



November 11, 2019

City of New Bern
Matt Montanye
300 Pollock Street
New Bern, NC 28560

**Re: Limited Fungal Indoor Environmental Quality Investigation with Airborne and Surface Fungal Sampling at 800 Cedar Street, New Bern, NC 28560
LRC Project – 19 -2287**

At your request, on November 6, 2019, LRC Indoor Testing & Research, Inc. (LRC) performed a limited environmental fungal Indoor Environmental Quality (IEQ) sampling that included airborne and surface fungal sampling at the property listed above. This project was requested to characterize the types and levels of airborne and surface fungi in the structure.

LRC performs all water-damage and fungal investigations with sampling and recommendations in accordance with guidelines published in *Bioaerosols: Assessment and Control*, by the American Conference of Governmental Industrial Hygienists (ACGIH), in *Mold Remediation in Schools and Commercial Buildings* by the United States Environmental Protection Agency (USEPA), and in the currently recognized and accepted industry standards including the ANSI/IICRC S500 *Standard and Reference Guide for Professional Water Damage Restoration*, Third Edition (S500) and the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520).

Our inspection included the following:

1. Visual inspection of the community center.
2. Collect representative moisture measurements in inspected areas.
3. Measure temperature and relative humidity indoors and outdoors.
4. Collect representative non-viable spore trap air samples indoors and one outdoors for comparison.
5. Collect representative non-viable surface tape lift samples of representative visible or suspect fungal growth if deemed necessary.
6. Provide a written report describing the survey results and comparing those results to accepted guidelines and directives. This report includes a summary of data, Certificates of Laboratory Analysis and a remediation protocol, if needed, based on the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520).

VISUAL INSPECTIONS, MOISTURE MEASUREMENTS, AND RELATIVE HUMIDITY

A calibrated moisture meter was used to measure moisture levels on representative hard surfaces. Typically, moisture contents approaching 17% and greater represent excessive moisture on hard surfaces (wood) in conditioned spaces; however, in non-conditioned spaces wood and semi-porous materials may approach these threshold levels naturally due to seasonal changes in temperature and humidity.

The temperature and relative humidity are summarized in Table A below. The relative humidity met the current ASHRAE Standard to maintain indoor relative humidity below 65%.

Table A – Temperature and Relative Humidity by Location

Location	Temperature	Relative Humidity
Indoor Air	61-68°F	51-61%
Outdoor Air	65°F	55%

Descriptions in this report are based on looking at the structure from the street front.

General Observations:

The studied property is a single story block exterior building used as a community center. Future occupants of the building expressed air quality concerns due to previous rodent and bat activity and suspect mold in the structure. This project was requested to characterize the types and levels of airborne and surface fungi in the structure. The HVAC system was off upon arrival, but was turned on and was operating normally for the duration of the air sampling. Heavy particulate accumulation was noted on the HVAC return and supply grills, and on the interior lining of the HVAC return plenum.

In the Right Side Meeting Room, vinyl tile flooring was in place and a small area was sunken in near the entry. This room had a wall air conditioning unit. No significant staining was observed. In the Front Chair Storage Room, no significant staining was observed. In the two storage rooms to the Rear of the Meeting room, contents stored there had visible fungal growth. A surface sample collected from a wood chair (Sample 13) contained Numerous *Penicillium/Aspergillus* group, Moderate *Cladosporium*, and Numerous Hyphal Elements (the growth structure of fungal spores). In addition, spotty staining was observed on block walls and a door. A surface sample collected from a door (Sample 10) contained Numerous *Cladosporium*, Numerous *Penicillium/Aspergillus* group, and Numerous Hyphal Elements.

In the Rear Right Corner Storage areas, visual inspection was limited due to contents.

In the Kitchen, some evidence of rodent activity was noted in the cabinets. No significant staining was observed on the walls or ceiling.

In the Back Stage area, particulate accumulation and evidence of rodent activity was noted on a piano, flooring, and steps. A surface sample collected from particulate accumulation on the piano (Sample 11) contained Occasional settled fungal spores.

In the Rear Left Corner Storage, visible fungal growth was observed on the back of the sheetrock of the Front wall at the Left Exterior wall. A surface sample collected there (Sample 12) contained Numerous *Penicillium/Aspergillus* group spores, Few Cladosporium, and Numerous Hyphal Elements.

