Order Location

1. Determine the nature and extent of conditions favorable for mold growth, or mold, if any. Determine the source of any water infiltration or excessive moisture – interior and exterior.
2. If a source of water or excessive moisture is found: Stop the leak or cause of excessive moisture and dry all affected areas completely immediately, or within 24 hours of notification.
3. If no mold is found: Send **Resident Follow-up Letter** indicating results of investigation.
4. If mold is found: Clean up the mold following the procedures outlined
5. Use the work order (**or Resident Follow-up Letter**) to inform the resident of the corrective action completed and additional steps to be taken, if any.

### Back at the Maintenance Work Order Office

1. Before determining that the remediation will require the use of outside professionals or that a unit be vacated, consult **[NAME OF CONTACT]** for guidance.
2. Complete the **Work Order Tracking Log** to reflect what action was taken.

### Within 7 – 10 Days

3. Send a **Resident Follow-up Letter**.
4. Log the follow-up action on the **Work Order Tracking Log**.



# SAMPLE INSPECTION FORM

**Project/Development:** \_\_\_\_\_ **Unit Number:** \_\_\_\_\_

**Date of Inspection:** \_\_\_\_\_

Check boxes for **Clean** (areas are clean, equipment is properly functioning, no work required) or **Corrected** (deficiencies repaired). File completed checklist in unit maintenance file.

Unit exterior (signs of holding water or missing building components)	clean/corrected	Kitchen (note any signs of current or past signs of moisture)	clean/corrected	Bedroom(s) Indicate Locations	clean/corrected
Check Roof		Check Inside all Cabinets		Check Windows	
Check Gutters/Downspouts		Check Sink		Check Sliding Doors	
Check Stairs		Check Faucets		Check Walls and Ceilings	
Check Landscape		Check Flooring		Check Carpet	
Check Exterior Utility Closet		Check Walls and Ceilings		Check Carpet Tack Strip in Corners	
Check Irrigation System		Check Doors		Check Closet(s)	
<b>Interior Entry (note any signs of current or past signs of moisture)</b>	clean/corrected	Check Windows			
Check Door surfaces		Check Refrigerator		<b>Closets (note any signs of current or past signs of moisture)</b>	clean/corrected
Check Inside of Closet		Check Ice maker (connections)		Check Shelving	
Check Windows		Check Dishwasher (underneath)		Check Walls and Ceilings	
Check all Baseboards		Check Waste disposal			
Check Walls and Ceilings		Check Washing Machine		<b>HVAC</b>	clean/corrected
Check Flooring		Check Hoses		Check Operation	
Check Carpet		Check Dryer		Check Air Circulation	
Check Carpet Tack Strip in Corners		Check Dryer Vent		Check Thermostat	
				Check Evaporator Coil	
<b>Living Room</b>	clean/corrected	<b>Bathroom(s) Indicate Location</b>	clean/corrected	Check Condensate Pan	
Check Inside of Closet		Check Lavatory Sinks		Check Condenser Coil	
Check Doors		Check Bathtubs/Showers		Check Condenser Fan Motor	
Check Windows		Check Toilets		Check Furnace	
Check all Baseboards		Check Inside all Cabinets		Check Baseboard Heaters	
Check Walls and Ceilings		Check Shelving		Check all Vents	
Check Flooring		Check Flooring		Change Filters	
Check Carpet		Check Walls and Ceilings			
Check Carpet Tack Strip in Corners		Check Interior Doors			
Check Fireplace		Check Windows			
		Check Bathroom Exhaust Fans			
<b>Patio/Balcony (note any signs of current or past signs of moisture)</b>	clean/corrected				
Check Roof		<b>Hallways (note any signs of current or past signs of moisture)</b>	clean/corrected		
Check Exterior Doors		Check Walls and Ceilings			
Check Deck Surface		Check Interior Doors			
Check Water Heater (all fittings)		Check Windows			
Check Storage Closet		Check Carpet			
Check Exterior Paint		Check Carpet Tack Strip in Corners			

**Inspector:** \_\_\_\_\_

## PROCEDURES FOR MOLD REMEDIATION

Once mold is identified, it is essential to identify and correct the underlying source of water intrusion. Otherwise, mold growth will recur.

