October 30, 2017

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

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

Re: Limited Mold and Allergen Investigation Report
Hunter Hall Room 477
Clemson University
Clemson, South Carolina
Terracon Project No. 86127158 – Task 113

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in Room 477 in Hunter Hall on the main campus of Clemson University, Clemson, South Carolina. Reports of respiratory irritation have been reported from the occupant of these office in the recent past. 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 representative Mr. Stephen Ellis conducted a limited mold and allergen investigation including sample collection in Room 477, Hunter Hall, on October 6, 2017. This five story building was constructed in 1987 and contains classroom, office and lab space. The office of Dr. Shiou-Jyh Hwu (Room 477) was of special interest as Mr. Hwu has reported significant respiratory irritation recently.

The investigation included measurements of temperature and relative humidity, the collection of two (2) spore trap samples inside the office, two (2) spore trap samples outside the building and the collection of one (1) dust sample from Room 477 for allergens analysis.

Standard of Care

This limited mold and allergen 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.

INVESTIGATION CRITERIA AND METHODS

Moisture Content in Building Materials

Excess moisture in building materials may result in the growth of fungi or bacteria. There are no regulations or standards for moisture content in installed building materials. Moisture content will vary building-to-building and across geography, depending largely on relative humidity and indoor environmental conditions. Terracon applied industry best practices and equipment manufacturer guidelines to determine the moisture content of materials in this facility.

A moisture meter was used to identify suspect water-impacted materials. Building materials have different absorptive and moisture retention properties and will come into equilibrium with environmental moisture (as indicated by relative humidity levels) or become wet by contact with water.

Our investigation was limited to accessible surfaces. No demolition or fixture removal was performed to access interstitial spaces such as mechanical enclosures or wall cavities. A Protimeter® Mini Moisture Meter, Model BLD2000 direct-reading moisture meter was used to measure the moisture content of the building materials included in this investigation. Prior to use, the meter was calibrated according to the manufacturer's recommendations. The moisture meter works via the measurement of electroconductivity through the surface being tested via two penetrating probes.

According to Protimeter®, Wood Moisture Equivalent (%WME) readings above 16% should generally be considered excess moisture that may indicate moisture intrusion and the early stages of wood-deteriorating organism growth.

Mold and Allergen Sampling

Total mold spore trap samples were collected using Allergenco-D™ 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 hand delivered to the Southeastern Environmental Microbiology Lab (SEEML) in Greenville, South Carolina. SEEML is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #173667. 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 spore trap 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.

One (1) dust sample for allergens analysis was collected from flooring and fixtures in Room 477 using a high volume air sampling pump in conjunction with a Zefon 25-millimeter dust sampling cassette preloaded with a 0.45 micrometer mixed cellulose ester (MCE) filter.

After collection, the dust sample was delivered by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Dust samples were analyzed for allergens (dust mites, mouse, rat, cat, dog, and cockroach). Allergen results are reported in micrograms per gram (µg/g).

To help interpret the allergen results, EMSL provides risk levels associated with the amount of each allergen found in each sample. Those risk levels are shown in the allergen results tables and also in the attached analytical reports.

Mold surface swabs were collected using Healthlink Transporterä sterile swabs. After collection, the dust swabs were hand delivered to the Southeastern Environmental Microbiology Lab (SEEML) in Greenville, South Carolina for analysis by direct exam. Results from the swab samples are reported as either Fungal Growth (FG) or No Fungal Growth (NFG) and for the mold genera identified, a semi-quantitative category is assigned by the laboratory as either Very Light (VL), Light (L), Medium (M) or High (H).

Temperature and Relative Humidity

Indoor air temperature and relative humidity are physical conditions important to the perception of comfort. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has published recommendations regarding thermal comfort. ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy, identifies six primary factors that affect comfort: metabolic rate (affected by the activity being performed); clothing insulation; air temperature; radiant temperature; air speed; and humidity.

Although the relationships are complex, a temperature range between 73 and 79 degrees Fahrenheit (°F) with relative humidity between roughly 20 and 60 percent (%) are recommended for persons in a conditioned setting wearing light summer clothing. Higher temperatures require lower humidity for comfort. For persons in winter clothing, temperatures can range between 68 and 75°F, with relative humidity between 20% and 60%, with preferred conditions falling between 30% and 50% for both winter and summer temperatures.

