



PROTECTION ENVIRONMENTAL SERVICES

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Residential Evaluation & Mechanical Introduction
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Microbiology Air Sampling Report

Date: November 9, 2021

Client: [REDACTED]

Lab Number: 13306374-6

Project Name: [REDACTED]

Address: Same

Project Number: 211105130

Test Date: November 5, 2021

Time: 2pm

Outside Temperature: 38 Deg Wind: Moderate RH%: 28%

Present:

Scope and Background

Protection Environmental Service was hired to perform air sampling, at the above address. The home has had a water problem in the second floor bathroom which has caused water damage to the second floor hall bathroom and the second floor master bathroom. The kitchen / dining / family room has signs of moisture intrusion and mold.

Observations

The home is in disarray and the kitchen and 2nd floor bathrooms are under containment. The remediation company has started the drying and demo process. There is visual mold on the kitchen ceiling and the floor and studs in the second floor bathrooms.

As seen on *HGTV* "House Detective"
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Member:

American Society of Home Inspectors (ASHI) #097240
Southern Ohio ASHI

Indoor Air Quality (IQA)
Ohio Chapter of ASHI

Cincinnati Area Board of Realtors (CABR)

Ambient Air Areas Tested

- 1) An air sample was taken at the exterior to identify the mold present and the levels of the molds. This sample is used as an air index.
- 2) An air sample was taken to identify any elevated levels of mold at the kitchen
- 3) An air sample was taken to identify any elevated molds in the 2nd floor bathrooms.

Remediation:

- 1) Keep the containment up at the kitchen, living room and dining area.**
- 2) Keep the containments up at the second floor hall and master bathroom.**
- 3) In all containment areas keep HEPA air scrubbers running.**
- 4) All personnel should be equipped with N-95 Masks and disposable gloves.**
- 5) While demo is taking place ensure that there is negative air pressure on the cleaning areas. Low MERV air filters can be used during demo.**
- 6) Upon completion of demo, install HEPA air filters and cancel the negative air pressure.**
- 7) Household item that are pores, such as fabric chairs, toys, etc. along with books should be double bagged and properly disposed of.**
- 8) The ceiling, walls and flooring should be removed 12-18" beyond any water staining and mold.**
- 9) All items removed from the home should be double bagged and properly disposed of.**
- 10) After demo, HEPA Vac and wet wipe all areas in the containment.**
- 11) Seal all lumber with a biocide.**

- 12) **Make sure to cover and seal all plumbing pipes to avoid molds from being drawn from the lines.**
- 13) **Cover and seal all electrical outlets and junction boxes.**
- 14) **Cover all HVAC air supplies and returns to avoid molds entering the HVAC system.**
- 15) **While working in the home install MERV 12 filters in the HVAC system , to filter any molds from other parts of the home.**
- 16) **The voids where the drywall has been remove and flooring, stuff insulation in these areas to avoid and cross contamination from other parts of the home.**
- 17) **Avoid any excessive ingress/ egress from the containment to avoid bringing any dirt/debris/ mold from other areas of the home.**
- 18) **After remediation run the air scrubbers for 24 hours before PRV testing.**
- 19) **After PRV testing is acceptable, begin to reconstruct.**

The extent of my professional education allows me to provide observations and indoor environmental assessments in conjunction with third-party laboratory results. I recommend you share these findings with your physician as they can provide an accurate assessment relating to potential health impacts to you and individual occupants

Concern about indoor exposure to mold has been increasing as the public becomes aware that exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. This document presents guidelines for the remediation/cleanup of mold and moisture problems in facilities at NC State

University including measures designed to protect the health of building occupants and remediators.

Molds, also known as fungi, are microscopic organisms that can be found virtually everywhere, indoors, and outdoors. In the presence of excess moisture, mold can grow rapidly to produce adverse conditions. In response to increasing public concern, several authorities, including the United States EPA, California Department of Health services and New York City Department of health, have developed recommendations and guidelines for assessment and remediation of mold.

While it is generally accepted that molds can be allergenic, infectious, and toxic, there are no generally accepted numerical guidelines for interpretation of microbial data. The absence of standards makes interpretation of microbial data somewhat challenging. This report has been designed to provide some basic interpretive information using certain assumptions and facts that have been extracted from several authoritative bodies and peer reviewed text, Such as the American Conference of Governmental Industrial Hygienists (ACGIH). In absents of standards, I must determine the testing conditions, appropriateness, and applicability of this report to a given situation. Weather, temperature, relative humidity, and dew points, in relationship with the index sample and other samples made must be taken in consideration along with debris ratings.