No significant staining or moisture issues were noted in the Bathroom and Front Storage Area. Construction activities were taking place in the other Bathroom at the time of inspection.

SAMPLING METHODOLOGY

Air Samples:

Currently there are no regulations regarding acceptable airborne fungal levels. Airborne fungal spores are ubiquitous in the outdoor and indoor environment. The guidelines followed in this report for the assessment and/or remediation of airborne and surface fungi are published in *Bioaerosols: Assessment and Control*, by the American Conference of Governmental Industrial Hygienists (ACGIH), in *Mold Remediation in Schools and Commercial Buildings* by the United States Environmental Protection Agency (USEPA), in *Recognition, Evaluation, and Control of Indoor Mold* by the American Industrial Hygiene Association (AIHA), and in the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520). Airborne fungal assessments are performed by comparing results from volumetric samples taken indoors to samples taken outdoors. Airborne fungi levels in non-problem indoor environments generally are less than or approximately the same as those outdoors and also show a similar composition and/or taxonomic predominance. Problems are usually implicated in the indoor air when one or more fungal genera or species are present in a much greater concentration indoors compared to outdoors. Sampling results are shown in the Certificates of Laboratory Analysis attached to this report. Results are discussed below.

Surface Samples:

Surface sampling results should follow guidelines as stated in the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520). Under normal circumstances, building materials that appear clean and free of dirt, water damage, and/or fungal amplification should show “Condition 1” or “normal fungal ecology”. Condition 1 is described in the Standard as “an indoor environment that may have settled spores, fungal fragments or traces of actual growth whose identity, location and quantity are reflective of a normal fungal ecology for a similar indoor environment”. Results from sampling “clean” surfaces, if performed, should show that there is no evidence of fungal amplification. Condition 2 is described as “an indoor environment which is primarily contaminated with settled spores that were dispersed directly or indirectly from a Condition 3 area, and which may have traces of actual growth”. Condition 3 is described as “an indoor environment contaminated with the presence of actual mold growth and associated spores”. Representative surface tape lift samples were collected as discussed below. Surface samples may be taken either with a tape lift or a swab

and are analyzed microscopically. Sampling results are shown in the Certificates of Laboratory Analysis attached to this report. Results are discussed below.

SAMPLING RESULTS

Total Non-Viable Spore Air Sample Results:

Representative samples were taken for total airborne fungal spores with a calibrated Buck spore trap. Total airborne fungal spore sample volumes were 75-liters. The outdoor total fungal spore level (Sample 09) was measured at 2,000 Spores/m³ and was comprised of *Cladosporium* (40%), *Penicillium/Aspergillus* group (23%), Ascospores (15%), Basidiospores (14%), *Curvularia* (2%), *Drechslera/Bipolaris* (2%), and 1% or less of various other fungal spores. The air sample results are summarized below in Table B.

Table B – Air Sampling Results

Sample #	Location	Total Airborne Spore Count (Spores/m³)	Background Particulate Level
01	Meeting Room	573	Moderate-Heavy
02	Open Area at Right Return	4,573	Moderate-Heavy
03	Kitchen	4,787	Low-Moderate
04	Back Stage	4,960	Moderate
05	Open Area – Rear Left	3,840	Low-Moderate
06	Bathroom	1,533	Low-Moderate
07	Rear Right Hall	2,653	Low-Moderate
08	Open Area – Center	2,307	Low-Moderate
09	Outdoor Air	2,000	Low-Moderate

The total fungal spore counts in the areas sampled in the **Meeting Room (Sample 01)** and **Bathroom (Sample 06)** were lower than that found in the outdoor air. The total fungal spore counts in the remaining areas sampled were higher than that found in the outdoor air. Nevertheless, the samples contained higher percentages of *Penicillium/Aspergillus* group spores and *Cladosporium* than found in the outdoor air. Spores in the *Penicillium/Aspergillus* grouping are commonly considered to be among the water loss fungi. Therefore the results suggested an altered indoor airborne fungal ecology in the areas sampled. Some species of these fungi are considered allergenic and/or toxicogenic and should be handled with caution.

The background particulate that we see in the microscope at the magnification used is usually called ‘coarse particulate’ and consists of many things and can include the following: dirt, dust, pollen, fiber, hair, skin cells, dust mites and other insects. Fine particulates (to include VOC’s – volatile organic compounds) are not seen with the magnification used for these samples.