EPA recommends maintaining indoor humidity below 60%, ideally 30-50%, if possible.

Readings of temperature and relative humidity were collected with an Extech Model 445580 IAQ instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- The office is approximately 160 square feet.
- Previous water damage was observed on the exterior wall adjacent to the window.
- A water stain was present on the drop-in ceiling tile adjacent to the window frame.
- Photographs from the assessment are attached.

Moisture Content in Building Materials Results

Moisture readings were collected on various wall surfaces. Readings in Room 477 ranged between 7% and 11%, below the recommended 16% threshold established by Protimeter to indicate elevated moisture content.

Mold Air Sampling Results

The results of the total spore count samples analyses and IAQ measurements are presented in Table 1. The laboratory analytical reports are attached.

Table 1: Summary of Total Spore Count Analyses and IAQ Measurements – October 6, 2017

Sample #	477-A1	477-A2	477-A3	477-A4	477-A5
Location Description	**On desk near entrance**	**On desk near window**	**Exterior-1**	**Exterior-2**	**Blank**
Spore Type	**Spores/ m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**
Ascospores	117	195	780	351	---
Basidiospores	156	117	1,560	1,560	---
Chaetomium	---	13	---	---	---
Cladosporium	195	1,110	3,510	3,510	---
Curvularia	13	65	---	---	---
Epicoccum	---	13	---	13	---
Cercospora	---	---	---	26	---
Nigrospora	13	26	---	13	---
Penicillium/ Aspergillus	39	117	---	---	---
Rusts	13	13	13	26	---
Smuts/*Periconia*/ Myxomycetes	117	156	78	91	---
Spegazzinia	13	---	13	---	---
Pithomyces	---	78	---		---
Zygomycetes	13	39	13	---	---
Total	**689**	**1,940**	**5,970**	**5,590**	**No trace**
Temperature (ºF)	72.5	69.9	78.6	---	---
Relative Humidity (%)	41.4	46.4	46.7	---	---

The lowest total spore count outside was approximately 2.8 times higher than the highest spore count inside. *Chaetomium*, *Curvularia*, *Penicillium/Aspergillus* and *Pithomyces* were detected in one or both indoor samples, but was not present in the outdoor samples, indicating that they may have grown indoors at some point. The dominant mold genera indoors were *Cladosporium and Ascospores.* The dominant mold spore types outdoors were *Basidiospores* and *Cladosporium*. Conditions outside on the day we sampled were warm and sunny.

The laboratory analytical report is attached.

A swab sample collected from the HVAC supply diffuser in Room 477 identified *Penicillium/Aspergillus* and *Cladosporium* at Very Light (VL) levels according to the laboratory interpretation.

Dust Sampling for Allergens

On the afternoon of October 6, 2017, Terracon collected a dust sample from the top of a bookshelf in the office (Room 477). The sample was analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach. The sample (Sample 477-AG-1) is reported in micrograms per gram. The lab assigned allergen risk levels based on the findings as described in their full analytical results.

Allergens were identified in the samples. Table 2 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information regarding the risk levels assigned by the lab.

Table 2: Summary of Allergen Analyses – October 6, 2017

Sample #	**477-AG-1**	**477-AG-1**
Location Description	**Room 477 office – top of bookshelf**	**See Risk Level Below**
Allergen Type/Antigen	**Concentrations (ug/g)**	**Allergen Risk Level assigned by the lab**
Dust Mites / Der fl	ND	Low
Dust Mites / Der pl	ND	Low
Mouse / Mus ml	ND	Low
Rat / Rat nl	ND	NA
Cat / Fel dl	0.13	Low
Dog / Can fl	ND	Low
Cockroach / Bla G2	ND	Low

Note: ug = microgram (10^{-6} grams), ND = Not detected, NA = Sufficient evidence is not available for risk levels

Temperature and Relative Humidity

The highest indoor temperature was 72.5ºF and the highest indoor relative humidity was 46.4%. The outdoor temperature was 78.6ºF and the relative humidity was 46.7% (See Table 1 above for all readings).