Mold can be found almost anywhere; it can grow on virtually any organic substance if moisture and oxygen are present. There is mold 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 molds and mold spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture indoors.

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. Delayed maintenance or insufficient maintenance is also associated with moisture problems in schools and large buildings. Moisture

problems in portable classrooms and other temporary structures have frequently been associated with mold problems.

Prevention

- Fix leaky plumbing and leaks in the building envelope as soon as possible.
- Watch for condensation and wet spots. Fix source(s) of moisture problem(s) as soon as possible.
- Prevent moisture due to condensation by increasing surface temperature or reducing the moisture level in air (humidity). To increase surface temperature, insulate or increase air circulation. To reduce the moisture level in air, repair leaks, increase ventilation (if outside air is cold and dry), or dehumidify (if outdoor air is warm and humid).
- Keep heating, ventilation, and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
- Vent moisture-generating appliances, such as dryers, to the outside where possible.
- Maintain low indoor humidity, below 60% relative humidity (RH), ideally 30-50%, if possible.
- Perform regular building/HVAC inspections and maintenance as scheduled.
- Clean and dry wet or damp spots within 48 hours.
- Do not let foundations stay wet. Provide drainage and slope the ground away from the foundation.

Hidden Mold

In some cases, indoor mold growth may not be obvious. It is possible that mold may be growing on hidden surfaces, such as the backside of dry wall, wallpaper, or paneling, the top of ceiling tiles, the underside of carpets and pads, etc. Possible locations of hidden mold can include pipe chases and utility tunnels (with leaking or condensing pipes), walls behind furniture (where condensation forms), condensate drain pans inside air handling units, porous thermal or acoustic liners inside ductwork, or roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

Some building materials, such as dry wall with vinyl wallpaper over it or wood paneling, may act as vapor barriers, trapping moisture underneath their surfaces and thereby providing a moist environment where mold can grow. You may

suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and building occupants are reporting health problems. Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth—make sure to use PPE.

For example, removal of wallpaper can lead to a massive release of spores from mold growing on the underside of the paper. If you discover hidden mold, you should revise your remediation plan to account for the total area affected by mold growth.

Assess the size of the mold or moisture problem and the type of damaged materials before planning the remediation work.

The decision to relocate occupants should consider the size and type of the area affected by mold growth, the type and extent of health effects reported by the occupants, the potential health risks that could be associated with debris and the amount of disruption likely to be caused by remediation activities. If possible, remediation activities should be scheduled during off-hours when building occupants are less likely to be affected.

Remediation

1. Fix the water or humidity problem. Complete and carry out repair plan if appropriate. Revise and carry out maintenance plan if necessary. Revise remediation plan as necessary if more damage is discovered during remediation.
2. Continue to communicate with building occupants, as appropriate to the situation. Be sure to address all concerns.
3. Completely clean up mold and dry water-damaged areas. Select appropriate cleaning and drying methods for damaged/ contaminated materials. Carefully contain and remove moldy building materials. Use appropriate Personal Protective Equipment (PPE). Arrange for outside professional support if necessary.

The Key to Mold Control

If you are unsure what to do, or if the item is expensive or of sentimental value, you may wish to consult a specialist. Specialists in furniture repair/restoration, painting, art restoration and conservation, carpet and rug cleaning, water damage, and fire/water restoration are commonly listed in phone books. Be sure to ask for

and check references; look for affiliation with professional organizations. **Molds Can Damage Building Materials and Furnishings**

Cleanup Methods

A variety of mold cleanup 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. Please note that professional remediators may use some methods not covered in these guidelines; absence of a method in the guidelines does not necessarily mean that it is not useful.

Test Procedures Used for Airborne Mold

Air Sampling was taken with a Bioaerosol Impactor and an external Buck air pump. The Buck air pump was calibrated to 15 liters of air per minute (LPM). The time of the air sample is determined by the traffic area and wind velocity. This is determined by the sampler and is recorded. The sampler also records times, temperature, Relative humidity, and dew points. The calibration is checked and monitored before, during, and after sample collection. The air pump, tubing and Buck are air flushed for 1 minute @ 30-35LPM before testing. The Buck Impactor is cleaned and sanitized with alcohol swabs prior to testing, to avoid any cross contamination. A sanitized prepared glass slide is then removed from its seal package and placed into the Impactor for the desired type test. The Mold spores are collected on a pre-coated glass slide that is placed into the Impactor.

