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Indoor Air Quality Investigation

LeRoy Central School District
Middle/High School Building

December 2011
Mold Sampling Results

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Background

This mold investigation was conducted on December 29, 2011 in response to a request from Ms. Kim Cox, District Superintendent, LeRoy Central School. This request was related to recent health issues being experienced by several students in the district. Although the NYS Department of Health has performed prior health related testing of the students and had ruled out any environmental factors aside from carbon monoxide, the school district requested this expanded sampling in order to be proactive in ensuring a safe environment for staff and students. This investigation was performed as a means to determine the baseline state of the MS/HS building and to determine the presence or absence of any potential indoor environmental contaminants.

Prior to the investigation, district records were checked to determine any building related conditions or historical issues that may lend themselves to possible air or other environmental complaints. No history of building water damage or site contamination was found and the building air handling units were determined to be in good working order based on past maintenance history.

Further visual inspection of the building prior to sampling, indicated a clean, well lit building with no signs of roof leaks or other water infiltration. Ventilation is provided to the district classrooms through individual unit ventilators and to the hallways through several air-handling units located on the roof of the building. According to District Superintendent of Buildings/Grounds air filters in the units are changed on a preventative maintenance schedule and at the time of the investigation the air-handling units appeared to be operational and filters clean.

This report provides only the results of the mold samples, to be considered in conjunction with our prior report outlining Volatile Organic, carbon dioxide, carbon monoxide, and formaldehyde and other potential contaminants. The mold samples were taken utilizing an air sampling pump calibrated with a bubble rotometer to 15 lpm immediately prior to use and a non-culturable (Air-O-Cell brand) media cassette. These samples were subsequently forwarded to an EMLab Certified analytical lab for microscopic analysis.

Sampling Areas

The areas sampled for mold spores included: the Room 340, Room 359, the Auditorium (added to our initial list), and an outdoor baseline sample for comparison. These rooms all have carpeting on the floor, plaster walls, and acoustical tile drop ceilings. These areas were chosen due to their distribution throughout the building and due to several being commonly used areas by all students.

The inspection involved a walk-through of the areas to visually look for potential sources of biological agents (mold) and evidence of current or past water damage or excessive moisture. Evidence that active mold (fungal) growth is occurring is most often sensory (visual identification or odor perception) and may be confirmed by source sampling.

There was no visual mold or water damage observed. There were no active water leaks at the time of the investigation. There was no standing water observed inside or outside the perimeter of the building. There was no condensate or moisture observed on indoor surfaces or walls. There was no visual indication of possible mold growth in any of the areas inspected.

Destructive methods were not used to investigate for mold. Generally, destructive methods are only used when conditions indicate that mold may be present in an inaccessible area. There was no visual indication of any mold presence in the areas investigated.

Mold Spore Air Sampling

Background Information on Mold

From the document *"Mold Remediation in Schools and Commercial Buildings", United States Environmental Protection Agency, Office of Air and Radiation, Indoor Environments Division (6609-J) EPA 402-K-01-001, March 2001:*

Molds can be found almost anywhere; they can grow on virtually any organic substance, as long as moisture and oxygen are present. There are molds that can grow on wood, paper, carpet, foods, and insulation. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or unaddressed. It is impossible to eliminate all mold and mold spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture.

Molds reproduce by making spores that usually cannot be seen without magnification. Mold spores waft through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they are growing on in order to survive. Molds gradually destroy the things they grow on.

Many types of molds exist. All molds have the potential to cause health effects. Molds can produce allergens that can trigger allergic reactions or even asthma attacks in people allergic to mold. Others are known to produce potent toxins and/or irritants. Potential health concerns are an important reason to prevent mold growth and to remediate/clean up any existing indoor mold growth.

Since mold requires water to grow, it is important to prevent moisture problems in buildings. Moisture problems can have many causes, including uncontrolled humidity. Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s, and 90s. Some of these changes have resulted in buildings that are tightly sealed, but may lack adequate ventilation, potentially leading to moisture buildup. Building materials, such as drywall, may not allow moisture to escape easily. Moisture problems may include roof leaks, landscaping or gutters that direct water into or under the building, and unvented combustion appliances.

Sampling Method

Sampling for airborne mold spores was conducted in the building on December 29, 2011 using Air-O-Cell™ Air Sampling cassettes. Three air samples were taken; 1 each in the Computer Lab, Biology Classroom, and an outdoor baseline sample.