Surface Non-viable Tape Lift Sample Results:

Representative surface tape lift samples were collected from suspect mold-contaminated surfaces. Tape lift samples are collected to confirm visual observations. The samples are

discussed in the narrative above and detailed in the attached certificates of laboratory analysis. The surface sampling results are summarized below in Table C.

Table C – Surface Sampling Results

Sample #	Location	Spores and Enumeration	Condition
10	T-1 Right Middle Storage Door	Numerous <i>Cladosporium</i> Numerous <i>Penicillium/Aspergillus</i> Group Numerous Hyphal Elements	3
11	T-2 Backstage Piano – Particulate	Occasional <i>Arthrinium</i>	1
12	T-3 Rear Left Sheetrock	Numerous <i>Penicillium/Aspergillus</i> Group Few <i>Cladosporium</i> Numerous Hyphal Elements	3
13	T-4 Storage – Wood Chair	Numerous <i>Penicillium/Aspergillus</i> Group Moderate <i>Cladosporium</i> Numerous Hyphal Elements	3

CONCLUSIONS AND RECOMMENDATIONS

Results as reported by LRC apply only to the day of this inspection. LRC cannot and does not warranty that other parts of the structure were completely free or that the structure will remain free in the future from hidden sources of moisture or fungal contamination.

LRC’s visual inspection of the structure was as thorough as possible considering the nature of this investigation. It should be noted that conditions reported in this report were based on the time of the inspection only and circumstances may change following the inspection. Should further issues occur and conditions change it may be necessary to re-evaluate the structure and consider more in depth testing.

All water damage and fungal remediation should follow guidelines as stated in the ANSI/IICRC S500 *Standard and Reference Guide for Professional Water Damage Restoration*, Third Edition (S500) and in the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520). All work should follow recommendations therein to protect workers, occupants, building spaces from dusts and debris during remediation and removal of fungal contaminated materials.

Due to finding the impacted indoor air and surface fungal growth we make the following recommendations. Please see Appendix A at the end of this document for general mold remediation recommendations and general responsibilities of the remediation contractor.

Specific recommendations for this project are as follows:

- Due to finding the altered indoor airborne fungal ecology in the sample collected from the return it is recommended that the HVAC system be evaluated by a qualified technician and cleaned according to their recommendations. Depending on the unit the

components should be cleaned to include the supply and return ducts and registers, grills and diffusers, heating and cooling coils, condensate drain pans, fan motor and fan housing and air handling unit housing.

- HEPA vacuum and wipe clean impacted block walls and wood doors/door trim in the Storage areas to remove staining. You may wish to re-paint these areas after cleaning with a product that inhibits fungal growth.
- Remove and triage contents in the Storage areas and discard those that will not be kept. It is recommended that contents that are heavily contaminated be cleaned off-site but this is left up to the remediation contractor. Remaining hard surface contents should be HEPA vacuumed and cleaned with a quality product. It is recommended that any porous contents with visible fungal growth be discarded.
- In the Rear Left Corner Storage area, remove impacted sheetrock to 24 inches beyond moisture or staining.
- Operate HEPA filtered air scrubbers throughout the structure to remove airborne fungal spores and particulates.

In areas where there is evidence of rodent activity, you may wish to follow the Center for Disease Control and Prevention (CDC)'s guidelines for clean-up:

Before cleaning attics, basements, crawlspaces and other storage areas, it is necessary to completely remove the existing rodent infestation by trapping. When there is no evidence of infestation, wait about 5 days before beginning to clean these areas. Before cleaning the space, ventilate the area by opening the doors and windows for at least 30 minutes to allow fresh air to enter the area and to remove potentially contaminated air from the area. Use cross-ventilation and leave the area during the airing-out period.

