ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Indoor Air Quality Program

Wall Township Public School District
1620 18th Avenue
Wall, New Jersey 07719

Issued September 10, 2024

120 North Warren Street • Trenton, New Jersey 08608 • tel: 609-392-4200

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

Contents

APPENDICES

Policy and Administration

This notice is to inform employees that our agency complies with the Public Employees Occupational Safety and Health (PEOSH) Program, Indoor Air Quality (IAQ) Standard (N.J.A.C. 12:100-13) (2007), which was proposed on December 18, 2006 and adopted on May 21, 2007.

We recognize that good indoor air quality is essential to employee's health and productivity. We have established the following policies to promote good indoor air quality for employees in our buildings. These policies follow the requirements established by the PEOSH IAQ Standard as it applies to our workplace. This Written Indoor Air Quality Program applies to the following buildings/locations:

Administration Building
1620 18th Avenue
Wall, New Jersey 07719

Allenwood Elementary School
3301 Allenwood-Lakewood Road
Allenwood, New Jersey 08720

Central Elementary School
2007 Allenwood Road
Wall, New Jersey 07719

Garage/Maintenance
1620 18th Avenue
Wall, New Jersey 07719

Old Mill Elementary School
2119 Old Mill Road
Wall, New Jersey 07719

Special Services #1
1801 Bailey's Corner Road
Wal, New Jersey 07719

Special Services #2
1801 Bailey's Corner Road
Wall, New Jersey 07719

Wall High School
1630 18th Avenue
Wall, New Jersey 07719

Wall Intermediate School
2801 Allaire Road
Wall, New Jersey 07719

Wall Primary School
2500 Bedford Corner Lane
Wall, New Jersey 07719

West Belmar Elementary School
925 17th Avenue
Wall, New Jersey 08629

Transportation Building
1740 Route 34
Wall, New Jersey 07719

18th Avenue Field House
Wall, New Jersey 07719

Designated Person

As required by the New Jersey PEOSH Indoor Air Quality Standard, a person has been designated as the person responsible for Wall Township Public School District's compliance with the standard. This person is:

William Van Syckel, CEFM, Facilities Manager	(732) 556-2029
Designated Person	*Phone Number*

The designated person is the person who has been trained and given the responsibility by The Wall Township Public School District to make routine visual inspections, oversee preventive maintenance programs, and maintain required records in order to ensure compliance with the IAQ Standard. The designated person is also assigned to receive employee concerns/complaints about indoor air quality, conduct investigations, facilitate repairs or further investigation as necessary, maintain required records, and update the written program annually.

Preventive Maintenance Schedule

Preventive maintenance schedules that follow manufacturers' specifications are in place for heating, ventilation and air conditioning systems (HVAC) systems in this workplace. A copy of the preventive maintenance schedule is attached. Damaged and inoperable components will be repaired or replaced as appropriate and a work order to show actions taken will be completed.

Recordkeeping

Documentation of preventive maintenance and repairs to the ventilation system are retained for at least 3 years and include the following information:

- Date that preventive maintenance or repair was performed
- Person or company performing the work
- Documentation of:
  - Checking and/or changing air filters
  - Checking and/or changing belts
  - Lubrication of equipment parts
  - Checking the functioning of motors
  - Confirming that equipment is in operating order
  - Checking for microbial growth in condensate pans or standing water

Documentation of preventive maintenance and work orders for repairs are maintained by William Van Syckel.

Indoor Air Quality Compliance Documents

Our School District will make reasonable efforts to obtain and maintain copies of IAQ compliance documents. Available IAQ compliance documents will be maintained by the Designated Person and will be available to PEOSH during an inspection. These documents include:

1. As-built construction documents
2. HVAC system commissioning reports
3. HVAC systems testing, adjusting, and balancing reports
4. Operations and maintenance manuals
5. Water treatment logs
6. Operator training materials

Investigating Complaints

If employees begin to experience health symptoms that they believe are related to poor indoor air quality, they should notify the Designated Person so that their concerns can be investigated. The Designated Person has been trained and given the authority to conduct basic indoor air quality complaint investigations. In many cases IAQ complaints can be resolved by the Designated Person.

Responding to Signed Employee Complaints to PEOSH

If we receive a written notification from PEOSH that a signed employee complaint has been filed with PEOSH, we will conduct an inquiry into the allegations. The findings of the initial inquiry and any planned actions will be provided in a written response to PEOSH within fifteen (15) working days of receipt. Copies of all responses to PEOSH will be maintained by the Designated Person.

Notification of Employees

The Designated Person will notify employees at least 24 hours in advance, or promptly in emergency situations, of work to be performed on a building that may introduce air contaminants into their work area. This notification will be in writing and will identify the planned project and the start date. The notification will also include information on how to access Safety Data Sheets (SDS) or other hazard information. The Designated Person will maintain records of this notification for compliance recordkeeping purposes.

Controlling Microbial Contamination

Uncontrolled water intrusion into buildings (roof leaks, flooding, pipe condensation, plumbing leaks, or sewer backups) has the potential to support microbial growth. All employees should routinely observe their workplace for evidence of water intrusion (i.e. roof leaks, pipe leaks). Employees should notify the Designated Person immediately if they observe evidence of water intrusion so that corrective action can be taken. Ceiling tiles, carpet, and wall boards not dried within 48 hours may be removed as directed by the Designated Person.

Controlling Air Contaminants

Outside Air

The Designated Person will identify the location of outside air intakes and identify potential contamination sources nearby, such as loading docks or other areas where vehicles idle, nearby exhaust stacks, or vegetation. Periodic inspections will be conducted to ensure that the intakes remain clear of potential contaminants. If contamination occurs, the Designated Person will eliminate the contaminant source or make arrangements to relocate the intake.

Point Source Contaminants

The Designated Person will identify point sources of contaminants and arrange to capture and exhaust these sources from the building using local exhaust ventilation. Exhaust fans will be periodically inspected to ensure that they are functioning properly and exhausting to areas located away from outside air intakes.

Response to Temperature and Carbon Dioxide

Temperature

Where a mechanical ventilation system capable of regulating temperature is present, facilities personnel strive to maintain office building temperatures within the range of 68 to 79 degrees Fahrenheit. If outside this range, the Designated Person should be contacted. The Designated Person will ascertain whether the HVAC system is operating properly. If not, the system must be repaired. The IAQ Standard does not require the installation of new HVAC equipment to achieve this temperature range.

Carbon Dioxide

If the room is equipped with non-mechanical ventilation systems such as operable windows, stacks, louvers, the Designated Person should ensure that these areas are clear and operable to allow the flow of air. If carbon dioxide (CO2) concentrations exceed 1,000 parts per million (ppm), and the room is not equipped with operable windows, the Designated Person will conduct an inspection to ensure that the mechanical HVAC system is operating properly.

Maintaining Indoor Air Quality During Renovation and Construction Projects

Renovation work and/or new construction projects that have the potential to result in the diffusion of dust, stone and other small particles, toxic gases or other potentially harmful substances into occupied areas in quantities hazardous to health will be controlled in order to minimize employee exposure. The Designated Person will utilize the following protocol to assure that employees' exposure to potentially harmful substances is minimized:

- Obtain SDS for all products to be utilized on the project and maintain on-site throughout the duration of the project.
- Choose the least toxic product that is technically and economically feasible.
- Consider performing the renovation/construction project when building is least

occupied.
- Consider temporarily relocating employees to an alternate worksite.
- Notify potentially affected employees, in writing, at least 24 hours prior to commencement of chemical use or dust generation.
- Isolate the work area from occupied areas.
- Use mechanical ventilation and local exhaust ventilation to maintain a negative pressure gradient between the work area and occupied areas.

Before selection and use of paints, adhesives, sealants, solvents or installation of insulation, particle board, plywood, floor coverings, carpet backing, textiles, or other materials in the course of renovation or construction, the Designated Person will check product labels or seek and obtain information from the manufacturer of those products on whether or not they contain volatile organic compounds such as solvents, formaldehyde or isocyanates that could be emitted during regular use. This information should be used to select the least volatile/hazardous products and to determine if additional necessary measures need to be taken to comply with the objectives of this section. The Designated Person will maintain records of this evaluation for compliance recordkeeping purposes.

Management and the Designated Person will consider the feasibility of conducting renovation/construction work using appropriate barriers, during periods when the building is unoccupied, or temporarily relocating potentially affected employees to areas of the building that will not be impacted by the project.

Temporary barriers will be utilized to provide a physical isolation between the construction area and occupied areas of the building.

Mechanical ventilation (i.e. fans, portable blowers, or existing HVAC equipment) will be used to maintain a negative pressure gradient between the work area and occupied areas to ensure the safety of employees. Renovation areas in occupied buildings will be isolated and dust and debris shall be confined to the renovation or construction area.

If work is being performed by an outside contractor, the Designated Person will maintain communication with contractor personnel to ensure they comply with the requirements of the PEOSH IAQ standard.

Employees who have special concerns about potential exposures during or after renovation/construction/repair work should consult with their supervisor. If despite these preventive actions, employees are exposed to air contaminants resulting in health effects, employees will be instructed to report any work-related health symptoms to one person (e.g., the nurse, human resources, designated person) so that they can be accurately assessed and investigated when indicated. All exposures should also be reported to their supervisor and the designated person.

Obtaining Permits and Performing Work in Accordance with the New Jersey Uniform Construction Code (N.J.A.C. 5:23)

Permits for renovation and construction-related work will be obtained as required by the New Jersey Uniform Construction Code (NJUCC), (N.J.A.C. 5:23). All work requiring a permit will be performed in compliance with N.J.A.C. 5:23. Additional information concerning the NJUCC can be obtained from the NJ Department of Community Affairs, Division of Codes and Standards (www.state.nj.us/dca/codes, 609-984-7609).