**Generally speaking, if mold is either seen or smelled, it should be remediated.** Thus, a visual inspection is the first step to assessing a mold service request. According to the previously mentioned EPA guidelines, it is not essential to identify the types of mold (i.e., test) to remediate the situation. Under certain circumstances, however, it may be important to have building materials/air tested to determine the type of mold present. Consult with **[NAME OF CONTACT]** before proceeding with any testing. If extensive (i.e., the total surface area of visible mold is greater than 100 square feet or the potential for increased resident or remediator exposure during remediation is estimated to be significant), it is important to consult an experienced professional with specific experience in mold projects to develop a remediation plan.

### Sampling and Testing

Sampling and testing are to proceed only upon the approval of **[NAME OF CONTACT]**. A reputable Indoor Environmental Quality professional (preferably a Certified Industrial Hygienist) should conduct the sampling. The American Industrial Hygiene Association (AIHA) ([www.aiha.org/](http://www.aiha.org/)) and the American Society of Cleaning Restorers (ASCR) ([www.ascr.org](http://www.ascr.org)) may provide leads. There are advantages to identifying a professional contact before you have a problem. A lab, accredited by AIHA's Environmental Microbiological Laboratory Accreditation Program (EMLAP), should perform all testing analysis. Testing may involve bulk and/or air sampling.

- 1. Bulk Sampling:** Bulk or surface sampling involves taking a sample of material and performing laboratory analysis. Sampling and testing are not a prerequisite to remediation.
- 2. Air Sampling:** Air sampling may be utilized if the presence of mold is suspected (e.g., musty odors) but cannot be identified through a visual inspection. Any air sampling must also include an exterior air sample as a baseline sample for the ambient environmental level of mold. If air sampling is conducted, personnel conducting the sampling must be trained in proper air sampling methods.

### Remediation

In all situations, the underlying cause of water accumulation must be fixed or the problem may recur. A prompt response (**within 24 to 48 hours**) and thorough clean up, drying and/or removal of water-damaged materials will prevent or limit mold growth.

EPA has delineated three levels of remediation, based on the total area of material affected by visible mold growth. EPA's guidelines and suggested work practices include the use of Personal Protective Equipment ("PPE") and containment systems based on the total surface area affected. Adapt or modify these guidelines to fit your situation and contact [insert name of appropriate corporate/management contact person] with any questions regarding retaining outside consultants.

In some circumstances, the Public Housing Authority may retain an environmental restoration consultant to deal with a water intrusion/mold problem. In other cases, it may be useful to obtain a written protocol prepared by an industrial hygienist or other qualified indoor air quality professional to be used as a guide for on-site staff to follow in conducting the remediation. Under certain circumstances, written confirmation from the contractor, which states that remediation has been performed and the property is habitable, should be obtained.

## **EQUIPMENT LIST**

The following equipment is available at most supply stores and is useful to have on site to deal with water intrusion and/or mold remediation.

1. Moisture meter
2. High efficiency particulate air (HEPA) filtered vacuum cleaner
3. Disinfectant or bleach and standard cleaning detergent
4. Wet vacuum
5. Blowers (have on site or know where to rent)
6. Dehumidifiers (have on site or know where to rent)
7. Localized containment bag (2-glove bags)
8. Disposable clothing (1 box)
9. N-95 Disposable Respirators (5 pack)
10. 6-mil disposable bags (1 box)
11. 6-mil Polyethylene sheeting (2 rolls)
12. Yellow caution tape (3 rolls)
13. Plastic spray cleaning bottles
14. Disposable scrub brush, sponges, and cloths

# Sample Resident Follow-Up Letter

DATE

**ABC Housing Authority  
123 Smith Street  
Anytown, USA  
(000) 123- 4567**

To: **[Residents Name and Unit Number]**

Re: Follow-Up Inspection letter

Dear Resident(s),

It has been (**insert appropriate time**) days since we inspected (and/or treated) your apartment. We hope that all of your concerns have been addressed (and/or remedied) to your satisfaction

Please refer to the attached information, which contains useful tips for preventing mold growth in your apartment home.

If you notice any evidence of mold growth in your apartment, please immediately notify **[NAME OF CONTACT and PHONE NUMBER]**..

Best Regards,

John H. Doe

Attachment:  
Tip Sheet on Mold

# Resident Tip Sheet on Household Mold

It is our goal to maintain the highest quality living environment for our residents. To help achieve this goal, it is important to work together to minimize the potential for conditions that could lead to the growth of naturally occurring mold.