When cleaning attics, basements, crawlspaces and other storage areas:

- Wear rubber, latex, or vinyl gloves when cleaning up urine, droppings, or nesting materials. Note that a dust mask may provide some protection against dust, molds, and insulation fibers, but does not protect against viruses.
- Spray any urine, droppings, and nesting materials with either a bleach and water solution (1 part bleach to 9 parts water) or a household disinfectant prepared according to the label instructions for dilution and disinfection time. Soak well. This will inactivate any virus. Use a paper towel or rag to pick up the materials and dispose of them.
- Mop floors after spraying them using bleach/water solution or a disinfectant. Dirt floors can be sprayed with either bleach and water solution or a disinfectant.
- If exposed insulation has become contaminated with urine and droppings, it should be placed into plastic bags for removal.
- To remove any potentially contaminated materials from storage vessels/boxes:
 - First, move the storage vessels/boxes outside and place them in an area that is well-ventilated and exposed to direct sunlight. The outside of the storage vessels/boxes can be disinfected using bleach and water solution or disinfectant solution;

- Next, remove the potentially contaminated materials while in the sunlit, ventilated area. Remain upwind so that any dust or debris is not blown toward your face. Some contaminated stored materials, such as clothing, books, etc. can be decontaminated by following the recommended methods of disinfection provided in the table below; items that are no longer needed can be discarded.
- Dispose of any cardboard boxes contaminated with urine or droppings. Plastic, glass, or metal containers can be disinfected by spraying with the bleach and water solution or disinfectant. Then, using a rag or paper towel, wipe up the urine or droppings and dispose of the waste.
- Clean countertops, cabinets, and drawers with disinfectant or bleach and water solution.
- Decontaminate gloves with disinfectant or bleach and water solution. Wash hands well with soap and warm water.

Before clearance testing:

- Run air scrubbers at the completion of remediation to cleanse the air to get a minimum of 100 air exchanges.
- Prior to re-sampling, seal and turn off air scrubbers.
- Control the indoor relative humidity to be between 30 and 65% at all times.

Disclaimer:

The recommendations are given in order to assist a certified mold remediation contractor in returning the impacted structures to “Condition 1” or “normal fungal ecology” in accordance with the ANSI/IICRC S520 *Standard and Reference Guide for Professional Mold Remediation*, Second Edition (S520).

If you have any questions or concerns, please do not hesitate to contact us.

Sincerely,



Amber Campbell, REHS, WRT, CMI
LRC Indoor Testing & Research

APPENDIX A

General recommendations are as follows:

- Services should be performed by a certified mold remediation contractor. IICRC or equivalent certifications and experience are suggested.
- Mold remediation contractors should carry Mold Specific Liability Insurance.
- Remediation workers should use all appropriate personal protective equipment (PPE), including but not limited to half-face respirators with HEPA cartridges, protective eyeglasses, disposable protective clothing, gloves, and safety shoes.
- All negative air machines and air scrubbers must have triple filtration, including at least one HEPA filter.
- All vacuums must be HEPA filtered. The HEPA filter should be certified.

The remediation contractor will use their professional judgment to:

- Determine the ultimate extent and method of material removal based on current environmental conditions and previous sampling and inspection results.
- Preserve the structure's architectural and structural integrity.
- Identify and implement specific work practices meeting health, safety, and environmental regulations.
- Select appropriate and, where regulated, approved materials to successfully conduct this project.
- Remediation workers should use all appropriate personal protective equipment (PPE), including but not limited to half-face respirators with HEPA cartridges, protective eyeglasses, disposable protective clothing, gloves, and safety shoes.
- Construct containment(s) and place all work areas to be remediated under negative pressure relative to surrounding areas. If possible, negative pressure should be maintained using HEPA-filtered air scrubbers exhausted to the outside. Containment should include polyethylene barriers, negative air pressure machines with HEPA-filtration, and decontamination chambers. Care should be taken to ensure make up air is drawn from acceptable sources.
- Any debris or materials removed from containment should be secured in closed 6-mil polyethylene bags or containers prior to removal. Any sheetrock removed should be removed to a distance of 24 inches beyond the end of damage or visible microbial growth if practical. Removal of additional material to facilitate ease of work, i.e. replacing sheetrock in full or half sheets should be after discussion with the homeowner and insurance representative.
- Source or sources of water intrusion should be identified and corrected before final cleaning is conducted or new materials are installed.
- Surfaces inside the containment that will not be removed should be HEPA-vacuumed, cleaned with an appropriate detergent and/or treated with an EPA registered biocide, and vacuumed a second time to remove any residue.
- The use of HEPA filtered air scrubbers is recommended in areas outside containment to minimize dust and inadvertent cross contamination.