Maintaining Natural Ventilation in Buildings without Mechanical Ventilation

In buildings not equipped with mechanical ventilation, the Designated Person will identify the location of non-mechanical ventilation systems, such as stacks and operable windows. Periodic inspections will be conducted to ensure that these systems are operable and the surrounding areas remain clear of obstructions and potential contaminants.

Employee Responsibilities

Employees have a role in maintaining good indoor air quality within their workplace. Employees should ensure that they do not introduce unauthorized chemicals (i.e. fragrances, air fresheners, cleaning solvents, ozone generators) into the workplace. In addition, if employees observe situations which may lead to poor indoor air quality (i.e. inoperable windows, water leaks, visible mold) they should notify the Designated Person of the situation so that it can be addressed promptly. Employees are responsible for maintaining mechanical and passive ventilation systems by ensuring that louvers and diffusers remain clear to allow the free flow of air. Intentionally blocking, diverting, or otherwise manipulating components (i.e. thermostat,) of the ventilation system may result in disruption of the ventilation system in the immediate area or other occupied areas of the building.

Periodic Review and Update

The Written Indoor Air Quality Program will be updated at least annually to reflect changes in policies, procedures, responsibilities, and contact information. This plan will be reviewed prior to *September 10, 2025*.

Certifications:
Reviewed and Approved:

_____ _____

Mr. William Van Syckel, CEFM [*Date*]
Designated Person

Appendix A

HVAC Preventive Maintenance (PM) Log

HVAC Preventive Maintenance (PM) Log

Employer Name: _____
Facility Name: _____
Air Handling Unit _____
Area Served _____

Date	PM Action	Initials

Note: N.J.A.C. 12:100-13.6 requires that this maintenance log be maintained on site by the employer's designated person for3 years and must be made available to PEOSH, employees, and employee representatives upon request.

Appendix B

HVAC Inspection Checklist

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Appendix B discusses HVAC system components in relation to indoor air quality.

Component	OK	Needs Attention	Not Applicable	Comments
Outside Air Intake				
Location _____ _____				
Open during occupied hours?				
Unobstructed?				
Standing water, bird droppings in vicinity?				
Odors from outdoors? (describe) _____ _____				
Carryover of exhaust heat?				
Cooling tower within 25 feet?				
Exhaust outlet within 25 feet?				
Trash compactor within 25 feet?				
Near parking facility, busy road, loading dock?				
Bird Screen				
Unobstructed?				
General condition?				
Size of mesh? (½" minimum)				
Outside Air Dampers				
Operation acceptable?				
Seal when closed?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Actuators operational?				
Outdoor Air (O.A.) Quantity ***(Check against applicable codes and ASHRAE 62-1989.)***				
Minimum % O.A. _____				
Measured % O.A. _____ *Note day, time, HVAC operating mode under "Comments"*				
Maximum % O.A. _____				
Is minimum O.A. a separate damper?				
For VAV systems: is O.A. increased as total system air-flow is reduced?				
Mixing Plenum				
Clean?				
Floor drain trapped?				
Airtightness				
■ of outside air dampers				
■ of return air dampers				
■ of exhaust air dampers				
All damper motors connected?				
All damper motors operational?				
Air mixers or opposed blades?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Mixed air temperature control setting _____ ^{O}F				
Freeze stat setting _____ ^{O}F				
Is mixing plenum under negative pressure? *Note: If it is under positive pressure, outdoor air may not be entering.*				
Filters				
Type _____				
Complete coverage? (i.e., no bypassing)				
Correct pressure drop? *(Compare to manufacturer's recommendations.)*				
Contaminants visible?				
Odor noticeable?				
Spray Humidifiers or Air Washers				
Humidifier type				
All nozzles working?				
Complete coil coverage?				
Pans clean, no overflow?				
Drains trapped?				
Biocide treatment working? *Note: Is MSDS on file?* _____				
Spill contaminant system in place?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Face and Bypass Dampers				
Damper operation correct?				
Damper motors operational?				
Cooling Coil				
Inspection access?				
Clean?				
Supply water temp. _____°F				
Water carryover?				
Any indication of condensation problems?				
Condensate Drip Pans				
Accessible to inspect and clean?				
Clean, no residue?				
No standing water, no leaks?				
Noticeable odor?				
Visible growth (e.g., slime)?				
Drains and traps clear, working?				
Trapped to air gap?				
Water overflow?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Mist Eliminators				
Clean, straight, no carryover?				
Supply Fan Chambers				
Clean?				
No trash or storage?				
Floor drain traps are wet or sealed?				
No air leaks?				
Doors close tightly?				
Supply Fans				
Location _____				
Fan blades clean?				
Belt guards installed?				
Proper belt tension?				
Excess vibration?				
Corrosion problems?				
Controls operational, calibrated?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Control sequence conforms to design/specifications? (describe changes)				
No pneumatic leaks?				
Heating Coil				
Inspection access?				
Clean?				
Contol sequence conforms to design/specifications? (describe changes)				
Supply water temp. _____^{O}F				
Discharge thermostat? (air temp. setting _____^{O}F)				
Reheat Coils				
Clean?				
Obstructed?				
Operational?				
Steam Humidifier				
Humidifier type				
Treated boiler water				
Standing water?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Visible growth?				
Mineral deposits?				
Control setpoint _____°F				
High limit setpoint _____°F				
Duct liner within 12 feet? (If so, check for dirt, mold growth.)				
Supply Ductwork				
Clean?				
Sealed, no leaks, tight connections?				
Fire dampers open?				
Access doors closed?				
Lined ducts?				
Flex duct connected, no tears?				
Light troffer supply?				
Balanced within 3-5 years?				
Balanced after recent renovations?				
Short circuiting or other air distribution problems? Note location(s) _____ _____				
Pressurized Ceiling Supply Plenum				
No unintentional openings?				
All ceiling tiles in place?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Barrier paper correctly placed and in good condition?				
Proper layout for air distribution?				
Supply diffusers open?				
Supply diffusers balanced?				
Noticeable flow of air?				
Short circuiting or other air distribution problems? *Note location(s) in"Comments"*				
Terminal Equipment (supply)				
Housing interiors clean and unob-structed?				
Controls working?				
Delivering rated volume?				
Balanced within 3-5 years?				
Filters in place?				
Condensate pans clean, drain freely?				
VAV Box				
Minimum stops _____ %				
Minimum outside air ___ % *(from page 2 of this form)*				
Minimum airflow _____cfm				
Minimum outside air _____ cfm				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Supply setpoint _____°F (summer) _____°F (winter)				
Thermostats				
Type _____				
Properly located?				
Working?				
Setpoints _____°F (summer) _____°F (winter)				
Space temperature _____°F				
Humidity Sensor				
Humidistat setpoints _____ % RH				
Dehumudistat setpoints _____ % RH				
Actual RH _____ %				
Room Partitions				
Gap allowing airflow at top?				
Gap allowing airflow at bottom?				
Supply, return each room?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Stairwells				
Doors close and latch?				
No openings allowing uncontrolled airflow?				
Clean, dry?				
No noticeable odors?				
Return Air Plenum				
Tiles in place?				
No unintentional openings?				
Return grilles?				
Balancing capability?				
Noticeable flow of air?				
Transfer grilles?				
Fire dampers open?				
Ducted Returns				
Balanced within 3-5 years?				
Unobstructed grilles?				
Unobstructed return air path?				
Return Fan Chambers				
Clean and no trash or storage?				
No standing water?				
Floor drain traps are wet or sealed?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
No air leaks?				
Doors close tightly, kept closed?				
Return Fans				
Location _____				
Fan blades clean?				
Belt guards installed?				
Proper belt tension?				
Excess vibration?				
Corrosion problems?				
Controls working, calibrated?				
Controls sequence conforms to design/specifications? (describe changes)				
Exhaust Fans				
Central?				
Distributed (locations) _____ _____				
Operational?				
Controls operational?				
Toilet exhaust only?				
Gravity relief?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Total powered exhaust _____ cfm				
Make-up air sufficient?				
Toilet Exhausts				
Fans working occupied hours?				
Registers open, clear?				
Make-up air path adequate?				
Volume according to code?				
Floor drain traps wet or sealable?				
Bathrooms run slightly negative relative to building?				
Smoking Lounge Exhaust				
Room runs negative relative to building?				
Print Room Exhaust				
Room runs negative relative to building?				
Garage Ventilation				
Operates according to codes?				
Fans, controls, dampers all operate?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
Garage slightly negative relative to building?				
Doors to building close tightly?				
Vestibule entrance to building from garage?				
Mechanical Rooms				
General condition?				
Controls operational?				
Pneumatic controls:				
■ compressor operational?				
■ air dryer operational?				
Electric contols?				
EMS (Energy Management System) or DDC (Direct Digital Control):				
■ operator on site?				
■ controlled off-site?				
■ are fans cycled "off" while building is occupied?				
■ is chiller reset to shed load?				
Preventive Maintenance				
Spare parts inventoried?				
Spare air filters?				
Control drawing posted?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments
PM (Preventive Maintenance) schedule available?				
PM followed?				
Boilers				
Flues, breeching tight?				
Purge cycle working?				
Door gaskets tight?				
Fuel system tight, no leaks?				
Combustion air: at least 1 square inch free area per 2000 Btu input?				
Cooling Tower				
Sump clean?				
No leaks, no overflow?				
Eliminators working, no carryover?				
No slime or algae?				
Biocide treatment working?				
Dirt separator working?				
Chillers				
No refrigerant leaks?				
Purge cycle normal?				
Waste oil, refrigerant properly disposed of and spare refrigerant properly stored?				
Condensation problems?				