Air-O-Cell™ Air Sampling cassettes are a sampling device designed for the rapid collection and analysis of a wide range of airborne aerosols. These include fungal spores, pollen, insect parts, skin cell fragments, fibers, and inorganic particulates. Air enters the cassette, particles suspended in the air become impacted on the sampling substrate, and the air leaves through the exit orifice. Air was sampled at a flow rate of 15 liters per minute (lpm) for 5 minutes in the indoor samples and for 10 minutes in the outdoor sample resulting in 75 and 150 total liters of air sampled, respectively. Samples are then analyzed by microscopic examination at an EMLAP certified lab and the results are reported in fungal spores per cubic meter of air (spores/m^3).

Sampling Interpretation

At this time there are no U.S. Environmental Protection Agency, OSHA or other Federal standards or threshold limits for mold or mold spores in an indoor environment. This is due to

naturally diverse and variable exposure, the absence of measurement and health response data, and differing immunogenic susceptibilities of individuals. Relationships between health effects and environmental microorganisms must be determined through the combined contributions of medical, epidemiological, and environmental evaluations.[1]

Air sampling for mold and mold spores is interpreted by:

- Comparing indoor airborne concentrations to outdoor mold spore concentrations. Total indoor airborne concentration levels higher than levels outside the building would indicate the possible presence of a fungal reservoir and amplification inside the building.
- Comparing species of mold inside and outside the building. Mold spores found inside and not outside the building could indicate a possible fungal reservoir and amplification inside the building.
- The presence of high airborne concentrations of indicator species, such as *stachbotrys*, *aspergillus*, or *penicillium*, which can indicate an excessive moisture problem or a possible health hazard that should not typically be present in healthy indoor environments.

Sampling Results

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Test Report: Air-O - Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (EMSL Method 05-TP-003)

Lab Sample Number:	141200225-0001			141200225-0002			141200225-0003		
Client Sample ID:	17714417			17713327			17713336		
Volume (L):	75			150			75		
Sample Location:	rm #340			outdoor base			rm #359		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	-	-	-	1	21	100	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	-	None Detected	-	1	21	100	-	None Detected	-
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	21	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	7*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

[1] ACGIH [1999]. Bioaerosols: Assessment and Control. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.

Test Report: Air-O - Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (EMSL Method 05-TP-003)

Lab Sample Number:	141200225-0004				
Client Sample ID:	17717781				
Volume (L):	75				
Sample Location:	aud, area				
Spore Types	**Raw Count**	**Count/m³**	**% of Total**		
Alternaria	-	-	-		
Ascospores	-	-	-		
Aspergillus/Penicillium	-	-	-		
Basidiospores	-	-	-		
Bipolaris++	-	-	-		
Chaetomium	-	-	-		
Cladosporium	-	-	-		
Curvularia	-	-	-		
Epicoccum	-	-	-		
Fusarium	-	-	-		
Ganoderma	-	-	-		
Myxomycetes++	-	-	-		
Pithomyces	-	-	-		
Rust	-	-	-		
Scopulariopsis	-	-	-		
Stachybotrys	-	-	-		
Torula	-	-	-		
Ulocladium	-	-	-		
Unidentifiable Spores	-	-	-		
Zygomycetes	-	-	-		
Total Fungi	-	**None Detected**	-		
Hyphal Fragment	-	-	-		
Insect Fragment	-	-	-		
Pollen	-	-	-		
Analyt. Sensitivity 600x	-	42	-		
Analyt. Sensitivity 300x	-	13*	-		
Skin Fragments (1-4)	-	1	-		
Fibrous Particulate (1-4)	-	1	-		
Background (1-5)	-	1	-		

Summary

- There was no visual evidence of fungal/mold growth or water damaged building materials observed in any of the building areas investigated. There were also no odors detected that would normally be attributed to mold. Further, there was no evidence of standing water in or around the areas investigated and the maintenance staff indicated that there was no history of roof or other water damage in the building.

- At the time of the investigation and in the areas sampled, no indoor levels of mold spores were detected. Outdoor levels were minimal and below any generally accepted levels that might cause health effects.

Recommendations

1) Although no detectable levels of molds were detected in the building at the times sampled, it would be prudent to perform future samples in order to rule out variations in air movement and room conditions. I would recommend that more samples be performed over the next few months.
2) All air handling units should be maintained in good working order and filters changed on a regular schedule.
3) All future complaints of any building related odors, conditions, or suspected health symptoms should be immediately reported to the SOBG for action and logged for future reference.

If you have any questions or need additional information, please feel free to contact our office at (585) 346-4108.

Respectfully Submitted,

Donald Case, Supervisor, Management Services
Genesee Valley Educational Partnership

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