## TIPS FOR RESIDENTS

Residents can help minimize mold growth in their apartment homes by taking the following actions:

**Open your windows** Proper ventilation is essential. If it is not possible to open windows, run the fan on the apartment air-handling unit to circulate fresh air throughout your apartment. In damp or rainy weather conditions, keep windows and doors closed.

If possible, **maintain a temperature of between 50° and 80°** Fahrenheit within your apartment at all times.

Clean and dust your apartment on a regular basis as required by your lease. Regular vacuuming, mopping, and use of environmentally safe household cleaners is important to remove household dirt and debris that contribute to mold growth.

Periodically clean and dry the walls and floors around the sink, bathtub, shower, toilets, windows and patio doors using a common household disinfecting cleaner.

On a regular basis, wipe down and dry areas where moisture sometimes accumulates, like countertops, windows and windowsills.

Use the pre-installed bathroom fan or alternative ventilation when bathing or showering and allow the fan to run until all excess moisture has vented from the bathroom.

Use the exhaust fans in your kitchen when cooking or while the dishwasher is running and allow the fan to run until all excess moisture has vented from the kitchen.

Use care when watering houseplants. If spills occur, dry up excess water immediately.

Ensure that your clothes dryer vent is operating properly, and clean the lint screen after every use.

When washing clothes in warm or hot water, watch to make sure condensation does not build up within the washer and dryer closet; if condensation does accumulate, dry with a fan or towel.

Thoroughly dry any spills or pet urine on carpeting.

Do not overfill closets or storage areas. Ventilation is important in these spaces.

Do not allow damp or moist stacks of clothes or other cloth materials to lie in piles for an extended period of time.

Immediately report to the management office any evidence of a water leak or excessive moisture in your apartment, storage room, garage, or any common area.

Immediately report to the management office any evidence of mold growth that cannot be removed by simply applying a common household cleaner and wiping the area. Also report any area of mold that reappears despite regular cleaning.

Immediately report to the management office any failure or malfunction with your heating, ventilation, air-conditioning system, or laundry system. As your lease provides, do not block or cover any of the heating, ventilation or air-conditioning ducts in your apartment.

Immediately report to the management office any inoperable windows or doors.

Immediately report to the management office any musty odors that you notice in your apartment.

<b>Table 1: Water Damage – Cleanup and Mold Prevention</b>	
<i>Guidelines for Response to Clean Water Damage within 24-48 Hours to Prevent Mold Growth</i>	
<b>Water-Damaged Material</b>	<b>Actions</b>
<b>Books and papers</b>	<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>
<b>Carpet and backing – dry within 24-48 hours</b>	<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>
<b>Ceiling tiles</b>	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
<b>Cellulose insulation</b>	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
<b>Concrete or cinder block surfaces</b>	<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>
<b>Fiberglass insulation</b>	<ul style="list-style-type: none"> <li>• Discard and replace.</li> </ul>
<b>Hard surface, porous flooring*</b> (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>
<b>Non-porous, hard surfaces</b> (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>
<b>Upholstered furniture</b>	<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>
<b>Wallboard</b> (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>
<b>Window drapes</b>	<ul style="list-style-type: none"> <li>• Follow laundering or cleaning instructions recommended by the manufacturer.</li> </ul>
<b>Wood surfaces</b>	<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>

Source: U.S. EPA, "Mold Remediation in Schools and Commercial Buildings" (March 2001, Updated June 2001).

\*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.

**Table 2: U.S. EPA Guidelines for Remediating Building Materials  
with Mold Growth Caused by Clean Water\***

Material or Furnishing Affected	Cleanup Methods†	Personal Protective Equipment	Containment
<b>SMALL - Total Surface Area Affected Less Than 10 square feet (ft<sup>2</sup>)</b>			
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		
<b>MEDIUM - Total Surface Area Affected Between 10 and 100 (ft<sup>2</sup>)</b>			
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		
<b>LARGE - Total Surface Area Affected Greater Than 100 (ft<sup>2</sup>) or Potential for Increased Occupant or Remediator Exposure During Remediation Estimated to be Significant</b>			
Books and papers	3	Full Use professional judgment, consider potential for remediator/occupant exposure and size of contaminated area	Full Use professional judgment, consider potential for remediator 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)	1,2,3,4		
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		

Table 2 continued

\*Use professional judgment to determine prudent levels of Personal Protective Equipment (PPE) 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 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.**

### 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.

# Sample Residential Lease Addendum on Mold



This lease is provided for informational purposes and is a suggested lease only, It should be reviewed and modified to meet the PHA's needs and address local and state regulations. Adherence to this suggested plan does not constitute compliance with any applicable laws or regulations or duty to provide care. You are urged research and monitor any applicable federal, state and local regulations regarding the subject of mold. Bernard J. Morosco is not responsible for errors and omissions regarding this plan and it is highly recommended that the advice of counsel and appropriate government agencies be sought prior to adopting this as an O & M Plan.