HVAC Checklist - Long Form

Building: _____ File Number: _____

Completed by: _____ Title: _____ Date Checked: _____

Component	OK	Needs Attention	Not Applicable	Comments

Appendix C

PEOSH Indoor Air Quality Standard Inspection List

PEOSH Indoor Air Quality Standard
Inspection Checklist

Location: _____

Inspector: _____ Date:___/___/202

COMPLIANCE PROGRAM - GENERAL REQUIREMENTS: N.J.A.C. 12:100-		Y	N	N/A
13.3(a)	Has a designated person been identified to handle the implementation and documentation of the New Jersey indoor air quality standard? Name/Title/Phone #: _____	☐	☐	☐
13.3(a)	Has the employer ensured that the designated person is familiar with all the requirements of the standard?	☐	☐	☐
13.3(a)1	Is there an established, operating & documented preventive maintenance schedule for the heating, ventilation and air conditioning (HVAC) system in accordance with the manufacturer's recommendations for the HVAC system?	☐	☐	☐
13.3(a)1	Does the HVAC preventive maintenance schedule include: checking &/or changing air filters, checking &/or changing belts, lubrication of equipment, checking the functioning of motors & confirming all equipment is in operating?	☐	☐	☐
13.3(a)1	Damaged or inoperable components of the HVAC system replaced or repaired?	☐	☐	☐
13.3(a)1	Are parts of the HVAC system with standing water checked visually for microbial growth?	☐	☐	☐
13.3(a)2	Is general or local exhaust ventilation used where housekeeping & maintenance activities could be expected to result in exposure to hazardous substances?	☐	☐	☐
13.3(a)3	When the carbon dioxide level exceeds 1,000 parts per million, is the HVAC system checked & repaired to ensure the system is operating properly?	☐	☐	☐
13.3(a)4	In office buildings, when the temperature is outside of the range of 68 to 79^0 F, is the HVAC system checked & repaired to ensure the system is operating properly?	☐	☐	☐
13.3(a)5	When a contaminant is identified in the make-up air supply, is the source of the contaminant eliminated or the make-up inlets and/or exhaust air outlets relocated to avoid entry of the contaminant into the air system?	☐	☐	☐
13.3(a)6	If buildings do not have mechanical ventilation, are windows, doors, vents, stacks, and other portals used for natural ventilation operating properly?	☐	☐	☐
13.3(a)7	Are complaints promptly investigated that involve signs or symptoms that may be associated with Building-Related Illness or Sick Building Syndrome?	☐	☐	☐
13.3(a)8	Employer have a written plan that meets the requirements of subchapter?	☐	☐	☐
13.3(a)9	Is the written compliance plan reviewed and updated annually to reflect new or updated procedures?	☐	☐	☐
CONTROLS OF SPECIFIC CONTAMINANTS		**Y**	**N**	**N/A**
13.4(a)	When point sources generate airborne levels of contaminants above applicable limits, is local exhaust ventilation or substitution used to reduce the exposure levels to below the limits?	☐	☐	☐
13.4(b)	Does the employer control microbial contamination by promptly repairing water intrusion that can promote growth of biologic agents?	☐	☐	☐
13.4(c)	Does the employer remediate damp or wet materials by drying, replacing, removing, or cleaning within 48 hours of discovery & continue remediation until water intrusion is eliminated?	☐	☐	☐
13.4(d)	Are visible microbial contaminants removed from ductwork, humidifiers, dehumidifiers, condensate drip pans, heat exchange components, & other HVAC & building system components, or on building surfaces, such as carpeting & ceiling tiles, when found during regular or emergency maintenance activities or during visual inspection?	☐	☐	☐

PEOSH Indoor Air Quality Standard
Inspection Checklist

RENOVATION/REMODELING		Y	N	N/A
13.5(a)	During renovation work &/or new construction, is local ventilation devices used to safeguard employees from dust, stone & other small particles, toxic gases or other harmful substances in quantities hazardous to health?	☐	☐	☐
13.5(a)	Are renovation areas in occupied buildings isolated so that air contaminants, are confined to the renovation area by measures such as physical barriers, pressure differentials, &/or performing work during periods of low occupancy?	☐	☐	☐
13.5(a)(1)	Are work areas cleaned & aired out as necessary prior to re-occupancy?	☐	☐	☐
13.5(a)(2)	Hazard information used to select products & measures to be taken?	☐	☐	☐
13.5(b)	Before selection & use are labels & SDS checked on whether the use of paints, adhesives, sealants, solvents or installation of insulation, particle board, plywood, floor coverings, carpet backing, textiles or other materials contain volatile organic compounds such as solvents, formaldehyde, or Isocyanates that could be emitted during regular use?	☐	☐	☐
13.5(c)	Are employees notified at least 24 hours in advance, or promptly in emergency situations, of work to be performed on the building that may introduce air contaminants into their work area?	☐	☐	☐
RECORDKEEPING		**Y**	**N**	**N/A**
13.6(a)	Maintenance schedule updated to show all maintenance performed on the building systems?	☐	☐	☐
13.6(a)	Maintenance schedule include the dates the building systems maintenance was performed & the names of the persons/companies doing the work?	☐	☐	☐
13.6(b)	Are maintenance schedules retained for at least 3 years?	☐	☐	☐
13.6(b)	Are the records required to be maintained available for inspection by PEOSH?	☐	☐	☐
13.6(b)	Are the records required to be maintained available for inspection by employees for examination within 10 working days of request?	☐	☐	☐
EMPLOYER'S RESPONSE TO A SIGNED COMPLAINT		**Y**	**N**	**N/A**
13.7(a)	If the employer receives a complaint notification from PEOSH about an indoor air quality problem, is a written response returned within 15 working days?	☐	☐	☐
13.7(a)	Do the employer's written responses to complaint notifications received from the PEOSH Program about an indoor air quality problem include any combination of the following: 1) A statement that the complaint is unfounded; 2) A description of any remedial action already taken; 3) An outline of any remedial measures planned but not yet taken with a timetable for completion; and/or 4) A statement that a study of the problem, with a timetable for completion of the study, has been initiated?	☐	☐	☐
13.7(b)	If the employer plans remedial measures or a study initiated in response to a complaint notification received from the PEOSH Program, is a written report describing the remedial measures implemented and/or a copy of a study's report submitted to the PEOSH Program within 15 working days of completion?	☐	☐	☐
13.7(c)	If remedial work is initiated in response to a complaint notification from the PEOSH Program, are permits obtained and work performed as required by N.J.A.C. 5:23 (the New Jersey Uniform Construction Code)?	☐	☐	☐
13.8(a)	If available, are the following documents provided to the PEOSH Program when requested in response to an employee complaint: 1) As-built construction documents; 2) HVAC system commissioning reports; 3) HVAC systems testing, adjusting and balancing reports; 4) Operations and maintenance manuals; 5) Water treatment logs; and 6) Operator training materials?	☐	☐	☐

Appendix D

Renovation/Construction Project IAQ Compliance Checklist

Renovation/Construction Project
IAQ Compliance Checklist

Employer Name: _____
Facility Name: _____
Project Name: _____
Estimated Time Period: _____
Area(s) Affected _____
General Contractor Name/Phone #: _____

Pre-Construction/Planning Phase:	**Complete**	**N/A**
Notified the Designated Person of the project.	☐	☐
Considered performing work during periods of minimal or non-occupancy and included requirements in bid specification (if applicable).	☐	☐
Reviewed hazard information (labels, MSDS) with contractor(s) and approved selected products.*	☐	☐
In buildings constructed prior to 1981: Reviewed Asbestos Survey. Ensured that all Asbestos-containing materials (ACM)/and Presumed Asbestos-containing materials (PACM) are labeled, Employees and Contractors notified of presence of ACM/PACM.	☐	☐
Notified affected employees at least 24 hours in advance, or promptly in emergency situations, of work to be performed on the building that may introduce air contaminants into their work area.*	☐	☐
Reviewed hazard information (labels, MSDS) to determine necessary measures to be taken.*	☐	☐
Reviewed product labels and MSDS sheets to determine whether the use of paints, adhesives, sealants, solvents or installation of insulation, particle board, plywood, floor coverings, carpet backing, textiles or other materials contain volatile organic compounds that could be emitted during regular use.*	☐	☐
Construction Phase:		
Local ventilation or other protective devices used to safeguard employees and students from dust, stone and other small particles, toxic gases or other harmful substances in quantities hazardous to health are in place.	☐	☐
Renovation/Construction areas in occupied buildings are isolated so that air contaminants, dust, and debris are confined to the renovation or construction area by use of measures such as physical barriers and pressure differentials.	☐	☐
Re-occupancy Phase:		
Inspected that the work areas are cleaned and aired out as necessary prior to re-occupancy.*	☐	☐
Re-occupancy authorized by: (Name/Title) Name:_____ Title: _____ Signature: _____ Date: _____		

** N.J.A.C.12:100-13.5 requires that documentation of this action be maintained in accordance with recordkeeping requirements.*

Appendix E

"Notice" Warning Sign

ENVIRONMENTAL CONNECTION INC
A Vertical Technologies Corporation

NOTICE

Dear Employee:

In accordance with the requirement of the NJ Indoor Air Quality Standard (N.J.A.C. 12:100-13)(2007), you are hereby notified that a construction/renovation project will take place at the _____School from _____ through_____. Materials will be utilized which contain ingredients that may be potentially offensive or harmful to sensitive individuals. Efforts will be made to minimize employee exposure to these chemicals and other construction-related dusts and odors.

The Safety Data Sheets for these materials are attached. If you have any questions please contact Mr. William Van Syckel at (732) 556-2029.

Appendix F

Indoor Air Quality Standard
N.J.A.C. 12:100:13.1

TITLE 12. DEPARTMENT OF LABOR
CHAPTER 100. SAFETY AND HEALTH STANDARDS FOR PUBLIC EMPLOYEES
SUBCHAPTER 13. INDOOR AIR QUALITY STANDARD

N.J.A.C. 12:100-13.1 (2007)

§ 12:100-13.1 Scope

This subchapter shall apply to matters relating to indoor air quality in buildings occupied by public employees during regular work hours.

