December 12, 2018

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

Attn: Mr. W. Robert Newberry, IV
E-mail: wnewber@clemson.edu

Re: Limited Mold Investigation Report
Clemson University
Lehotsky Hall, Office 120
Clemson, South Carolina
Terracon Project No. 86187072Y

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold investigation in rooms 102A, 117, 131, 207, 221, 244, and 267B of Lehotsky Hall at Clemson University in Clemson, South Carolina. This service was conducted in general accordance with our Master Service Agreement with Clemson University.

PROJECT DESCRIPTION

Scope of Services

At the request of Clemson University, Terracon conducted a limited mold investigation in rooms 102A, 117, 131, 207, 221, 244, and 267B of Lehotsky Hall on October 3, 2018 and October 11, 2018. Reportedly, Clemson University would like to establish a baseline of molds in the above-mentioned areas prior to deep cleaning, following the deep clean, and once again after air purifiers have been installed in the building.

On our October 3rd and October 11th visits, Terracon conducted airborne mold sampling (non-viable) which consisted of collecting spore trap air samples inside rooms 102A, 117, 131, 207, 221, 244, and 267B, and the collection of two additional samples outside for comparison.

Standard of Care

This limited mold investigation was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. Terracon did not attempt to identify every potential exposure or hazard present in the subject building. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our sampling. Many factors, such as weather conditions, building occupancy, ventilation patterns and seasonal variations in fungal concentrations, can affect the conditions observed. The information contained in this report should not be relied upon to represent conditions that existed prior to or after this sampling. Terracon does not warrant the services of regulatory agencies, laboratories or other third parties supplying information that may have been used in the preparation of this report.

SAMPLING CRITERIA AND METHODS

Mold Sampling

Total mold spore trap samples were collected using Air-O-Cell™ spore trap cassettes specifically designed for the collection of airborne mold spores. Air samples were collected using a calibrated Zefon Bio-Pump™ at a flow rate of 15 liters per minute (LPM) for 5 minutes at each location.

After collection, the spore trap samples were delivered via FedEx utilizing chain-of-custody procedures to EMSL Analytical, INC. in Pineville, North Carolina. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #192283. Air samples were analyzed by direct microscopic examination and results are reported in spores per cubic meter of air (spores/m^3).

To help interpret the mold sampling results, we compared indoor air and outdoor air measurements. High variability in airborne fungal spore concentrations can exist in different geographic locations, during different seasons, and weather patterns, and over the course of a given day. As a general rule, indoor air fungal spore concentrations in a heating, ventilation and air-conditioning (HVAC)-supplied building are typically less than, but qualitatively similar to, fungal spore concentrations found in the outside environment.

No state or federal exposure limits have been established for fungal aerosols. Regulatory standards, medically based threshold limit or dose-response relationships have not been established for exposure to airborne or surface concentrations of mold spores. Terracon relies upon experience, professional judgment, current scientific literature, guidelines and recommendations made by professional organizations and experts, and statistical methods in interpreting mold sampling results.