CONCLUSIONS

The following conclusions are provided based on our assessment:

- No wet building materials were identified during the assessment; however, inner wall cavities were not accessible.
- Although the results of mold air sampling indicated that total airborne mold spore concentrations inside the building were below the total mold spore levels measured in the two outdoor samples, *Chaetomium*, *Curvularia*, *Penicillium/Aspergillus* and *Pithomyces* were present in the indoor samples but were not found in the corresponding outdoor mold samples, suggesting that those genera may have grown indoors at some point. Generally when *Chaetomium* mold spores are detected, there has been past or current water damage as this type of mold has a high water activity and will only grow in wet locations.
- Levels of dust in allergen Sample 477-AG-1 collected in Room E136 were found to contain cat allergens at a low risk level with all other allergen types measured not detected.
- Molds identified on the swab sample from the HVAC slot diffuser were designated by the lab as “Very Light” and as “Minimal Fungal Growth”.
- Temperature and relative humidity levels measured were within EPA/ASHRAE guideline ranges.

RECOMMENDATIONS

The following recommendations are provided based on our assessment:

- Previous water damage was observed on the exterior wall adjacent to the window and molds indicating high water activity were observed in the air samples. Terracon recommends opening the wall cavity in a controlled environment to further check for hidden mold. Asbestos testing of the wall materials should be performed prior to disturbance.
- The water stained ceiling tile should be replaced and monitored for additional leaks until the wall assembly can be further evaluated.

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.

Benjamin Hestir, P.E.
Project Industrial Hygienist

Jeffrey A. Gurrie
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 View of Room 477 – Hunter Hall



Photo #2 View of HVAC supply slot diffuser – location of mold swab sample



Photo #3 Top of bookcase – location of allergen dust sample



Photo #4 View of previous water damage adjacent to window



Photo #5 View of water stain on ceiling grid tile adjacent to window

Laboratory Results

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Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #:	**371722138**
Customer ID:	**GTER78**
Customer PO:	**86127158Task113**

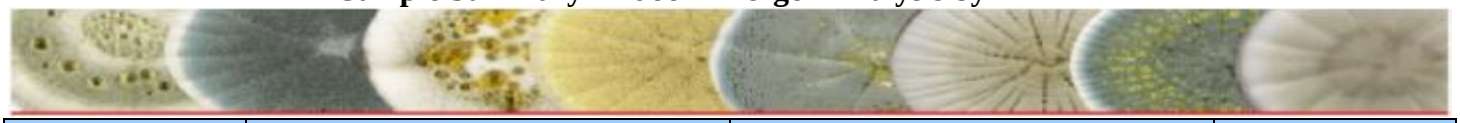
Attn: **Ben Hestir**
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72 Pointe Circle
Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Clemson Hunter 477**

Date Collected: **10/6/2017**
Date Received: **10/10/2017**
Date Analyzed: **10/12/2017**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371722138-0001	477-AG1	Top of Bookshelf	Bulk

Report Date	Report Revision	Revision Comments
10/17/2017	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

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Disclaimers

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable. EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

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Project: **Clemson Hunter 477**

Date Collected: **10/6/2017**
Date Received: **10/10/2017**
Date Analyzed: **10/12/2017**

EMSL Sample #: **371722138-0001**
Client ID: **477-AG1**
Location: **Top of Bookshelf**

Sample Type: **Bulk**
Sample Size: **49**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**ND**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**0.13**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**ND**	µg/g	☑
Cockroach Allergen	Bla g2	0.012	µg/g	**ND**	µg/g	☑

†Sufficient evidence is not available for risk levels.

Allergen Risk Levels:

High -Risk of acute asthmatic attack.

Moderate -Risk for sensitization and bronchial hyperactivity.

Low -Not sufficient to cause symptoms or ND (None Detected); Indicates that the amount of allergen in the sample is below the detection limits.