§ 12:100-13.2 Definitions

The following words and terms, when used in this subchapter, have the following meaning unless the context clearly indicates otherwise.

"Air contaminants" refers to substances contained in the vapors from paint, cleaning chemicals, pesticides, solvents, particulates, outdoor air pollutants and other airborne substances which together may cause material impairment to employees working within the enclosed workplace.

"Building-related illness" describes specific medical conditions of known etiology which can be documented by physical signs and laboratory findings. Such illnesses include sensory irritation when caused by known agents, respiratory allergies, asthma, nosocomial infections, humidifier fever, Legionnaires' disease, and the signs and symptoms characteristic of exposure to chemical or biologic substances such as carbon monoxide, formaldehyde, pesticides, endotoxins, or mycotoxins.

"Building systems" includes the heating, ventilation and air-conditioning (HVAC) system, the energy management system and all other systems in a facility which may impact indoor air quality.

"Department" means the Department of Health and Senior Services.

"Designated person" means a person who has been given the responsibility by the employer to take necessary measures to assure compliance with this subchapter.

"Employee" means the term as defined at *N.J.A.C. 12:100-2.1*.

"Employer" means the term as defined at *N.J.A.C. 12:100-2.1*.

"HVAC system" means the collective components of the heating, ventilation and air-conditioning system including, but not limited to, filters and frames, cooling coil condensate drip pans and drainage piping, outside air dampers and actuators, humidifiers, air distribution ductwork, automatic temperature controls, and cooling towers.

"HVAC System Commissioning Report" means a document normally prepared by an architect or engineer that provides verification that the HVAC system is operating in conformity with the design intent.

"Office building" means a building in which administrative, clerical or educational activities are conducted. Examples of facilities and/or operations, which are not office buildings, include repair shops, garages, print shops and warehouses.

"Renovation and remodeling" means building modification involving activities that include but are not limited to: removal or replacement of walls, roofing, ceilings, floors, carpet, and components such as moldings, cabinets, doors, and windows; painting; decorating; demolition; surface refinishing; and removal or cleaning of ventilation ducts.

"Sick Building Syndrome" describes a situation in which a workplace is characterized by a substantial number of building occupants experiencing health and comfort problems that can be related to working indoors. Additionally the reported symptoms do not fit the pattern of any particular illness, are difficult to trace to any specific source and relief from these symptoms occurs upon leaving the building. It is important to distinguish Sick Building Syndrome from

problems of building-related illness. The latter term is reserved for situations in which signs and symptoms of diagnosable illness are identified and can be attributed directly to specific airborne contaminants.

§ 12:100-13.3 Compliance program

(a) The employer shall identify a designated person who is given the responsibility to assure compliance with this section. The employer shall assure that the designated person is familiar with the requirements of this subchapter. The designated person shall assure that at least the following actions are implemented and documented:

1. Establishing and following a preventive maintenance schedule in accordance with the manufacturer's recommendations or with accepted practice for the HVAC system. Scheduled maintenance of the HVAC system shall include checking and/or changing air filters, checking and/or changing belts, lubrication of equipment parts, checking the functioning of motors and confirming that all equipment is in operating order. Damaged or inoperable components shall be replaced or repaired as appropriate. Additionally, any parts of this system with standing water shall be checked visually for microbial growth;

2. Implementing the use of general or local exhaust ventilation where housekeeping and maintenance activities involve use of equipment or products that could reasonably be expected to result in hazardous chemical or particulate exposures, above the applicable Permissible Exposure Limit (PEL), as adopted by reference under *N.J.A.C. 12:100-4.2*, to employees working in other areas of the building or facility;

3. When the carbon dioxide level exceeds 1,000 parts per million (ppm), the employer shall check to make sure the HVAC system is operating as it should. If it is not, the employer shall take necessary steps as outlined in (a)1 above;

4. When temperatures in office buildings are outside of the range of 68 to 79 degrees Fahrenheit, the employer shall check to make sure the HVAC system is in proper operating order. If it is not, the employer shall take necessary steps as outlined in (a)1 above;

5. If contamination of the make-up air supply is identified and documented, then the make-up inlets and/or exhaust air outlets shall be relocated or the source of the contamination eliminated. Sources of make-up air contamination may include contaminants from sources such as, but not limited to, cooling towers, vents, and vehicle exhaust;

6. Assuring that building without mechanical ventilation are maintained so that windows, doors, vents, stacks and other portals designed or used for natural ventilation are in operable condition;

7. Promptly investigating all employee complaints of signs or symptoms that may be associated with building-related illness or sick building syndrome;

8. The employer shall have a written plan describing how it will achieve compliance with this subchapter, which plan shall list the identity and responsibilities of the designated person referred to in (a) above and which shall include procedures which, at a minimum, address the following issues:

i. Following of a preventive maintenance schedule;

ii. Keeping of required records;

iii. Locating of Indoor Air Quality compliance documents;

iv. Investigating of employee complaints;

v. Responding to signed employee complaints that have been submitted to the State alleging violation of the Public Employees' Occupational Safety and Health Act, *N.J.S.A. 34:6A-25* et seq.;

vi. Notifying employees of work that may introduce air contaminants;

vii. Controlling microbial contamination;

viii. Controlling air contaminants;

ix. Responding to temperature and/or carbon dioxide exceedences;

x. Maintaining air quality during renovations and remodeling;

xi. Obtaining permits and performing work as required by the New Jersey Uniform Construction Code, *N.J.A.C. 5:23*; and

xii. Maintaining natural ventilation in buildings without mechanical ventilation; and

9. The employer shall review and update the written compliance plan referred to in (a)8 above at least annually, and whenever necessary to reflect new or modified tasks and procedures and to reflect new or revised employee positions.

§ 12:100-13.4 Controls of specific contaminant sources

(a) Regarding other indoor air contaminants, when general ventilation is inadequate to control air contaminants emitted from point sources within work spaces to below the applicable PEL, as adopted by reference under *N.J.A.C. 12:100-4.2*, the employer shall implement other control measures such as local source capture exhaust ventilation or substitution.

(b) The employer shall control microbial contamination in the building by promptly repairing water intrusion that can promote growth of biologic agents.

(c) The employer shall remediate damp or wet materials by drying, replacing, removing or cleaning same within 48 hours of discovery and shall continue such remediation until the water intrusion is eliminated.

(d) The employer shall take measures to remove visible microbial contamination in areas such as ductwork, humidifiers, dehumidifiers, condensate drip pans, heat exchange components, other HVAC and building system components, or on building surfaces, such as carpeting and ceiling tiles, when found during regular or emergency maintenance activities or during visual inspection.

§ 12:100-13.5 Air quality during renovation and remodeling

(a) Renovation work and/or new construction that results in the diffusion of dust, stone and other small particles, toxic gases or other harmful substances in quantities hazardous to health shall be safeguarded by means of local ventilation or other protective devices to ensure the safety of employees. Renovation and/or new construction work in occupied buildings shall be isolated and air contaminants, dust and debris shall be confined to the renovation or construction area by use of measures such as, but not limited to, physical barriers, pressure differentials, and/or performing the work during periods of minimal occupancy.

1. Before re-occupancy, work areas shall be cleaned and aired out as necessary.

2. Hazard information shall be used to select products and to determine necessary measures to be taken to comply with (a) above.

(b) Before selection and use of paints, adhesives, sealants, solvents, or installation of insulation, particle board, plywood, floor coverings, carpet, textiles, or other materials in the course of renovation or construction, the employer shall check product labels and Material Safety Data Sheets or seek and obtain information from the manufacturers of those products on whether or not they contain volatile organic compounds such as solvents, formaldehyde or isocyanates that could be emitted during regular use.

(c) The employer shall notify employees at least 24 hours in advance, or promptly in emergency situations, of work to be performed on the building that may introduce air contaminants into their work area.

§ 12:100-13.6 Recordkeeping

a) The maintenance schedule shall be updated to show all maintenance performed on the building systems. The schedule shall include the date that such maintenance was performed and the name of the person or company performing the work.

(b) The records required to be maintained by this section shall be retained for at least three years.

(c) The records required to be maintained by this section shall be available on request to Department representatives for examination and copying.

(d) The records required to be maintained by this section shall be made available to employees and employee representatives for examination and copying upon written request as soon as possible after receipt by the employer of the written request, but no later than 10 working days from the date upon which the employer has received the request.

§ 12:100-13.7 Employer's response to a signed PEOSH complaint

(a) Within 15 working days of receipt by the employer of notification from the Department that a complaint has been filed against the employer under the Public Employees' Occupational Safety and Health Act, *N.J.S.A. 34:6A-25* et seq., the employer shall respond in writing to the Department. The response may include any combination of the following:

1. A statement that the complaint is unfounded;

2. A description of any remedial action already taken;

3. An outline of any remedial measures planned but not yet taken with a timetable for completion; and/or

4. A statement that a study of the problem, with a timetable for completion of the study, has been initiated.

(b) Where remedial measures are planned or a study initiated, they shall be completed as soon as feasible. The employer shall submit, to the Department, a written report describing the remedial measures implemented and/or a copy of a study's report within 15 working days of completion.

(c) Permits for remedial work shall be obtained as required by *N.J.A.C. 5:23* (the New Jersey Uniform Construction Code). All work requiring a permit shall be performed in compliance with *N.J.A.C. 5:23*.