FINDINGS

General Observations

- No evidence of mold growth was observed in assessed areas of the building.
- **102A**: Lecture area and attached lab with a concrete floor, drywall, and drop ceiling with ceiling tiles. Reportedly, this room has been recently renovated and is under negative pressure. Some water stains were observed surrounding electrical conduit on the wall behind a fridge outside the lecture area. No odors were observed in this area.
- **117**: Lab area currently being used as a graduate student lounge with wood panel walls, vinyl tile flooring, and drop ceiling with ceiling tiles. It contains a fridge, sink, vapor hood, and sitting area. Some signs of water intrusion were observed on one ceiling tile above the sink. No odors were observed in this area.
- **131**: Office and lab area with wood panel walls, vinyl tile flooring, and drop ceiling with ceiling tiles. The lab contains a sink, vapor hood, and two safety showers. Some staining was observed surrounding the drain below the safety shower behind the door. No odors were observed in this area.
- **207**: Lab area with drywall, vinyl tile flooring, and drop ceiling with ceiling tiles. The lab contains a full shower and vapor hood. This area did not appear to be in use, currently. There were no visible signs of water intrusion; however, a musty smell was observed.
- **221**: Office area with drywall, vinyl tile flooring, and drop ceiling with ceiling tiles. There was a floor fan blowing prior to assessment which was turned off while samples were being collected. There were no visible signs of water intrusion; however, a musty smell was observed.
- **244**: Office area with drywall, vinyl wood flooring, and drop ceiling with ceiling tiles. After interviewing the office tenant, Kyle Barrett, it was reported that this room has been recently renovated due to previous mold issues. Reportedly, one book and the door stopper within the office continue to grow mold, on occasion. There were no visible signs of water intrusion or odors observed.
- **276B**: Office area with carpet, drywall, and drop ceiling with ceiling tiles. There have been complaints of a foul odor within the office which the tenant does not notice. There were no signs of water intrusion; however, an earthy smell was observed.

Mold Air Sampling

On the afternoon of October 3, 2018, Terracon collected seven (7) mold spore trap samples inside the building and two (2) samples in outdoor locations for comparison. The results of the total spore count samples analyses are summarized in Table 1 below:

Table 1: Summary of Total Spore Count Analyses in the Air – October 3, 2018

Sample #	8524	8471	8483	8482	6698	6593	8502	8498	8463
Location Description	Exterior 1	102A	117	131	207	221	244	276B	Exterior 2
Spore Type	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³
Alternaria	100	-	-	-	-	-	-	-	-
Ascospores	1,000	100	-	-	200	40	80	-	860
Aspergillus/Penicillium	540	2,200	450	200	200	80	860	40	300
Basidiospores	7,320	1,400	490	200	740	200	200	100	5,270
Bipolaris	-	10	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	10
Cladosporium	1,200	300	-	100	490	-	200	200	1,200
Curvularia	80	30	10	-	-	-	40	200	80
Gonoderma	-	-	80	-	-	-	-	-	80
Myxomycetes	40	40	-	200	80	-	-	-	780
Pithomyces	10	40	-	-	-	-	-	40	10
Rusts	10	-	-	-	-	-	-	40	10
Stachybotrys/Memnoniella	-	-	-	-	40	-	-	-	-
Cercospora	80	40	10	-	40	-	-	-	200
Nigrospora	30	-	10	-	-	-	-	-	80
Pyricularia	40	-	-	-	-	-	-	-	-
Torula	10	-	-	-	-	-	-	-	-
Total	**10,460**	**4,160**	**1,050**	**700**	**1,790**	**320**	**1,380**	**620**	**9,330**

The total mold spore levels indoors were lower than the outdoor levels. In general, the predominant mold type identified outdoors and indoors was Basidiospores and Aspergillus/Penicillium like spores. The laboratory analytical report is attached.

On the afternoon of October 11, 2018, Terracon returned following a deep cleaning of the above-mentioned areas to collect seven (7) mold spore trap samples inside the building and two (2) samples in outdoor locations for comparison. The results of the total spore count samples analyses are summarized in Table 2 below:

Table 2: Summary of Total Spore Count Analyses in the Air – October 11, 2018

Sample #	8368	8367	8486	8494	8366	8355	8347	8498	8369
Location Description	Exterior 1	102A	117	131	207	221	244	276B	Exterior 2
Spore Type	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³
Ascospores	2,700	100	40	80	40	-	-	40	860
Aspergillus/Penicillium	200	300	300	-	-	-	100	620	-
Basidiospores	12,700	1,500	660	860	400	400	620	450	9,300
Bipolaris	-	-	-	-	-		-	400	-
Cladosporium	300	10	-	-	-	10	-	40	100
Curvularia	-	-	10	-	-		-	-	-
Gonoderma	40	-	-	-	-		-	-	-
Myxomycetes	-	-	-	30	-	40	40	-	-
Pithomyces	-	-	-	10	-	10	-	-	-
Rusts	-	-	-	-	10	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	10
Oidium	-	-	-	-	-	-	-	-	10
Total	**15,940**	**1,910**	**1,010**	**980**	**450**	**460**	**760**	**1,190**	**10,280**

The total mold spore levels indoors were lower than the outdoor levels. In general, the predominant mold type identified outdoors and indoors was Basidiospores. The laboratory analytical report is attached.