# LEASE ADDENDUM ON MOLD

To minimize the occurrence and growth of mold in the Leased premises, Resident hereby agrees to the following:

1. **MOISTURE ACCUMULATION.** Resident shall remove any visible moisture accumulation in or on the Leased Premises, including on walls, windows, floors, ceilings, and bathroom fixtures; mop up spills and thoroughly dry affected area as soon as possible after occurrence; use exhaust fans in kitchen and bathroom when necessary; and keep climate and moisture in the Leased Premises at reasonable levels.
2. **VENTILATION.** Resident shall arrange their possessions to allow proper circulation of air throughout the unit and shall introduce fresh air as much as possible. Relative humidity should be maintained at levels below 60% to discourage mold growth.
3. **APARTMENT CLEANLINESS.** Resident shall clean and dust the Leased Premises regularly, and shall keep the Leased Premises, particularly kitchen and bathrooms, clean.
4. **NOTIFICATION OF MANAGEMENT.** Resident shall promptly notify management by calling the Work Order Center at \_\_\_\_\_ of the presence of the following condition:
  - i. A water leak, excessive moisture, or standing water inside the Leased Premises;
  - ii. A water leak, excessive moisture, or standing water in any community common area;
  - iii. Mold growth in or on the Leased Premises that persists after resident has tried several times to remove it with household cleaning solution, such as Lysol or Pine-Sol disinfectants, Tilex Mildew Remover, or Clorox, or a combination of water and bleach;
  - iv. A malfunction in any part of the heating, air-conditioning, or ventilation system in the Leased Premises.
5. **LIABILITY.** Resident shall be liable to Owner for damages sustained to the Leased Premises or to Resident's person or property as a result of Resident's failure to comply with the terms of this addendum.
6. **VIOLATION OF ADDENDUM.** Violation of this Addendum shall be deemed a material violation under the terms of the Lease, and Owner shall be entitled to exercise all rights and remedies it possesses against Resident at law or in equity.
7. **ADDENDUM SUPERSEDES LEASE.** In case of a conflict between the provisions of this Addendum and any other provisions of the Lease, the provisions of the Addendum shall govern. This Lease Addendum on Mold is incorporated into the lease executed or renewed on (insert date) between Owner and Resident.

Resident's signature \_\_\_\_\_ Date \_\_\_\_\_

Owner/Manager's signature \_\_\_\_\_ Date \_\_\_\_\_

# Glossary and Internet Links



# GLOSSARY

**ACID AEROSOL:** Acidic liquid or solid particles that are small enough to become airborne. High concentrations of acid aerosols can be irritating to the lungs and have been associated with some respiratory diseases, such as asthma.

**ACTION LEVEL:** A term used to identify the level of indoor radon at which remedial action is recommended. (EPA's current action level is 4 pCi/L.)

**ACTION PACKET:** In reference to the IAQ Tools for Schools Kit - contains three components - an introductory memo, *IAQ Background*, and IAQ Checklist - to assist school personnel to implement an effective yet simple IAQ program in their school.

**AHU:** See "Air Handling Unit."

**AIR CLEANING:** An IAQ control strategy to remove various airborne particulates and/or gases from the air. The three types of air cleaning most commonly used are particulate filtration, electrostatic precipitation, and gas sorption.

**AIR EXCHANGE RATE:** The rate at which outside air replaces indoor air in a space. Expressed in one of two ways: the number of changes of outside air per unit of time air changes per hour (ACH); or the rate at which a volume of outside air enters per unit of time - cubic feet per minute (cfm).

**AIR HANDLING UNIT (AHU):** For purposes of this document refers to equipment that includes a blower or fan, heating and/or cooling coils, and related equipment such as controls, condensate drain pans, and air filters. Does not include ductwork, registers or grilles, or boilers and chillers.