§ 12:100-13.8 Indoor air quality (IAQ) compliance documents

(a) In response to an employee complaint to the Department, the employer shall provide any of the following documents, if available, and requested by the Department:

1. As-built construction documents;

2. HVAC system commissioning reports;

3. HVAC systems testing, adjusting and balancing reports;

4. Operations and maintenance manuals;

5. Water treatment logs; and

6. Operator training materials.

Appendix G

Mold Prevention Guidelines

NO PC
NECE
IF M.
IN
UNITED

BUSINESS REPLY MAIL

FIRST-CLASS PERMIT NO. 206 TRENTON, NJ

POSTAGE WILL BE PAID BY ADDRESSEE

STATE OF NEW JERSEY
DEPT OF HEALTH & SENIOR SERVICES
PEOSH PROGRAM
PO BOX 360
TRENTON, NEW JERSEY 08625-9985

NEW JERSEY DEPARTMENT OF HEALTH AND SENIOR SERVICES

NEW JERSEY DEPARTMENT OF LWD LABOR AND WORKFORCE DEVELOPMENT nj.gov/labor

Heather Howard, J.D.
Commissioner

Jon S. Corzine
Governor

David J. Socolow
Commissioner

Mold in the Workplace Prevention and Control

Public Employees Occupational Safety and Health Program

This Information Bulletin is not a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to provide guidance to New Jersey public employees and to assist building managers, custodians, and others who are responsible for building maintenance, and who respond to mold and moisture situations in buildings.

The New Jersey Public Employees Occupational Safety and Health (PEOSH) Program modified the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (EPA) publications to address New Jersey's public sector needs. (See References, p.12.)

Introduction

Indoor exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. Heightened public awareness has increased concern about mold growth inside buildings. This safety and health information bulletin provides recommendations for the prevention of mold growth and describes measures designed to protect the health of building occupants and workers involved in mold clean-up and prevention. This bulletin is designed primarily for building managers, custodians, and others responsible for building maintenance, but may also be used as a basic reference for those involved in mold remediation. By reading this safety and health information bulletin, individuals with little or no experience with mold remediation may be able to reasonably judge whether mold contamination can be managed in-house or whether outside assistance is required. This document will help those responsible for building maintenance in the evaluation of remediation plans. The document also provides information on mold to all New Jersey public employees.

The advice of a medical professional should always be sought if there are any emerging health issues. The information in these guidelines is intended only as a summary of basic procedures and is not intended, nor should it be used, as a detailed guide to mold remediation. These guidelines are subject to change as more information regarding mold contamination and remediation becomes available.

Mold Basics

Molds are part of the natural environment. Molds are fungi that can be found anywhere - inside or outside- throughout the year. About 1,000 species of mold can be found in the United States, with more than 100,000 known species worldwide.

Outdoors, molds play an important role in nature by breaking down organic matter such as toppled trees, fallen leaves, and dead animals. We would not have food and medicines, like cheese and penicillin, without mold.

Indoors, mold growth should be avoided. Problems may arise when mold starts eating away at materials, affecting the look, smell, and with respect to wood-framed buildings, possibily affecting the structural integrity of the buildings.

Molds can grow on virtually any substance, as long as moisture or water, oxygen, and an organic source are present. Molds reproduce by creating tiny spores (viable seeds) that usually cannot be seen without magnification. Mold spores continually float through the indoor and outdoor air.

Molds are usually not a problem unless mold spores land on a damp spot and begin growing. They digest whatever they land on in order to survive. There are molds that grow on wood, paper, carpet, foods and insulation, while other molds feast on the everyday dust and dirt that gather in the moist regions of a building.

When excessive moisture or water accumulates indoors, mold growth often will occur, particularly if the moisture problem remains uncorrected. While it is impossible to eliminate all molds and mold spores, controlling moisture can control indoor mold growth.

Since mold requires water to grow, it is important to prevent excessive moisture in buildings. Some moisture problems in buildings have been linked to changes in building construction practices since the 1970s, which resulted in tightly sealed buildings with diminished ventilation, contributing to moisture vapor buildup. Other moisture problems may result from roof leaks, landscaping or gutters that direct water into or under a building, or unvented combustion appliances. Delayed or insufficient maintenance may contribute to moisture problems in buildings. Improper maintenance and design of building heating/ventilating/air-conditioning (HVAC) systems, such as insufficient cooling capacity for an air conditioning system, can result in elevated humidity levels in a building.

All molds share the characteristic of being able to grow without sunlight; mold needs only a viable seed (spore), a nutrient source, moisture, and the right temperature to proliferate. This explains why mold infestation is often found in damp, dark, hidden spaces; light and air circulation dry areas out, making them less hospitable for mold.

Molds gradually damage building materials and furnishings. If left unchecked, mold can eventually cause structural damage to a wood framed building, weakening floors and walls as it feeds on moist wooden structrual members. If you suspect that mold has damaged building integrity, consult a structural engineer or other professional with the appropriate expertise.

Health Effects

Scientific research on the relationship between mold exposures and health effects is ongoing. This section provides a brief overview, but does not describe all potential health effects related to mold exposure.

Currently, there are no federal standards or recommendations, (e.g., OSHA, NIOSH, EPA) for airborne concentrations of mold or mold spores. The NJDHSS PEOSH Program, however, enforces an Indoor Quality Standard for public employees in New Jersey that addresses visible microbial contamination in buildings (N.J.A.C. 12:100-13.4 (c)). For further information on the Standard, contact the NJDHSS PEOSH Program (see p. 12).

There are many types of mold. Most typical indoor air exposures to mold do not present a risk of adverse health effects. However, molds can cause adverse effects by producing allergens (substances that can cause allergic reactions). Allergic responses include hay fever-type symptoms such as runny nose and red eyes.

Molds may cause localized skin or mucosal infections but, in general, do not cause systemic infections in humans, except for persons with impaired immunity, AIDS, uncontrolled diabetes, or those taking immune-suppressive drugs.

Molds 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.

Some specific species of mold produce mycotoxins under certain environmental conditions. Potential health effects from mycotoxins are the subject of ongoing scientific research and are beyond the scope of this document.

Potential health concerns are important reasons to prevent mold growth and to remediate existing problem areas.

Cut here, fold in thirds, tape.

PEOSH PROGRAM
READER RESPONSE CARD

Mold in the Workplace

Dear Reader:

Please take a few minutes to help us evaluate this publication. Please check the following:

Check the category that best describes your position:

- ❑ manager
- ❑ safety professional
- ❑ researcher
- ❑ employee
- ❑ occupational health professional
- ❑ health care worker
- ❑ educator
- ❑ other (specify) _____

Check the category that best describes your workplace:

- ❑ academia
- ❑ state government
- ❑ county government
- ❑ municipal government
- ❑ municipal utilities authority
- ❑ labor organization
- ❑ other (specify) _____

Describe how thoroughly you read this publication:

- ❑ cover-to-cover
- ❑ sections of interest only (specify) _____
- ❑ other (specify) _____

How will you use this information (check all that apply):

- ❑ change the work environment
- ❑ change a procedure
- ❑ assist in research
- ❑ change training curriculum
- ❑ provide information
- ❑ copy and distribute
- ❑ in training
- ❑ not used
- ❑ other (specify) _____

Which section did you find most useful?

The least useful and why?

Other occupational health topics on which you would like to see the PEOSH Program develop an information bulletin:

Other comments and suggestions:

Prevention

The Key to Mold Control is Moisture Control!

When water leaks or spills occur indoors - act promptly. Any intial water infiltration should be stopped and cleaned promptly. A prompt response (within 24-48 hours) and thorough clean-up, drying, and/or removal of water-damaged materials will prevent or limit mold growth.

Mold prevention tips include:

- Repair plumbing leaks and leaks in the building structure as soon as possible.
- Look for condensation and wet spots. Fix source(s) of moisture incursion problem(s) as soon as possible.
- Prevent moisture from condensing by increasing surface temperature or reducing the moisture level in the air (humidity). To increase surface temperature, insulate or increase air circulation. To reduce the moisture level in the air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid).
- Keep HVAC drip pans clean, flowing properly, and unobstructed.
- Perform regularly scheduled building/HVAC inspections and maintenance, including filter changes.
- Maintain indoor relative humidity below 70%.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Vent kitchens (cooking areas) and bathrooms according to local code requirements.
- Clean and dry wet or damp spots as soon as possible, but no more than 48 hours after discovery.
- Provide adequate drainage around buildings and sloping the ground away from building foundations. Follow all local building codes.
- Pinpoint areas where leaks have occurred, identifying the causes, and take preventive action to ensure that they do not reoccur.

Questions That May Assist in Determining Whether a Mold Problem Currently Exists

- Are building materials or furnishings visibly moisture damaged?
- Have building materials been wet more than 48 hours?
- Are there existing moisture problems in the building?
- Are building occupants reporting musty or moldy odors?
- Are building occupants reporting health symptoms that they think are related to mold in the indoor environment?
- Has the building been recently remodeled or has the building use changed?
- Has routine maintenance been delayed or the maintenance plan been altered?

Always consider consulting a health professional to address any employee health concerns.

Remediation Plan

Remediation includes both the identification and correction of the conditions that permit mold growth, as well as the steps to safely and effectively remove mold damaged materials.

Before planning the remediation, assess the extent of the mold or moisture problem and the type of damaged materials. If you choose to hire outside assistance to do the clean-up, make sure the contractor has experience with mold remediation. Check references and ask the contractor to follow the recommendations in EPA's publication, "Mold Remediation in Schools and Commercial Buildings," or other guidelines developed by professional or governmental organizations.

The remediation plan should include steps to permanently correct the water or moisture problem. The plan should cover the use of appropriate personal protective equipment (PPE). It also should include steps to carefully contain and remove moldy building materials in a manner that will prevent further contamination. Remediation plans may vary greatly depending on the size and complexity of the job, and may require revision if circumstances change or new facts are discovered.