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Report Date	**Report Revision**	**Revision Comments**
10/17/2017	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

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Guidelines to Interpretation

µg/g

Allergens	<DL	<1	1	2	3	4	5	6	7	8	9	>10
Fel d1	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High
Can f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der p1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Mus m1	ND	Low	Mod	Mod	Mod	High	High	High	High	High	High	High

µg/m3

Rat n1	ND	<0.7 µg /m3 = Not associated with increased risk of asthma

µg/g

	<DL	<0.08	0.08	0.09	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Bla g2 †	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High	High

† *Suggested levels. Not officially established.*

Note: *This report and guidelines furnish information only. Whether an individual suffers allergic symptoms or not depends on his/her medical history and previous exposure.*

References

Journal of Allergy and Clinical Immunology 1989; 83:416-427
Journal of Allergy and Clinical Immunology 1995; 96:449-456
The American review of respiratory disease 1990; 141:361-367
The American review of respiratory disease 1993; 147:573-578
Environmental Health Perspectives 2002; 110:419-425
Clinical and Experimental Allergy 1998; 28(5):537-44
Pediatric allergy-principles and practice. Mosby Inc 2003: 261-268.

Terminology

ELISA	Enzyme-linked Immunosorbent Assay
MARIA®	Multiplex Array for Indoor Allergens
Allergen	A substance which reacts with the body's immune system to produce an allergic reaction.
Antigen	A substance, foreign to the body, which stimulates the production of antibodies by the immune system.
Bla g2	*Blattella germanica* (Cockroach) allergen 2
Can f1	*Canis familiaris* (Dog) allergen 1
Der f1	*Dermatophagoides farinae* (Dust Mites) allergen 1
Der p1	*Dermatophagoides pteronyssinus* (Dust Mites) allergen 1
Detection Limits	DL is the smallest amount of a substance, in this case antigens, which can be measured.
Fel d1	*Felis domesticus* (Cat) allergen 1
Mus m1	*Mus musculus* (Mouse) allergen 1
ND	None detected, if any allergens are present they are below the detection limits.
Rat n1	*Rattus norvegicus* (Rat) allergen 1

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Date Collected: **10/6/2017**
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Important Terms, Conditions, and Limitations

A. Sample Retention
Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation
All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

C. Warranty
EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

D. Limits of Liability
In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client orvalue of any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

E. Indemnification
Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL's services, the test result data or its use by client.

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EMSL Order Number (Lab Use Only): 371722138

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200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
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Report To Contact Name: Ben Hestir	**Bill To Company:** Terracon (GTER78)	**Client ID #:**
Company Name: Terracon Consultants, Inc.	**Attention To:**	
Street: 72 Pointe Circle	**Street:**	
City: Greenville **State/Province:** SC **Zip/Postal Code:** 29615	**City:** **State/Province:** **Zip/Postal Code:**	
Phone : 864-293-7348 **Fax :**	**Phone:** **Fax:**	
Project Name: Clemson Hunter 477	**Email Results To:** ben.hestir@terracon.com	**U.S. State where Samples Collected:** SC
# Samples in Shipment: 1 **Date of Shipment:** 10-7-17	**Purchase Order:** 86127158 - Task 113	**Sampled By (Signature):**

Turnaround Time (TAT) – Please Check: If No Selection Made, Standard 2 Week TAT Will Apply

☐ 2 Week ☑ 1 Week ☐ 4 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day ☐ Other (Call Lab)

Media Type: Zefon 25mm Pump Cassette
Manufacturer/Part #: Zefon Z0450 **Lot #:** 46203

Client Sample ID	Location/Description	Analyte / Method	Media	Flow (lpm)	Sample Time On	Sample Time Off	Volume / Area	Sample Type	Sample Date	Comments
477-AG1	Top of Bookshelf	M038, M039, M044	Cassette			1545	288 in2	☑ Area ☐ Personal	10-6-17	
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
	10-6-17 1750	Kyle Nelson - 10/9/17 8:50AM F/x 7704 4285 4108	
		Clemson Lab 10-10-17	10a

Comments:

RECEIVED EMSL CINNAMINSON, N.J. OCT 10 A 10:11

OrderID: 371722138

SEEML Reference Number:
171009199

Southeast Environmental Microbiology Laboratories
506 Laurens Rd
Greenville, SC 29607
Phone: (864) 233-3770
FAX: (864) 233-6589

The information and data for **Terracon** has been checked for thoroughness and accuracy. The following reports are contained within this document:

- ☒ Direct Exam Report
- ☒ Spore Trap Report
- ☐ Andersen Fungal Report
- ☐ Quantitative Direct Exam Report
- ☐ Quantitative Fungal Report

Lab Manager Review: Rafael Berrios Date: 10/09/17

Thank you for using SEEML laboratories. We strive to provide superior quality and service.
SEEML laboratories are AIHA (American Industrial Hygiene Association) Environmental Microbiology Accredited laboratory for only fungal analysis Air-Direct Examination (EMLAP # 173667).