**AIR PASSAGES:** Openings through or within walls, through floors and ceilings, and around chimney flues and plumbing chases, that permit air to move out of the conditioned spaces of the building.

**ANIMAL DANDER:** Tiny scales of animal skin.

**ALLERGEN:** A substance capable of causing an allergic reaction because of an individual's sensitivity to that substance.

**ALLERGIC RHINITIS:** Inflammation of the mucous membranes in the nose that is caused by an allergic reaction.

**ANTIMICROBIAL:** Agent that kills microbial growth. See "disinfectant," "sanitizer," and "sterilizer."

**BIOLOGICAL CONTAMINANTS:** Agents derived from, or that are, living organisms (e.g., viruses, bacteria, fungi, and mammal and bird antigens) that can be inhaled and can cause many types of health effects including allergic reactions, respiratory disorders, hypersensitivity diseases, and infectious diseases.

**BREATHING ZONE:** Area of a room in which occupants breathe as they stand, sit, or lie down.

**BUILDING ENVELOPE:** Elements of the building, including all external building materials, windows, and walls, that enclose the internal space.

**BUILDING-RELATED ILLNESS (BRI):** Diagnosable illness whose symptoms can be identified and whose cause can be directly attributed to airborne building pollutants (e.g., Legionnaire's disease, hypersensitivity pneumonitis). Also: A discrete, identifiable disease or illness that can be traced to a specific pollutant or source within a building. (Contrast with "Sick building syndrome").

**CEILING PLENUM:** Space below the flooring and above the suspended ceiling that accommodates the mechanical and electrical equipment and that is used as part of the air distribution system. The space is kept under negative pressure.

**CENTRAL AIR HANDLING UNIT (Central AHU):** This is the same as an Air Handling Unit, but serves more than one area.

**CFM.** Cubic feet per minute. The amount of air, in cubic feet, that flows through a given space in one minute. 1 CFM equals approximately 2 liters per second (l/s).

**CHEMICAL SENSITIZATION:** Evidence suggests that some people may develop health problems characterized by effects such as dizziness, eye and throat irritation, chest tightness, and nasal congestion that appear whenever they are exposed to certain chemicals. People may react to even trace amounts of chemicals to which they have become "sensitized."

**CO:** Carbon monoxide.

**CO<sub>2</sub>:** Carbon dioxide.

**COMBINATION FOUNDATIONS:** Buildings constructed with more than one foundation type; e.g., basement/crawlspace or basement/slab-on-grade.

**COMMISSIONING:** Start-up of a building that includes testing and adjusting HVAC, electrical, plumbing, and other systems to assure proper functioning and adherence to design criteria. Commissioning also includes the instruction of building representatives in the use of the building systems.

**CONDITIONED AIR:** Air that has been heated, cooled, humidified, or dehumidified to maintain an interior space within the "comfort zone." (Sometimes referred to as "tempered" air.)

**CONSTANT AIR VOLUME SYSTEMS:** Air handling system that provides a constant air flow while varying the temperature to meet heating and cooling needs.

**DAMPERS:** Controls that vary airflow through an air outlet, inlet, or duct. A damper position may be immovable, manually adjustable or part of an automated control system.

**DIFFUSERS AND GRILLES:** Components of the ventilation system that distribute and return air to promote air circulation in the occupied space. As used in this document, supply air enters a space through a diffuser or vent and return air leaves a space through a grille.

**DISINFECTANTS:** One of three groups of antimicrobials registered by EPA for public health uses. EPA considers an antimicrobial to be a disinfectant when it destroys or irreversibly inactivates infectious or other undesirable organisms, but not necessarily their spores. EPA registers three types of disinfectant products based upon submitted efficacy data: limited, general or broad spectrum, and hospital disinfectant.

**DRAIN TILE LOOP:** A continuous length of drain tile or perforated pipe extending around all or part of the internal or external perimeter of a basement or crawlspace footing.

**DRAIN TRAP:** A dip in the drain pipe of sinks, toilets, floor drains, etc., which is designed to stay filled with water, thereby preventing sewer gases from escaping into the room.

**ENVIRONMENTAL AGENTS:** Conditions other than indoor air contaminants that cause stress, comfort, and/or health problems (e.g., humidity extremes, drafts, lack of air circulation, noise, and over-crowding).

**ENVIRONMENTAL TOBACCO SMOKE (ETS):** Mixture of smoke from the burning end of a cigarette, pipe, or cigar and smoke exhaled by the smoker (also secondhand smoke (SHS) or passive smoking).

