



Monomoy Regional Middle School Air Quality Testing Report

Reason for Testing: Staff Concerns/ Window Leak

Date of Testing: November 20, 2024

Description: Inspection of library – visual and surface samples

Conducted By: Marina Brock, Soteria, EHS

Summary of Findings: Elevated moisture on flooring near previous water intrusion, water-damaged books, some aspergillus detected but levels and state-suggested remediation of moisture had been effective.

District Response: Disposal of damaged books.

Monitoring of impacted areas to ensure they dry out and no mold is detected.

Routine inspections for mold.

Cleaning, clearing of storage areas to minimize risk of mold.

To: Rick Travers, Facilities Director, Monomoy Regional School District
From: Marina Brock, PhD, Soteria EHS
Re: Water Intrusion Assessment – Monomoy Middle School Library
Date of Inspection: November 20, 2024
Date of Report: November 29, 2024

Background

At your request, I conducted an inspection of the Monomoy Middle School library due to concerns about water intrusion through the forward-facing windows during a previous severe storm. The objective of the inspection was to evaluate residual contamination, potential microbial growth, and structural concerns following the storm and subsequent cleanup efforts.

Inspection Overview

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During the inspection, the affected area appeared to have been thoroughly cleaned, dried, and remediated. Conditions at the time of inspection included cold weather and low humidity levels, with no detectable musty odors, indicating an absence of active microbial growth in the immediate environment.

Using a moisture meter, we detected slight but varying levels of moisture in the carpet and wallboard within 3 inches from the front wall. Areas further than 3 inches were completely dry, suggesting that residual moisture is localized and may be diminishing over time.

The school librarian had collected numerous library books that had been affected and wetted during the storm. These books were secured in plastic bags and exhibited varying degrees of wetness and mold growth, ranging from minor to significant. A sample was collected from one of the visibly mold-affected books for further analysis. Most of these books will need to be assessed individually and discarded at the discretion of the library director and school administration to prevent potential contamination.

In the library, shelving in the damaged area had been removed, leaving the space open and dry. To further evaluate potential microbial contamination, I collected tape samples from the following locations:

- Wooden sills and shelves from under the picture windows (Samples 1, 2, and 3).
- Carpet surface near the front wall picture windows (Sample 4).
- Mold-affected book from the collected items (Sample 5).

Key Findings

Samples Collected

- Samples 1, 2, and 3: Wooden sills and shelving.
- Sample 4: Carpet surface under the front wall picture windows.
- Sample 5: Mold sample from one of the affected library books.

Analysis Results

1. **Wooden Surfaces (Samples 1, 2, and 3)**
 - **Composition:** The samples contained fine wood grain striations and fragments of surface wood finish, likely varnish (or similar) residues.
 - **Microbial Presence:** Trace amounts of *Penicillium*/*Aspergillus* spore fragments were identified. No flowering units or hyphae were detected, suggesting prior cleaning and drying efforts were effective.
 - **Additional Observations:**
 - Minimal trace organic fibers, such as human or animal hair and textile fibers (e.g., cotton, wool, polyester).
 - Plant-based fibers, likely originating from paper or wood materials.
2. **Carpet Surface (Sample 4)**
 - **Microbial Presence:** Extremely low levels of *Penicillium*/*Aspergillus* spores were present. No active fungal structures were observed.
 - **Inorganic Fibers:** Minor traces of mineral dust, potentially from construction materials or silica-based debris, were present alongside carpet fibers.
3. **Mold-Affected Book (Sample 5)**
 - **Microbial Presence:** Mold growth on the book consisted primarily of *Penicillium* and *Aspergillus* species. The mold presence was consistent with conditions of prolonged dampness and inadequate airflow.

Conclusions

The inspection and sample analysis indicate that the library's affected area has been effectively remediated, with no active microbial growth on wooden surfaces or the carpet. However, mold detected on the library books demonstrates the impact of water intrusion and highlights the need for ongoing vigilance.

The absence of active fungal structures on surfaces within the front of the library suggests that the cleaning and drying measures were largely successful and assisted by the changing weather, colder temperatures and lower relative humidity. Minimal environmental particulates, including organic and inorganic fibers, are within expected background levels.

Recommendations

1. Preventative Maintenance:
 - Repair, inspect, and maintain window seals to prevent further water intrusion. - Already underway and work progressing
 - Consider monitoring humidity levels (through all seasons) in the library to discourage microbial growth.
2. Management of Mold-Affected Materials:
 - Safely assess and dispose of all visibly mold-affected books to eliminate potential sources of contamination – Already underway.
 - Consider evaluating storage areas for conditions conducive to mold growth, especially for paper-based materials. Already underway
3. Regular Monitoring:
 - Perform routine inspections for signs of moisture, especially following storms or high-humidity events.

Conclusions

The inspection and sample analysis indicate no significant microbial contamination beyond trace levels of spores, which are consistent with environmental exposure and previous water intrusion. The absence of active fungal growth (flowering units or hyphae) supports the effectiveness of prior remediation efforts.

The materials examined (wood and carpet) exhibit typical background organic and inorganic particulates, such as textile and plant fibers, with minimal inorganic debris. No immediate health risks or environmental concerns were identified in the assessed area.

Part 2 Additional Observations: The Rear of the Library

During the inspection, the library director brought attention to an area at the back of the library, located away from any exterior walls. She noted that the carpet in this area exhibited periodic light water staining that appeared and dried over time.