If you suspect that the HVAC system is contaminated with mold, or if mold is present near the intake to the system, contact the National Air Duct Cleaners Association (NADCA), or consult EPA's guide, "Should You Have the Air Ducts in Your Home Cleaned?" before

taking further action. **Do not run the HVAC system if you know or suspect that it is contaminated with mold, as it could spread contamination throughout the building.** If the water or mold damage was caused by sewage or other contaminated water, consult a professional who has experience cleaning and repairing buildings damaged by contaminated water.

The remediation manager's highest priority must be to protect the health and safety of the building occupants and remediators. Remediators should avoid exposing themselves and others to mold-laden dusts as they conduct their clean-up activities. Caution should be used to prevent mold and mold spores from being dispersed throughout the air where they can be inhaled by building occupants. In some cases, especially those involving large areas of contamination, the remediation plan may include temporary relocation of some or all of the building occupants.

When deciding if relocating occupants is necessary, consideration should be given to the size and type of mold growth, the type and extent of health effects reported by the occupants, the potential health risks that could be associated with the remediation activity, and the amount of disruption this activity is likely to cause. In addition, before deciding to relocate occupants, one should also evaluate the remediator's ability to contain/minimize possible aerosolization of mold spores given their expertise and the physical parameters of the workplace. When possible, remediation activities should be scheduled during off hours when building occupants are less likely to be affected.

Mold Remediation/Clean-up Methods

The purpose of mold remediation is to correct the moisture problem and to remove moldy and contaminated materials to prevent human exposure and further damage to building materials and furnishings. Porous materials that are wet and have mold growing on them may have to be discarded because molds can infiltrate porous substances and grow on or fill in empty spaces or crevices. This mold can be difficult or impossible to remove completely.

As a general rule, simply killing the mold, for example, with a biocide is not enough. The mold must be removed, since the chemicals and proteins, which can cause a reaction in humans, are present even in dead mold.

A variety of clean-up methods are available for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected. Some methods that may be used include the following:

Wet Vacuum

Wet vacuums are vacuum cleaners designed to collect water. They can be used to remove water from floors, carpets, and hard surfaces where water has accumulated. They should not be used to vacuum porous materials, such as gypsum board. Wet vacuums should be used only on wet materials, as spores may be exhausted into the indoor environment if insufficent liquid is present. The tanks, hoses, and attachments of these vacuums should be thoroughly cleaned and dried after use since mold and mold spores may adhere to equipment surfaces.

Damp Wipe

Mold can generally be removed from nonporous sufaces by wiping or scrubbing with water and detergent. It is important to dry these surfaces quickly and thoroughly to discourage further mold growth. Instructions for cleaning surfaces, as listed on product labels, should always be read and followed.

HEPA Vacuum

HEPA (High-Efficiency Particulate Air) vacuums are recommended for final clean-up of remediation areas after materials have been thoroughly dried and contaminated materials removed. HEPA vacuums also are recommended for clean-up of dust that may have settled on surfaces outside the remediation area. Care must be taken to assure that the filter is properly seated in the vacuum so that all the air passes through the filter. When changing the vacuum filter, remediators should wear respirators, appropriate personal protective clothing, gloves, and eye protection to prevent exposure to any

National Air Duct Cleaners Association (NADCA)
Phone: (202) 737-2926
http://www.nadca.com
Duct cleaning information.

National Institute of Building Sciences (NIBS)
Phone: (202) 289-7800
http://www.nibs.org
Information on building regulations, science, and technology.

National Institute for Occupational Safety and Health (NIOSH)
Phone: (800) 35NIOSH (800) 356-4674)
http://www.cdc.gov/niosh
Health and safety information with a workplace orientation.

National Pesticide Information Center (NPIC)
Phone: (800) 858-7378
http://npic.orst.edu/
Information on pesticides/antimicrobial chemicals, including safety and disposal information.

New York Department of Health, Bureau of Environmental and Occupational Disease Epidemiology, Guidelines on Assessment and Remediation of Fungi in Indoor Environments.
Phone: (212) 788-4290
http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html

Occupational Safety and Health Administration (OSHA)
Phone: (800) 321-OSHA (800) 321-6742)
http://www.osha.gov
Information on worker safety and health, compliance assistance, laws and regulations, cooperative programs, state programs, statistics, and newsroom.

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
Phone: (703) 803-2980
http://www.smacna.org
Technical information on topics such as air conditioning and air ducts.

Document prepared by:
New Jersey Department of Health and Senior Services
Public Health Services Branch
Division of Epidemiology, Environmental, and Occupational Health
Occupational Health Service
Public Employees Occupational Safety and Health Program

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Association of Specialists in Cleaning and Restoration (ASCR)
Phone: (800) 272-7012 or (410) 729-3603
http://www.ascr.org/institutes
Carpet and Upholstery Cleaning Institute, Mechanical System Hygiene Institute, National Institute of Disaster Restoration, National Institute Rug Cleaning, Water Loss Institute referrals to professionals.

American Academy of Allergy, Asthma & Immunology (AAAAI)
Phone: (800) 822-2762
http://www.aaaai.org/
Physician referral directory, information on allergies and asthma.

Asthma and Allergy Foundation of America (AAFA)
Phone: (800) 7ASTHMA (800) 727-8462)
http://www.aafa.org
Information on allergies and asthma.

American Lung Association (ALA)
Phone: (800) LUNGUSA (800) 586-4872)
http://www.lungusa.org
Information on allergies and asthma.

Allergy and Asthma Network Mothers of Asthmatics (AANMA)
Phone: (800) 878-4403 or (703) 641-9595)
http://www.aanma.org
Information on allergies and asthma.

National Institute of Allergy and Infectious Diseases (NIAID)
Phone: (301) 496-5717
http://www.niaid.nih.gov
Information on allergies and asthma.

National Jewish Medical and Research Center
Phone: (800) 222-LUNG (800) 222-5864)
http://www.njc.org
Information on allergies and asthma.

Carpet and Rug Institute (CRI)
Phone: (800) 882-8846
http://www.carpet-rug.com
Carpet maintenance, restoration guidelines for water-damaged carpet, other carpet-related issues.

Centers for Disease Control and Prevention (CDC)
Phone: (800) 311-3435
http://www.cdc.gov
Information on health-related topics including asthma, molds in the environment, and occupational health. CDC is recognized as the lead federal agency for protecting the health and safety of the American people at home and abroad. It serves as the national focus for developing and applying disease prevention and control, enviromental health, and health promotion and education activities.

Floods/Flooding
Federal Emergency Management Agency (FEMA)
Phone: (800) 480-2520
http://www.fema.gov/mit
Publications on floods, flood-proofing, etc.

University of Minnesota, Department of Environmental Health and Safety
Phone: (612) 626-5804
http://www.dehs.umn.edu/iaq/flood.html
Management water infiltration into buildings.

Indoor Environmental Remediation Board (IERB)
Phone: (215) 387-4097
http://www.ierb.org
Information on best practices in building remediation.

Institute of Inspection, Cleaning and Restoration Certification (IICRC)
Phone: (360) 693-5675
http://www.iicrc.org
Information on and standards for the inspection, cleaning, and restoration industry.

International Sanitary Supply Association (ISSA)
Phone: (800) 225-4772
http://www.issa.com
Education and training on cleaning and maintenance.

MidAtlantic Environmental Hygiene Resource Center (MEHRC)
Phone: (215) 387-4096
http://www.mehrc.org
Indoor environmental quality training center giving courses in building moisture and biocontamination, and managing and operating facilities for good IAQ. Extensive courses given in IAQ.

captured mold and other contaminants. The filter and contents of the HEPA vacuum must be disposed of in impermeable bags or containers in such a way as to prevent release of the debris.

Disposal of Damaged Materials

Building materials and furnishings contaminated with mold growth that are not salvageable should be placed in sealed impermeable bags or closed containers while in the remediation area. These materials can usually be discarded as ordinary construction waste. It is important to package mold-contaminated materials in this fashion to minimize the dispersion of mold spores. Large items with heavy mold growth should be covered with polyethylene sheeting and sealed with duct tape before being removed from the remediation area. Some jobs may require the use of dust-tight chutes to move large quantities of debris to a dumpster strategically placed outside a window in the remediation area.

Use of Biocides

The use of a biocide, such as chlorine bleach, is not recommended as a routine practice during mold remediation, although there may be instances where professional judgment may indicate its use (for example, when immuno-compromised individuals are present). In most cases, it is not possible or desirable to sterilize an area, as a background level of mold spores comparable to the level in outside air will persist. However, the spores in the ambient air will not cause further problems if the moisture level in the building has been corrected.

Biocides are toxic to animals and humans, as well as to mold. If you choose to use disinfectants or biocides, always ventilate the area, using outside air if possible, and exhaust the air to the outdoors. When using fans, take care not to extend the zone of contamination by distributing mold spores to a previously unaffected area.

Never mix chlorine bleach solution with other cleaning solutions or detergents that contain ammonia because this may produce highly toxic vapors and create a hazard to workers.

Some biocides are considered pesticides, and some states require that only registered pesticide applicators apply these products in schools, commercial buildings, and homes. Make sure anyone applying a biocide is properly licensed where required. For further information, contact the New Jersey Department of Environmental Protection, Pesticide Control Program, at 609-984-6507.

Fungicides are commonly applied to outdoor plants, soil, and grains as a powder or spray. Examples of fungicides include hexachlorobenzene, organomercurials, pentachlorophenol, phthalimides, and dithiocarbamates.

Do not use fungicides developed for outdoor use in any indoor application, as they can be extremely toxic to animals and humans in an enclosed environment.

When you use biocides as a disinfectant or a pesticide, or as a fungicide, you should use appropriate PPE, including respirators. Always, read and follow product label precautions. It is a violation of Federal (EPA) law to use a biocide in any manner inconsistent with its label instructions.