**ERGONOMICS:** Applied science that investigates the impact of people's physical environment on their health and comfort (e.g., determining the proper chair height for computer operators).

**EXHAUST VENTILATION:** Mechanical removal of air from a portion of a building (e.g., piece of equipment, room, or general area).

**FLOW HOOD:** Device that easily measures airflow quantity, typically up to 2,500 cfm.

**FUNGI:** Any of a group of parasitic lower plants that lack chlorophyll, including molds and mildews.

**GAS SORPTION:** Devices used to reduce levels of airborne gaseous compounds by passing the air through materials that extract the gases. The performance of solid sorbents is dependent on the airflow rate, concentration of the pollutants, presence of other gases or vapors, and other factors.

**GOVERNMENTAL:** In the case of building codes, these are the State or local organizations/agencies responsible for building code enforcement.

**HEPA:** High efficiency particulate arrestance (filters).

**HUMIDIFIER FEVER:** A respiratory illness caused by exposure to toxins from microorganisms found in wet or moist areas in humidifiers and air conditioners. Also called air conditioner or ventilation fever.

**HVAC:** Heating, ventilation, and air-conditioning system.

**HYPERSENSITIVITY DISEASES:** Diseases characterized by allergic responses to pollutants. The hypersensitivity diseases most clearly associated with indoor air quality are asthma, rhinitis, and hypersensitivity pneumonitis. Hypersensitivity pneumonitis is a rare but serious disease that involves progressive lung damage as long as there is exposure to the causative agent.

**HYPERSENSITIVITY PNEUMONITIS:** A group of respiratory diseases that cause inflammation of the lung (specifically granulomatous cells). Most forms of hypersensitivity pneumonitis are caused by the inhalation of organic dusts, including molds.

**IAQ:** Indoor air quality.

**IAQ BACKGROUNDER:** A component of the *IAQ Tools for Schools* Kit that provides a general introduction to IAQ issues, as well as IAQ program implementation information.

**IAQ COORDINATOR:** An individual at the school and/or school district level who provides leadership and coordination of IAQ activities.

**IAQ CHECKLIST:** A component of the *IAQ Tools for Schools Kit* containing information and suggested easy-to-do activities for school staff to improve or maintain good indoor air quality. Each Activity Guide focuses on topic areas and actions that are targeted to particular school staff (e.g., Teacher's Checklist, Administrative Staff Checklist, Health Officer's Checklist, Ventilation Checklist, Building Maintenance Checklist, Food Service Checklist, Waste Management Checklist, Renovation and Repair Checklist and Walkthrough Checklist) or specific building functions (e.g., HVAC system, roofing, renovation, etc.). The Checklists are to be completed by the staff and returned to the IAQ Coordinator as a record of activities completed and assistance as requested.

**IAQ MANAGEMENT PLAN:** A component of the IAQ Tools for Schools Kit, specifically, a set of flexible and specific steps for preventing and resolving IAQ problems.

**IAQ TEAM:** People who have a direct impact on IAQ in the schools (school staff, administrators, school board members, students and parents) and who implement the IAQ Action Packets.

**IPM:** Integrated pest management.

**INDICATOR COMPOUNDS:** Chemical compounds, such as carbon dioxide, whose presence at certain concentrations may be used to estimate certain building conditions (e.g., airflow, presence of sources).

**INDOOR AIR POLLUTANT:** Particles and dust, fibers, mists, bioaerosols, and gases or vapors.

**MAKE-UP AIR:** See "Outdoor Air Supply."

**MAP OF RADON ZONES:** A U.S. EPA publication depicting areas of differing radon potential in both map form and in state specific booklets.

**MCS:** See "Multiple Chemical Sensitivity."

**MECHANICALLY VENTILATED CRAWLSPACE SYSTEM:** A system designed to increase ventilation within a crawlspace, achieve higher air pressure in the crawlspace relative to air pressure in the soil beneath the crawlspace, or achieve lower air pressure in the crawlspace relative to air pressure in the living spaces, by use of a fan.

**MICROBIOLOGICALS:** See "Biological Contaminants."

**MODEL BUILDING CODES:** The building codes published by the 4 Model Code Organizations and commonly adopted by state or other jurisdictions to control local construction activity.