The data within this report is reliable to three significant figures. The third significant figure is technically unjustified. In this instance, the third figure is reported as an estimate to facilitate the interpretation by the customer.

Confidentiality Notice:
The document(s) contained herein are confidential and privileged information, intended for the exclusive use of the individual or entity named above. If the reader of this message is not the intended recipient, or the employee or agent responsible for delivering it to the intended recipient, you are hereby notified that any dissemination, distribution or copying of the document(s) is strictly prohibited. If you have received this document in error, please immediately notify us by telephone to arrange for its return. Thank you.

Guidelines for Interpretation:
No accepted quantitative regulatory standards currently exist by which to assess the health risks related to mold and bacterial exposure. Molds and bacteria have been associated with a variety of health effects and sensitivity varies from person to person.
Several organizations, including: the American Conference of Government Industrial Hygienists (ACGIH); the American Industrial Hygiene Association (AIHA); the Indoor Air Quality Association (IAQA); the United States Environmental Protection Agency (USEPA); the Centers for Disease Control (CDC), as well as the California Department of Health Services (CADHS), have all published guidelines for assessment and interpretation of mold resulting from water intrusion in buildings.

Interpretation of the data and information within this document is left to the company, consultant, and/or persons who conducted the fieldwork.

Spore Trap Report

Attention: Ben Hestir	Date Sampled: 10/06/17
Terracon	Date Received: 10/09/17
72 Pointe Circle	Date Analyzed: 10/09/17
Greenville, SC 29615	Date Reported: 10/09/17
	Date Revised:
	Project Name: Hunter Hall Room 477
	Project Address: 86127158-Task 113
	Project City, State, ZIP: Clemson, SC
	SEEML Reference # : 171009199

TEST METHOD: DIRECT MICROSCOPY EXAMINATION AT 400X (100% OF TRACE ANALYZED) SEEML SOP 7

Client Sample ID	447-A1			447-A2			447-A3		
Location	Room 477			Room 477			Exterior #1		
Lab Sample ID	171009199-752			171009199-753			171009199-754		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments				4	52		6	78	
Pollen	1	13		6	78		6	78	
Spore Trap Used	Allergenco			Allergenco			Allergenco		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores	9	117	17	15	195	10	60	780	13
Basidiospores	12	156	23	9	117	6	120	1560	26
Bipolaris/Drechslera									
Chaetomium				1	13	<1			
Cladosporium	15	195	28	85	1110	57	270	3510	59
Curvularia	1	13	2	5	65	3			
Epicoccum				1	13	<1			
Cercospora									
Fusarium									
Memnoniella									
Nigrospora	1	13	2	2	26	1			
Penicillium/Aspergillus	3	39	6	9	117	6			
Polythrincium									
Rusts	1	13	2	1	13	<1	1	13	<1
Smuts/Periconia/Myxomy	9	117	17	12	156	8	6	78	1
Spegazzinia	1	13	2				1	13	<1
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes	1	13	2	3	39	2	1	13	<1
Pithomyces				6	78	4			
Background debris (1-5)3	3			3			3		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	53	**689**		149	**1940**		459	**5970**	

Comments: Condition of the sample(s) upon receipt: Acceptable.

1=Total % may not equal 100 due to rounding.

2 = Colorless,other Brown are spores without a distinctive morphology on spore traps and non-viable surface samples.

3 = Background debris is the amount of particulate matter present on the slide and is graded from 1-5 with 1 = very light, 2= Light, 3 = Medium, 4 = Heavy, 5 = Very Heavy. The higher the rating the more likelihood spores may be underestimated. A rating of 5 should be interpreted as minimal counts and may actually be higher than reported.

The reporting limit is 1 Spore/sample.