Mold Remediation Guidelines

This section presents remediation guidelines for building materials that have or are likely to have mold growth. The guidelines are designed to protect the health of clean-up personnel and other workers during remediation. These guidelines are based on the size of the area impacted by mold contamination. Please note that these are guidelines; some professionals may prefer other remediation methods, and certain circumstances may require different approaches or variations on the approaches described below. If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

Although the level of personal protection suggested in these guidelines is based on the total surface area contaminated and the potential for remediator or occupant exposure, professional judgment always should play a part in remediation decisions. These remediation guidelines are based on the size of the affected area to make it easier for remediators to select appropriate techniques, not on the basis of research showing there is a specific method appropriate at a certain number of square feet. The guidelines have been designed to help construct a remediation plan. The remediation manager

should rely on professional judgment and experience to adapt the guidelines to particular situations. When in doubt, caution is advised. Consult an experienced mold remediator for more information.

Level I: Small Isolated Areas (10 sq. ft. or less) - e.g., ceiling tiles, small areas on walls.

- Remediation can be conducted by the regular building maintenance staff as long as they are trained 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 PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7).
- Respiratory protection (e.g., N-95 disposable respirator) is recommended. Respirators must be used in accordance with the PEOSH adopted Respiratory Protection Standard (29 CFR 1910.134). Gloves and eye protection should be worn.
- The work area should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for 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).
- Containment of the work area 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 impermeable plastic bag. These materials may be disposed of as ordinary waste.
- The work area and areas used by remediation workers for egress should be cleaned with a damp cloth or mop and a detergent solution.
- All areas should be left dry and visibly free from contamination and debris.

Level II: Mid-Sized Isolated Areas (10-30 sq. ft.) - e.g., individual wallboard panels.

- Remediation can be conducted by the regular building maintenance staff. 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 PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7).
- Respiratory protection (e.g., N-95 disposable respirator) is recommended. Respirators must be used in accordance with the PEOSH adopted Respiratory Protection Standard (29 CFR 1910.134). Gloves and eye protection should be worn.
- The work area should be unoccupied. Removing people from spaces adjacent to the work area is not necessary, but is recommended for 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).
- Surfaces in the work area that could become contaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/debris and prevent further contamination.
- 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 impermeable plastic bag. These materials may be disposed of as ordinary waste.
- The work area and areas used by remediation workers for egress should be HEPA-vacuumed and cleaned with a damp cloth or mop and a detergent solution.
- All areas should be left dry and visibly free from contamination and debris.

Level III: Large Isolated Areas (30-100 sq. ft.) - e.g., several wallboard panels.

Industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation should be consulted prior to remediation activities to provide oversight for the project.
The following procedures may be implemented depending upon the severity of the contamination:

- It is recommended that personnel be trained in the handling of hazardous materials and equipped with respiratory protection (e.g., N-95 disposable

Mold Resources List

Contact the PEOSH Consultation Project at 609-984-1863 for free consultation service. The Consultation Program can help the employer evaluate and prevent hazardous conditions in the workplace that can cause injuries and illnesses, including mold problems.

The following list of resources includes information developed and maintained by public and private organizations. However, PEOSH does not control this information and cannot guarantee the accuracy, relevance, timeliness, or completeness of this outside information. Further, the inclusion of these resources is not intended to endorse any view expressed, or products or services offered, by the author of the reference or the organization operating the service identified by the reference.

Questions and Answers on Stachybotrys Chartorum and Other Molds
http://www.cdc.gov/nceh/airpollution/mold/stachy.htm

An Office Building Occupant's Guide to IAQ
http://www.epa.gov/iaq/pubs/occupgd.html

Biological Contaminants
http://www.epa.gov/iaq/biologic.html

Building Air Quality Action Plan (For Commercial Buildings) *http://www.epa.gov/iaq/largebldgs/actionpl.html*

Floods/Flooding
http://www.epa.gov/iaq/pubs/flood.html

Indoor Air Quality (IAQ) Home Page
http://www.epa.gov/iaq

IAQ in Large Buildings/Commercial Buildings
http://www.epa.gov/iaq/largebldgs/

IAQ in Schools
http://www.epa.gov/iaq/schoolsl

Mold Resources
http://www.epa.gov/iaq/molds/moldresources.html

Mold Remediation in Schools and Commercial Buildings
http://www.epa.gov/iaq/molds/mold_remediation.html

U.S. EPA IAQ Information Clearinghouse (IAQINFO)
Phone: (800) 438-4318 or (703) 356-4020
Fax: (703) 356-5386
E-mail: iaqinfo@aol.com
Indoor air related documents, answers to Indoor Air Quality (IAQ) questions, maintains listing of State IAQ contracts, and regional EPA Contacts.

Air Conditioning Contractors of America (ACCA)
Phone: (703) 575-4477
http://www.acca.org/index.html
Information on indoor comfort products and services.

American College of Occupational and Environmental Medicine (ACOEM)
Phone: (847) 818-1800
http://www.acoemprivatepractice.com/
Referrals to physicians who have experience with environmental exposures.

American Conference of Governmental Industrial Hygienists, Inc. (ACGIH)
Phone: (513) 742-2020
http://www.acgih.org
Occupational and environmental health and safety information.

American Industrial Hygiene Association (AIHA)
Phone: (703) 849-8888
http://www.aiha.org
Information on industrial hygiene and indoor air quality issues including mold hazards and legal issues.

American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)
Phone: (800) 527-4723
http://www.ashrae.org
Information on engineering issues and indoor air quality.

Association of Occupational and Environmental Clinics (AOEC)
Phone: (202) 347-4976
http://www.aoec.org
Referrals to clinics with physicians, who have experience with environmental exposures, include exposure to mold; maintains a database of occupational and environmental cases.

respirator). Respirators must be used in accordance with the PEOSH adopted Respiratory Protection Standard (29 CFR 1910.134). Gloves and eye protection should be worn.

- Surfaces in the work area and areas directly adjacent that could become decontaminated should be covered with a secured plastic sheet(s) before remediation to contain dust/debris and prevent further contamination.
- Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting.
- The work area and areas directly adjacent should be unoccupied. Removing people from spaces near the work area is recommended for infants, persons having undergone recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases, (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- Dust suppression methods, such as misting (**not soaking**) surfaces prior to mediation, are recommended.
- Contaminated materials that cannot be cleaned should be removed from the building in sealed impermeable plastic bags. These materials may be disposed of as ordinary waste.
- The work area and surrounding areas should be HEPA-vacuumed and cleaned with a damp cloth or mop and a detergent solution.
- All areas should be left dry and visibly free from contamination and debris.

Note: If abatement procedures are expected to generate a lot of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of the mold is heavy (blanket coverage as opposed to patchy), it is recommended that the remediation procedures for Level IV be followed.

Level IV: Extensive Contamination (greater than 100 contiguous sq. ft. in an area).

Industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation should be consulted prior to remediation activities to provide oversight for the project.

The following procedures may be implemented depending upon the severity of the contamination:

- Personnel trained in the handling of hazardous materials and equipped with
  - full-face piece respirators with HEPA cartridges;
  - disposable protective clothing covering the entire body including both head and shoes; and
  - gloves.
- Containment of the affected area
  - complete isolation of the work area from occupied spaces using plastic sheeting sealed with duct tape (including ventilation ducts/grills, fixtures, and other openings);
  - the use of an exhaust fan with a HEPA filter to generate negative pressurization; and
  - airlocks and a decontamination room.
- If containment practices effectively prevent mold from migrating from affected areas, it may not be necessary to remove people from the surrounding work areas. However, removal is still recommended for infants, persons having undergone recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases, (e.g., asthma, hypersensitivity pneumonitis, and severe allergies).
- Contaminated materials that cannot be cleaned should be removed from the building in sealed impermeable plastic bags. The outside of the bags should be cleaned with a damp cloth and a detergent solution or HEPA-vacuumed in the decontamination chamber prior to their transport to uncontaminated areas of the building. These materials may be disposed of as ordinary waste.
- The contained area and decontamination room should be HEPA-vacuumed and cleaned with a damp cloth or mopped with a detergent solution and be visibly clean prior to the removal of isolation barriers.

Personal Protective Equipment (PPE)

Any remediation work that disturbs mold and causes mold spores to become airborne increases the degree of respiratory exposure. Actions that tend to disperse mold include: breaking apart moldy porous materials such as wallboard; destructive invasive procedures to examine or remediate mold growth in a wall cavity; removal of contaminated wallpaper by stripping or peeling; using fans to dry items or ventilate areas.

The primary function of personal protective equipment is to prevent the inhalation and ingestion of mold and mold spores and to avoid mold contact with the skin or eyes. The following sections discuss the various types of PPE that may be used during remediation activities.

Skin and Eye Protection

Gloves protect the skin from contact with mold, as well as from potentially irritating cleaning solutions. Long gloves that extend to the middle of the forearm are recommended. The glove material should be selected based on the type of substance/chemical being handled. If you are using a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC. If you are using a mild detergent or plain water, ordinary household rubber gloves may be used.

To protect your eyes, use properly fitted goggles or a full face piece respirator. Goggles must be designed to prevent the entry of dust and small particles. Safety glasses or goggles with open vent-holes are not appropriate in mold remediation.

Respiratory Protection

Respirators protect clean-up workers from inhaling airborne mold, contaminated dust, and other particulates that are released during the remediation process. Either a half mask or full-face piece air-purifying respirator can be used. A full-face piece respirator provides both respiratory and eye protection. Please refer to the discussion of the different levels of remediation to ascertain the type of respiratory protection recommended. Respirators used to provide protection from mold and mold spores must be certified by the National Institute for Occupational Safety and Health (NIOSH). More protective respirators may have to be selected and used if toxic contaminants such as asbestos or lead are encountered during remediation.