**MODEL CODE ORGANIZATIONS:** Includes the following agencies and the model building codes they promulgate:

- Building Officials and Code Administrators International, Inc. (BOCA National Building Code/1993 and BOCA National Mechanical Code/1993);
- International Conference of Building Officials (Uniform Building Code/1991 and Uniform Mechanical Code/1991);
- Southern Building Code Congress, International, Inc. (Standard Building Code/1991 and Standard Mechanical Code/1991);
- Council of American Building Officials (CABO One- and Two-Family Dwelling Code/1992 and CABO Model Energy Code/1993).

**MULTIPLE CHEMICAL SENSITIVITY (MCS):** A condition in which a person reports sensitivity or intolerance (as distinct from "allergic") to a number of chemicals and other irritants at very low concentrations. There are different views among medical professionals about the existence, causes, diagnosis, and treatment of this condition.

**NEGATIVE PRESSURE:** Condition that exists when less air is supplied to a space than is exhausted from the space, so the air pressure within that space is less than that in surrounding areas. Under this condition, if an opening exists, air will flow from surrounding areas into the negatively pressurized space.

**ORGANIC COMPOUNDS:** Chemicals that contain carbon. Volatile organic compounds vaporize at room temperature and pressure. They are found in many indoor sources, including many common household products and building materials.

**OUTDOOR AIR SUPPLY:** Air brought into a building from the outdoors (often through the ventilation system) that has not been previously circulated through the system. Also known as "Make-Up Air."

**PELs:** Permissible Exposure Limits (standards set by the Occupational, Safety and Health Administration - OSHA).

**PICOCURIE (pCi):** A unit for measuring radioactivity, often expressed as picocuries per liter (pCi/L) of air.

**PLENUM:** Air compartment connected to a duct or ducts.

**PM:** Preventive Maintenance.

**POLLUTANT PATHWAYS:** Avenues for distribution of pollutants in a building. HVAC systems are the primary pathways in most buildings; however all building components interact to affect how air movement distributes pollutants. Also - a term used in the *IAQ Tools for Schools: IAQ Coordinator's Guide*.

**POSITIVE PRESSURE:** Condition that exists when more air is supplied to a space than is exhausted, so the air pressure within that space is greater than that in surrounding areas. Under this condition, if an opening exists, air will flow from the positively pressurized space into surrounding areas.

**PPM:** Parts per million.

**PRESSED WOOD PRODUCTS:** A group of materials used in building and furniture construction that are made from wood veneers, particles, or fibers bonded together with an adhesive under heat and pressure.

**PRESSURE, STATIC:** In flowing air, the total pressure minus velocity pressure. The portion of the pressure that pushes equally in all directions.

**PRESSURE, TOTAL:** In flowing air, the sum of the static pressure and the velocity pressure.

**PRESSURE, VELOCITY:** In flowing air, the pressure due to the velocity and density of the air.

**PREVENTIVE MAINTENANCE:** Regular and systematic inspection, cleaning, and replacement of worn parts, materials, and systems. Preventive maintenance helps to prevent parts, material, and systems failure by ensuring that parts, materials and systems are in good working order.

**PSYCHOGENIC ILLNESS:** This syndrome has been defined as a group of symptoms that develop in an individual (or a group of individuals in the same indoor environment) who are under some type of physical or emotional stress. This does not mean that individuals have a psychiatric disorder or that they are imagining symptoms.

**PSYCHOSOCIAL FACTORS:** Psychological, organizational, and personal stressors that could produce symptoms similar to those caused by poor indoor air quality.

**RADIANT HEAT TRANSFER:** Radiant heat transfer occurs when there is a large difference between the temperatures of two surfaces that are exposed to each other, but are not touching.

**RADON (Rn) AND RADON DECAY PRODUCTS:** Radon is a radioactive gas formed in the decay of uranium. The radon decay products (also called radon daughters or progeny) can be breathed into the lung where they continue to release radiation as they further decay.

**RE-ENTRAINMENT:** Situation that occurs when the air being exhausted from a building is immediately brought back into the system through the air intake and other openings in the building envelope.

**RE-ENTRY:** Situation that occurs when the air being exhausted from a building is immediately brought back into the system through the air intake and other openings in the building envelope.

**RELS:** Recommended Exposure Limits (recommendations made by the National Institute for Occupational Safety and Health (NIOSH)).