- Inspect the HVAC system and associated duct work and where appropriate clean and treat with an EPA registered and approved biocide including components such as fan, coil, ducts, and diffusers.
- A thorough vacuuming with a HEPA filtered vacuum cleaner of the surfaces, floors and carpets and a final HEPA vacuuming be performed after all remediation is complete.
- After cleaning and removal is complete, a final inspection and testing should be performed prior to replacement of building materials. Application of an anti-microbial sealant such as Fosters or Fiberlock is permissible based on discussion with the building owner and the insurance company.

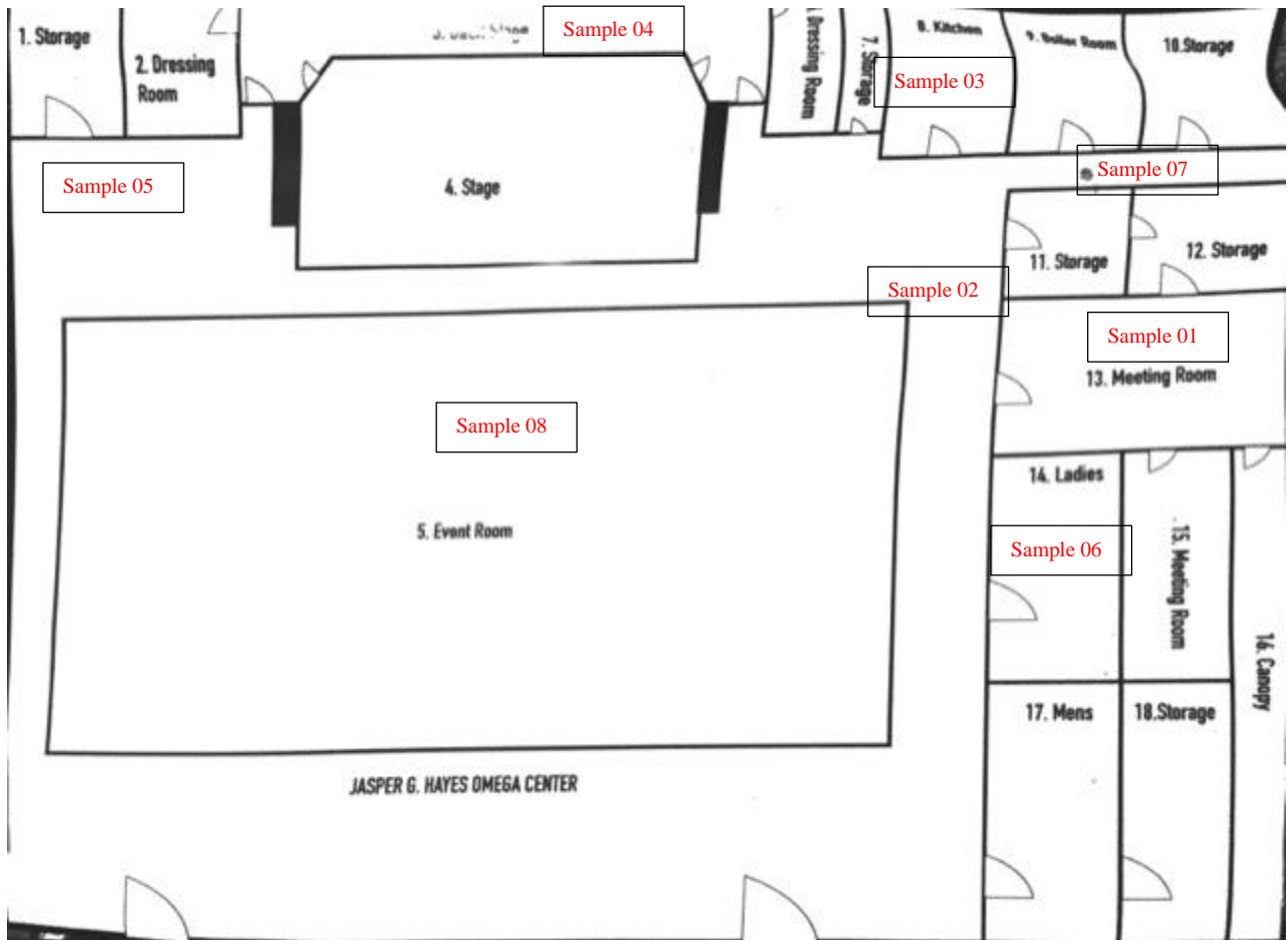


Figure 1: Sampling Locations