As specified by PEOSH in 29 CFR 1910.134, individuals who use respirators must be properly trained, have medical clearance, and be properly fit-tested before they begin using a respirator. In addition, use of respirators requires the employer to develop and implement a written respiratory protection program, with worksite-specific procedures and elements.

Protective Clothing

While conducting building inspections and remediation work, individuals may encounter hazardous biological agents as well as chemical and physical hazards. Consequently, appropriate personal protective clothing (i.e., reusable or disposable) is recommended to minimize cross-contamination between work areas and clean areas, to prevent the transfer and spread of mold and other contaminants to street clothing, and to eliminate skin contact with mold and potential chemical exposures.

Disposable PPE should be discarded after it is used. They should be placed into impermeable bags, and usually can be discarded as ordinary construction waste.

Sampling for Mold

Is it necessary to sample for mold? **In most cases, if visible mold growth is present, sampling is unnecessary**. Air sampling for mold may not be part of a routine assessment because decisions about appropriate remediation strategies often can be made on the basis of visual inspection.

Your first step should be to inspect for any evidence of water damage and visible mold growth. Testing for mold is expensive, and there should be a clear reason for doing so. In many cases, it is not economically practical or useful to test for mold growth on surfaces or for airborne spores in the building. In addition, there are no standards for "acceptable" levels of mold in buildings, and the lack of a definitive correlation between exposure levels and health effects makes interpreting the data difficult, if not impossible.

Testing is usually done to compare the levels and types of mold spores found inside the building with those found outside of the building or for comparison with another location in the building. In addition, air sampling may provide tangible evidence supporting a hypothesis that investigators have formulated. For example, air sampling may show a higher concentration of the same species of mold when the HVAC is operating than when it has been turned off. This finding may convince the investigators that the mold is growing within, and being disseminated by the HVAC system. Conversely, negative results may persuade investigators to abandon this hypothesis and to consider other sources of mold growth or dissemination.

References

New Jersey Department of Health and Senior Services
Public Employees Occupational Safety
and Health Program
PO Box 360, 7th Floor
Trenton, NJ 08625-0360
e-mail: peosh@doh.state.nj.us
http://www.nj.gov/health/eoh/peoshweb

New Jersey Department of Labor and
Workforce Development
Division of Public Safety and Occupational
Safety and Health
PO Box 386
Trenton, NJ 08625-0386
(609) 292-7036
Fax: (609) 292-3749
http://www.nj.gov/labor/lsse/lspeosh.html

New Jersey Department of Health and Senior Services
Consumer and Environmental Health Services
Indoor Environments Program
PO Box 369
Trenton, NJ 08625
Fax: (609) 588-7618
http://www.nj.gov/health/eoh/tsrp/index.htm

U.S. Department of Labor, Occupational Safety and Health Administration. *A Brief Guide to Mold in the Workplace*. *http://www.osha.gov/dts/shib/shib101003.html*

U.S. Environmental Protection Agency, Office of Air and Radiation, Indoor Environments Division 2001. *Mold Remediation in Schools and Commercial Buildings.* EPA 402-K-01-001, *http://www.epa.gov/iaq/molds/graphics/moldremediation.pdf*

American Conference of Governmental Industrial Hygienists 1999.
Bioaerosols Assessment and Control
http://www.acgih.org
National Apartment Association,
http://www.naahq.org

National Institute for Occupational Safety and Health (NIOSH), *http://www.cdc.gov/niosh*

National Multi-Housing Council,
http://www.nmhc.org

The Building Owners and Managers Association International (BOMA), *http://www.boma.org*

New York City Department of Health & Mental Hygiene Bureau of Environmental & Occupational Disease Epidemiology 2002. *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*.
http://www.nyc.gov/html/doh/html/epi/moldrpt1.html

If you know you have a mold problem, it is more important to spend time and resources removing the mold and solving the moisture problem that causes the moldy conditions than to undertake extensive testing for the type and quantity of mold.

If you are in doubt about sampling, consult an industrial hygienist or other environmental health or safety professional with experience in microbial investigations to help you decide if sampling for mold is necessary or useful, and to identify persons who can conduct any necessary sampling. Due to the wide difference in individual susceptibility to mold contamination, sampling results may have limited application. However, sampling results can be used as a guide to determine the extent of an infestation and the effectiveness of the clean-up. Their interpretation is best left to the industrial hygienist or other environmental health or safety professional.

Sampling for mold should be conducted by professionals with specific experience in designing mold-sampling protocols, sampling methods for microbial contaminants, and interpretation of results. For additional information on air sampling, refer to the American Conference of Governmental Industrial Hygienists' document, "Bioaerosols: Assessment and Control." In addition, sampling and analysis should follow any other methods recommended by either OSHA, NIOSH, EPA, the American Industrial Hygiene Association, or other recognized professional guidelines. Types of samples can include: air samples, surface samples, bulk samples, and water samples from condensate drain pans or cooling towers.

Microscopic identification of the spores/colonies requires considerable expertise. These services are not routinely available from commercial laboratories. Documented quality control in the laboratories used for analysis of the bulk, surface, and other samples is necessary. The American Industrial Hygiene Association offers accreditation to microbial laboratories (Environmental Microbiology Laboratory Accreditation Program (EMLAP)). Accredited laboratories must participate in quarterly proficiency testing (Environmental Microbiology Proficiency Analytical Testing Program (EMPAT)).

Remediation Equipment

There are various types of equipment useful in mold assessment and remediation. Some of the more common items include:

Moisture Meters

Moisture meters measure/monitor moisture levels in building materials, and may be helpful for measuring the moisture content in a variety of building materials following water damage. They also can be used to monitor the progress of drying damaged materials. These direct-reading devices have a thin probe that is inserted into the material to be tested or pressed directly against the surface of the material. Moisture meters can be used on materials such as carpet, wallboard, wood, brick, and concrete.

Humidity Gauges or Meters

Humidity meters can be used to monitor indoor humidity. Inexpensive (less than $50) models that monitor both temperature and humidity are available.

Humidistat

A humidistat is a control device that can be connected to an HVAC system and adjusted so that if the humidity level rises above a set point, the HVAC system will automatically turn on and reduce the humidity below the established point.

Boroscope

A boroscope is a hand-held tool that allows users to see potential mold problems inside walls, ceiling plenums, crawl spaces, and other tight areas. It consists of a video camera on the end of a flexible "snake." No major drilling or cutting of dry wall is required.

HVAC System Filter

High-quality filters must be used in a HVAC system during remediation because conventional HVAC filters are typically not effective in filtering particles the size of mold spores. Consult an engineer for

the appropriate filter efficiency for your specific HVAC system, and consider upgrading your filters if necessary. A filter with a minimum efficiency of 50 to 60% or a rating of MERV 8, as determined by Test Standard 52.2 of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, may be appropriate.

Remember to change filters as appropriate, especially following any remediation activities. Remove filters in a manner that minimizes the reentry of mold and other toxic substances into the workplace. Under certain circumstances, it may be necessary to wear appropriate PPE while performing this task.

How Do You Know When You Have Finished Remediation/Clean-up?

- You must have identified and completely corrected the source of the water or moisture problem.
- Mold removal should be complete. Visible mold, mold-damaged materials, and moldy odors should no longer be present.
- Sampling, if conducted, should show that the level and types of mold and mold spores inside the building are similar to those found outside.
- You should revisit the site(s) after remediation, and it should show no signs of moldy or musty odors, water damage, or mold growth and employee complaints should be diminishing.

Conclusion

The primary response to mold contamination in buildings is to correct water or moisture infiltration; then promptly remove contaminated materials and perform structural repairs.

In all situations, the underlying cause of water accumulation must be rectified or the mold growth may reoccur.

Emphasis should be placed on preventing contamination through proper building and HVAC system maintenance and prompt repair of water damaged areas.

Effective communication with building occupants is an essential component of all large-scale remediation efforts. The building owner, management, and/or employer should notify occupants in the affected area(s) of the presence of mold. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals with persistent health problems that appear to be related to mold exposure should see their physicians for a referral to practitioners who are trained in occupational/environmental medicine or related specialists and are knowledgeable about these types of exposures.

A checklist on mold remediation can be found in Appendix A on page 11.

APPENDIX A
CHECKLIST FOR MOLD REMEDIATION*

Investigate and evaluate moisture and mold problems

- ❑ Assess size of moldy area (square feet)
- ❑ Consider the possibility of hidden mold
- ❑ Clean-up small mold problems and fix moisture problems before they become large problems
- ❑ Select remediation manager for medium or large-size mold problem
- ❑ Investigate areas associated with occupant complaints
- ❑ Identify source(s) or cause of water or moisture problem(s)
- ❑ Note type of water-damaged materials (wallboard, carpet, etc.)
- ❑ Check inside air ducts and air handling unit
- ❑ Throughout process, consult qualified professional if necessary or desired

Communicate with building occupants at all stages of process, as appropriate

- ❑ Designate contact person for questions and comments about medium or large-scale remediation as needed

Plan remediation

- ❑ Adapt or modify remediation guidelines to fit your situation; use professional judgment
- ❑ Plan to dry wet, non-moldy materials within 48 hours to prevent mold growth
- ❑ Select clean-up methods for moldy items
- ❑ Select Personal Protective Equipment - protect remediators
- ❑ Select containment equipment - protect building occupants
- ❑ Select remediation personnel who have the experience and training needed to implement the remediation plan and use Personal Protective Equipment and containment as appropriate

Remediate moisture and mold problems

- ❑ Fix moisture problem, implement repair plan and/or maintenance plan
- ❑ Dry wet, non-moldy materials within 48 hours to prevent mold growth
- ❑ Clean and dry moldy materials
- ❑ Discard moldy porous items that can't be cleaned

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* For details, see EPA's *Mold Remediation in Schools and Commerical Buildings*. Please note that this checklist was designed to highlight key parts of a school or commerical building remediation and does not list all potential steps or problems.