CONCLUSIONS

The following conclusions are provided based on our assessment:

- Based upon visual observations on October 3, 1018 and October 11, 2018, the rooms overall appeared to be clean without any visible issues of mold. However, Rooms 207, 221, and 267B contained a slight musty/earthy odor.
- Results of the spore trap sampling showed that the indoors had mold spores at a lower concentration compared to the outdoors. After the October 3, 2018, sampling event the rooms were cleaned. The October 11, 2018 sampling event indicated a general decrease in spore levels. It should be noted the comparison outdoor mold spore levels on the October 11 sampling event were higher (~5,000 spores/m^3) than the previous October 3 sampling event.
- The October 11 sampling event indicated total mold spore levels indoors were lower than the outdoor levels. Additionally, the predominant mold type identified outdoors and indoors was Basidiospores.

Terracon appreciates the opportunity to provide this service to Clemson University. If you have any questions regarding this limited mold investigation report, please contact the undersigned at 864-292-2901.

Sincerely,
Terracon Consultants, Inc.

Stephen Ellis
Staff Industrial Hygienist

FOR:
Jeffrey A. Gurrie, CIH
Senior Industrial Hygienist

Attachments: Laboratory Results

Laboratory Results

EMSL Analytical, Inc.

10801 Southern Loop Blvd Pineville, NC 28134

Tel/Fax: (704) 525-2205 / (704) 525-2382

http://www.EMSL.com / charlottelab@emsl.com

EMSL Order: 411808577
Customer ID: TERA62
Customer PO: 86187072Z
Project ID:

Attn: Scarlett Walden
Terracon Consultants, Inc.
2105 Newpoint Place
Suite 600
Lawrenceville, GA 30043
Project: 86187072Z

Phone: (770) 623-0755
Fax: (770) 623-9628
Collected: 10/03/2018
Received: 10/05/2018
Analyzed: 10/06/2018

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	411808577-0001			411808577-0002			411808577-0003		
Client Sample ID:	2490-6910			2490-8475			2490-8469		
Volume (L):	75			75			75		
Sample Location	51A Exterior 1			Bathroom - 51A			51A Exterior 2		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	1	40	0.3	-	-	-	1	40	0.4
Ascospores	34	1400	10.5	1	40	6.5	22	910	9.1
Aspergillus/Penicillium	1	40	0.3	13	540	87.1	11	450	4.5
Basidiospores	252	10400	78.3	-	-	-	177	7280	73.2
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	23	950	7.2	1	40	6.5	22	910	9.1
Curvularia	3	100	0.8	-	-	-	1	40	0.4
Epicoccum	-	-	-	-	-	-	1	40	0.4
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	2*	30*	0.2	-	-	-	-	-	-
Myxomycetes++	4	200	1.5	-	-	-	4	200	2
Pithomyces++	1	40	0.3	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Cercospora++	1	40	0.3	-	-	-	1	40	0.4
Nigrospora	-	-	-	-	-	-	1	40	0.4
Torula-like	1	40	0.3	-	-	-	-	-	-
Total Fungi	**323**	**13280**	**100**	**15**	**620**	**100**	**241**	**9950**	**100**
Hyphal Fragment	1	40	-	1	40	-	9	400	-
Insect Fragment	-	-	-	-	-	-	1	40	-
Pollen	1	40	-	-	-	-	2*	30*	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	1	-

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

No discernable field blank was submitted with this group of samples.