Upon closer examination, the wooden toe kick base board, the foundation of the book shelving units displayed clear evidence of long-term repeated wetting and drying cycles. The moisture meter was reading variable moisture/water saturation present in both the base board and proximal carpet moving from higher to lower the further we moved from the back wall. Within 6 feet of the back wall, the carpet and wood were completely dry.

Observations included:

- Finish Degradation: The varnish coating was worn or entirely absent in several sections. The wood base board had variable striations and shades of contrast from carpet contact

upwards, indicating repeating episodes of water wicking and drying through the wood grain over time.

- **Chronic Water Damage:** Visible older water staining and discoloration suggested prolonged exposure to episodes of wetting and drying over time.
- **Dark Pigmentation:** Dark spotting was present on the surface and within the deeper wood grains, indicative of chronic moisture penetration and possible microbial activity.

Inspection of Mechanical (HVAC) Room

To identify the source of the periodic water intrusion, we inspected the adjacent mechanical (HVAC) room located behind the affected library wall. This inspection revealed:

- **Chronic Moisture Issues:** Evidence of ongoing and likely seasonal water damage, including visible condensate accumulation and staining, on floors and sheetrock wallboard.
- **Water Release:** Signs of water discharge from the HVAC system that likely impacted the shared wall and contributed to moisture seepage into the library's back wall and carpeted area by the bookshelf.

These findings suggest a systemic issue related to the HVAC system, which requires attention to mitigate further damage to the library's interior and prevent potential microbial growth. Rick Travers was immediately on this issue while we were present and during the assessment, already taking action.

Additional Findings – Tape Sampling and Microscopic Identification

During the inspection, the facilities staff disassembled the bottom section of the bookshelf, revealing an enclosed area totally encased beneath the bookshelf and adjacent to the back wall. Within this concealed space, active mold growth was observed on the interior side wooden toe kick. The mold appeared to have been effectively sealed and localized within this area, minimizing its potential spread to the surrounding environment.

To further evaluate the situation, I collected tape samples from the affected area to identify the species of mold present:

- **Samples 6, 7, and 8:** Collected from the surface of the interior wooden toe kick within the bottom section of the bookshelf.

Analysis Results

Samples 6, 7, and 8

The mold identified in the enclosed area under the bookshelf was determined to be *Ceratocystis* or *Ophiostoma*, commonly referred to as "bluestain" mold often found on sapwood like the bookshelf wood. This type of mold is typically harmless in indoor environments and is often associated with these types of wood materials. Its growth aligns with the conditions present in

the enclosed, unventilated space under the bookshelf, where moisture and organic materials created a conducive environment for its development.

Characteristics of Bluestain Mold

- **Appearance:** Bluestain mold typically presents as dark blue, gray, or black discoloration on wood surfaces, and it is a surface-level mold that does not compromise the structural integrity of the wood.
- **Health Risks:** Unlike other mold types, *Ceratocystis* and *Ophiostoma* do not produce mycotoxins that are harmful to humans. They are not known to cause significant allergic reactions or respiratory issues in most individuals.
- **Growth Conditions:** These molds thrive in environments with high humidity or prolonged dampness, particularly on wood surfaces that are not sealed or properly ventilated.

Peer Confirmation

To ensure accuracy, I consulted with several colleagues who reviewed the tape samples. They concurred with my preliminary identification of the mold as *Ceratocystis* or *Ophiostoma*. Their confirmation supports the assessment that the mold in question poses minimal risk in its current state but highlights the importance of addressing the moisture source to prevent further mold development.

Implications and Recommendations

While the identified mold does not present a health hazard, its presence indicates conditions favorable for microbial growth. Proactive steps should be taken to eliminate these conditions to prevent the growth of more problematic mold species in the future – Rick and facilities began action on the day of the assessment.

Actionable Steps

1. **Targeted Cleaning and Remediation:**
 - Remove and thoroughly clean the affected wooden toe kick and surrounding materials – Already initiated
 - Consider replacing the wooden components if cleaning does not fully eliminate the mold or discoloration Already initiated
2. **Moisture Source Mitigation:**
 - Investigate and address the moisture source that allowed mold growth. Given the findings in the adjacent HVAC room, ensure proper condensate drainage and humidity control – In progress already initiated
3. **Ventilation Improvements:**
 - Enhance airflow in the area beneath the bookshelf to discourage moisture buildup and inhibit future mold growth – If feasible and allowable with current bookshelf design.

4. Monitoring:

- Conduct periodic inspections of the area to ensure that no further microbial growth occurs – Update facility inspection plan

Interim Recommendations

1. Immediate Containment:

- Ensure the affected area remains sealed to prevent mold spores from dispersing into the surrounding library space during remediation - Completed

2. Remediation Planning:

- Develop a remediation strategy to safely remove and dispose of the mold-affected materials - Completed
- Consider replacing the wooden toe kick and any other structural components that may be beyond salvage - Planned and in process

3. Environmental Monitoring:

- Continue monitoring the area for signs of additional moisture or mold growth, particularly in nearby structures or materials that could be impacted by the concealed mold – Planned and in progress

4. Preventative Measures:

- Address the underlying cause of moisture intrusion in this area, potentially linked to the issues observed in the adjacent HVAC room – In Process

Should you require further clarification or assistance, please feel free to contact me directly.

Sincerely,

Marina Brock

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