**SANITIZER:** One of three groups of anti-microbials registered by EPA for public health uses. EPA considers an anti-microbial to be a sanitizer when it reduces but does not necessarily eliminate all the microorganisms on a treated surface. To be a registered sanitizer, the test results for a product must show a reduction of at least 99.9% in the number of each test microorganism over the parallel control.

**SHORT-CIRCUITING:** Situation that occurs when the supply air flows to return or exhaust grilles before entering the breathing zone (area of a room where people are). To avoid short-circuiting, the supply air must be delivered at a temperature and velocity that results in mixing throughout the space.

**SICK BUILDING SYNDROME (SBS):** Term that refers to a set of symptoms that affect some number of building occupants during the time they spend in the building and diminish or go away during periods when they leave the building. Cannot be traced to specific pollutants or sources within the building. (Contrast with "Building related illness").

**SOIL GAS:** The gas present in soil which may contain radon.

**SOIL-GAS-RETARDER:** A continuous membrane or other comparable material used to retard the flow of soil gases into a building.

**SOURCES:** Sources of indoor air pollutants. Indoor air pollutants can originate within the building or be drawn in from outdoors. Common sources include people, room furnishings such as carpeting, photocopiers, art supplies, etc.

**STACK EFFECT:** The overall upward movement of air inside a building that results from heated air rising and escaping through openings in the building super structure, thus causing an indoor pressure level lower than that in the soil gas beneath or surrounding the building foundation.

**STATIC PRESSURE:** Condition that exists when an equal amount of air is supplied to and exhausted from a space. At static pressure, equilibrium has been reached.

**STERILIZER:** One of three groups of anti-microbials registered by EPA for public health uses. EPA considers an anti-microbial to be a sterilizer when it destroys or eliminates all forms of bacteria, fungi, viruses, and their spores. Because spores are considered the most difficult form of a microorganism to destroy, EPA considers the term sporicide to be synonymous with "sterilizer."

**SUB-SLAB DEPRESSURIZATION SYSTEM (ACTIVE):** A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a fan-powered vent drawing air from beneath the slab.

**SUB-SLAB DEPRESSURIZATION SYSTEM (PASSIVE):** A system designed to achieve lower sub-slab air pressure relative to indoor air pressure by use of a vent pipe routed through the conditioned space of a building and connecting the sub-slab area with outdoor air, thereby relying solely on the convective flow of air upward in the vent to draw air from beneath the slab.

**SUB-MEMBRANE DEPRESSURIZATION SYSTEM:** A system designed to achieve lower sub-membrane air pressure relative to crawlspace air pressure by use of a fan-powered vent drawing air from under the soil-gas-retarder membrane.

**TRACER GASES:** Compounds, such as sulfur hexafluoride, which are used to identify suspected pollutant pathways and to quantify ventilation rates. Trace gases may be detected qualitatively by their odor or quantitatively by air monitoring equipment.

**TLVs** - Threshold Limit Values (guidelines recommended by the American Conference of Governmental Industrial Hygienists).

**TVOCs.** Total volatile organic compounds. See "Volatile Organic Compounds (VOCs)"

**UNIT VENTILATOR:** A fan-coil unit package device for applications in which the use of outdoor- and return-air mixing is intended to satisfy tempering requirements and ventilation needs.

**VARIABLE AIR VOLUME SYSTEM (VAV):** Air handling system that conditions the air to constant temperature and varies the outside airflow to ensure thermal comfort.

**VENTILATION AIR:** Defined as the total air, which is a combination of the air brought inside from outdoors and the air that is being re-circulated within the building. Sometimes, however, used in reference only to the air brought into the system from the outdoors; this document defines this air as "outdoor air ventilation."

**VENTILATION RATE:** The rate at which indoor air enters and leaves a building. Expressed in one of two ways: the number of changes of outdoor air per unit of time (air changes per hour, or "ach") or the rate at which a volume of outdoor air enters per unit of time (cubic feet per minute, or "cfm").

**VOLATILE ORGANIC COMPOUNDS (VOCs):** Compounds that vaporize (become a gas) at room temperature. Common sources which may emit VOCs into indoor air include housekeeping and maintenance products, and building and furnishing materials. In sufficient quantities, VOCs can cause eye, nose, and throat irritations, headaches, dizziness, visual disorders, memory impairment; some are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans. At present, not much is known about what health effects occur at the levels of VOCs typically found in public and commercial buildings.

**ZONE:** The occupied space or group of spaces within a building which has its heating or cooling controlled by a single thermostat