Lee Plumley, Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Pineville, NC AIHA-LAP, LLC - EMLAP 192283

Initial report from: 10/08/2018 06:47:40

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

OrderID: 411808577

EMSL Analytical, Inc.
10801 Southern Loop Blvd
Pineville, NC 28134
PHONE: (704) 525-2205
FAX: (704) 525-2382

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 411808577

Company Name: Terracon Consultants, Inc.		**EMSL-Bill to:** ☐ Same ☒ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*	
Street: 2105 Newpoint Place Suite 600			
City: Lawrenceville	**State/Province:** GA	**Zip/Postal Code:** 30043	**Country:** US
Report To (Name): Scarlett Walden		**Telephone #:** 770-623-0755	
Email Address: scarlett.walden@terracon.com		**Fax #:** 770-623-9628	**Purchase Order:**
Project Name/Number: 86187072		**Please Provide Results:** ☐ Fax ☒ Email	
U.S. State Samples Taken: SC	**Project Zip Code:**	**Connecticut Samples:** ☐ Commercial ☐ Residential	

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ **Biocide Used in Source (specify):** _____ ☐

Public Water Supply Samples: ☐ **Note: All results may automatically be reported to DOH if required by state.**

Turnaround Time (TAT) Options * - Please Check

☐ 3 Hour	☐ 6 Hour	☒ 24 Hour	☐ 48 Hour	☐ 72 Hour	☐ 96 Hour	☐ 1 Week	☐ 2 Week

Microbiology Test Codes

M001 Air-O-Cell
M174 MoldSnap
M030 Micro 5
M032 Allergenco-D
M041 Fungal Direct Examination
M169 Pollen ID & Enumeration
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi- Air Samples (Genus ID & Count)
M006 Viable Fungi- Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent
M012 Pseudomonas aeruginosa (P/A***)
M024 Pseudomonas aeruginosa (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & E. coli (Colilert P/A***)
M018 Total Coliform & E. coli (MFT*)
M114 Total Coliform & E. coli Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal Streptococcus (MFT*)
M029 Enterococci (MFT*)
M129 Enterococci (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)
M115 Sewage Screen - Water (P/A***)
M116 Sewage Screen - Water (MPN**)
M117 Sewage Screen - Swab (P/A***)
M013 Sewage Screen - Swab (MFT*)
M133 Methicillin-resistant Staph. aureus (MRSA)
M031 Rapid-growing non-TB Mycobacteria Detection & Enumeration
M014 Endotoxin Analysis
M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
Other See Analytical Price Guide
Legionella Analysis Please use EMSL Legionella COC

*MFT= Membrane Filtration Technique
**MPN= Most Probable Number
***P/A= Presence/Absence

Name of Sampler: SCARLETT WALDEN **Signature of Sampler:** Scarlett Walden

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (only for waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
Example A1	Kitchen Sink/Tap	Water	☒ P ☐ NP	M017	100 mL	9/1/13 4:00 PM	
2490-6910	51A Exterior 1	Air	☐ P ☐ NP	M001	75L	10/3/18 2:15pm	
2490-8475	Bathroom - 51A	1	☐ P ☐ NP	1	1	1 2:21pm	
2490-8469	51A Exterior 2	1	☐ P ☐ NP	1	1	1 2:27pm	
			☐ P ☐ NP				
			☐ P ☐ NP				
			☐ P ☐ NP				

Client Sample # (s): - **Total # of Samples:** 3 **Samples Received Chilled?** Yes / No

Relinquished (Client): _____ **Date:** _____ **Time:** _____

Received (Lab): [signature] **Date:** 10/5/18 **Time:** 8:45AM F/x

Comments/Special Instructions:

~~745~~ 7733 8609 4480

Controlled Document – COC-34 Micro R7.2 8/23/2017