The collection of the spores operates upon the principle of inertial impaction. Airflow is accelerated as it is drawn through the tapered inlet and directed through a 360 Degree hole towards the glass, coated slide, containing an optically clear collection media. Particles adhere to the collection media while the airflow continues out of the orifice. Microscopic spore counts, non-viable, are determined through light microscopy using the glass slide.

One outdoor sample is also collected to provide the background reference data for quantity and type mold spores present in the ambient air. This is considered the "AIR INDEX"

Samples are analyzed via light microscopy at 600X Magnification, with the entire slide (100% of the sample) being analyzed. The results are

reported as a total meaning that they include both viable and non-viable spores. Unfortunately, this technique does not allow for the differentiation between *Aspergillus* and *Penicillium*, and *Trichoderma* and other are grouped together as *Amerospores*. Additionally, it does not allow for cultivation or speciation of spores. Slides containing greater than 500 fungal spores are difficult to count accurately due to overcrowding and are therefore estimations. Similarly, excessive non-microbial particulates can mask the presence of fungal spores, thereby reducing counting accuracies.

Swab Testing Procedures

Each and any swab tests made are performed using a sterile swab. Rolling the swab over a 1 square inch area performs each collection. Each swab is the placed in its sterile transporter and shipped to the labs.

Analysis of Samples

The U.S. Environmental Protection Agency published the "Mold Remediation in Schools and Commercial Buildings" document that also provides guidelines and insight on clean-up procedures.

Common suggestions among the various documents include:

- Correct the source of excessive moisture.
- When handling or cleaning moldy materials, consider using a mask or respirator for protection against inhaling airborne spores. Respirators can be purchased from hardware stores; select one for particle removal (sometimes referred to as a N95 or TC-21C particulate respirator).
- Wear protective gloves, eye protection glasses, and clothing should be immediately washed.
- Take care to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied area.
- Non-porous (e.g., metals, glass, and hard plastics) and semi-porous (e.g., wood, and concrete) materials that are structurally sound and are visibly moldy can be cleaned and reused.
- Cleaning should be done using a detergent solution.

- Porous materials (e.g., ceiling tiles and insulation, and wallboard) with more than a small area of contamination should be removed and discarded. Porous materials that can be cleaned, can be reused, but should be discarded if possible.
- A professional restoration consultant should be contacted when restoring porous materials with more than a small area of fungal contamination.
- All materials to be reused should be dry and visibly free from mold.

Periodic inspections should be conducted to confirm the effectiveness of Remediation work.

Please note that I am not an Industrial hygienist or a Remediation Company.

The reader should be aware that the reference documents contain conflicting and inconclusive information about health effects from exposure to mold clean-up procedures, acceptable indoor air moisture levels and ventilation. However, two issues most experts agree upon are: active mold growth should be removed, and eliminating excessive moisture is required to stop mold growth. Armed with information from the reference documents, the reader should be able to make an informed decision about dealing with mold.

Note that there is not a numerical criterion for interpreting environmental measurements.

The California Department of Health Services also publishes clean-up procedures that are more oriented toward homeowners. At www.cal-iaq.org/mold9803.htm. The clean-up procedures established by this California agency recommend the use of a disinfectant (chlorine bleach) whereas the New York City guideline does not make a recommendation for use of a disinfectant.

This report is based on a visual inspection of the listed items and does not include any other systems of the property.

Latent and concealed defects and deficiencies are excluded from this inspection.

The conclusions and recommendations of this report represent my opinion of the existing structure. Protection Home Inspection is

not responsible for the conclusion, opinions, or recommendation made by others based on the information in this report.

The inspection involved visual techniques only, utilizing non-destructive evaluation and no material testing, subsurface investigation or design work has been done as part of this report.

Neither this survey nor this report constitutes an exhaustive technical evaluation.

This report is prepared for the sole and exclusive use of the client. This report is based on apparent conditions existing at the time of inspection only. The conditions of the property may change due to factors such as water and moisture leaks, actions taken by owners or others, or the passing of time itself.

The client must accept responsibility for all risks for all items which are not reasonably detectable within the scope of this inspection.

I have made every effort to perform a comprehensive and thorough inspection with recommendations for this property. I do not offer or imply any warranties or insurance to cover possible errors or hidden defects. If you have any questions regarding this inspection or need further evaluation, please let me know.

Sincerely,

A handwritten signature in cursive script that reads "Forrest A. Sutherland".

Forrest A. Sutherland ACI CIE

President