Disclaimer: This report relates only to the samples tested

Respectfully submitted, SEEML

Rafael Berrios

Rafael Berrios, Approved Laboratory Signatory

506 Laurens Road
Greenville, SC 29607
Phone: (864) 233- 3770
Fax: (864) 233-6589
AIHA-LAP, LLC EMLAP # 173667

Spore Trap Report

Attention: Ben Hestir	Date Sampled: 10/06/17
Terracon	Date Received: 10/09/17
72 Pointe Circle	Date Analyzed: 10/09/17
Greenville, SC 29615	Date Reported: 10/09/17
	Date Revised:
	Project Name: Hunter Hall Room 477
	Project Address: 86127158-Task 113
	Project City, State, ZIP: Clemson, SC
	SEEML Reference # : 171009199

TEST METHOD: DIRECT MICROSCOPY EXAMINATION AT 400X (100% OF TRACE ANALYZED) SEEML SOP 7

Client Sample ID	477-A4			477-A5					
Location	Exterior #2			Blank					
Lab Sample ID	171009199-755			171009199-756					
Detection Limit (spores/m^3)	13			13					
Hyphal Fragments									
Pollen	7	91							
Spore Trap Used	Allergenco			Allergenco					
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%			
Alternaria									
Ascospores	27	351	6						
Basidiospores	120	1560	28						
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	270	3510	63	No					
Curvularia				Trace					
Epicoccum	1	13	<1						
Cercospora	2	26	<1						
Fusarium									
Memnoniella									
Nigrospora	1	13	<1						
Penicillium/Aspergillus									
Polythrincium									
Rusts	2	26	<1						
Smuts/Periconia/Myxomy	7	91	2						
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	3			0					
Sample Volume(liters)	75			75					
TOTAL SPORES/M^3	430	**5590**							

Comments: Condition of the sample(s) upon receipt: Acceptable.

1=Total % may not equal 100 due to rounding.

2 = Colorless,other Brown are spores without a distinctive morphology on spore traps and non-viable surface samples.

3 = Background debris is the amount of particulate matter present on the slide and is graded from 1-5 with 1 = very light, 2= Light, 3 = Medium, 4 = Heavy, 5 = Very Heavy. The higher the rating the more likelihood spores may be underestimated. A rating of 5 should be interpreted as minimal counts and may actually be higher than reported.

The reporting limit is 1 Spore/sample.

Disclaimer: This report relates only to the samples tested

Respectfully submitted, SEEML

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AIHA-LAP, LLC EMLAP # 173667

Surface and Bulk Sample Report

	Date Sampled: 10/06/17
Attention: Jeff Gurrie	Date Received: 10/09/17
Terracon	Date Analyzed: 10/09/17
72 Pointe Circle	Date Reported: 10/09/17
Greenville, SC 29615	Date Revised:
	Project Name: Hunter Hall Room 477
	Project Address: 86127158-Task 113
	Project City, State ZIP: Clemson, SC
	SEEML Reference #: 171009199

TEST METHOD: Direct Microscopic Examination (SEEML SOP 18)

Client Sample ID	477-S1			
Location	Slot Diffuser			
SEEML Sample ID	171009199-757			
Sample Type	Swab			
	Quantification*			
Hyphal Fragments	**VL**			
Pollen				
General Impressions **	**MFG**			
Fungal Spore:				
Alternaria				
Acremonium				
Ascospores				
Basidiospores				
Bipolaris/Drechslera				
Cercospora				
Chaetomium				
Cladosporium	**VL**			
Curvularia				
Epicoccum				
Fusarium				
Geotrichum sp.				
Memnoniella				
Myxomycetes				
Nigrospora				
Penicillium/Aspergillus	**VL**			
Pithomyces				
Rusts/Smuts				
Stachybotrys				
Torula				
Ulocladium				

**** General Impressions: NFG = No Fungal Growth, FG = Fungal Growth, MFG = Minimal Fungal Growth Or Growth in vicinity**

Quantification of fungal growth is done by semi-quantitative grading using the following ranges:

Scattered Spores, 1-20 fungal spores

VL = 21-100 fungal spores **L = 101-1,000 fungal spores** **M = 1,001-10,000 fungal spores** **H = >10,000 fungal spores**

ND = No Fungal Spores Detected

Disclaimer: This report relates only to the samples tested

Respectfully submitted, SEEML

Rafael Berrios, **Approved Laboratory Signatory**

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AIHA-LAP, LLC EMLAP # 173667

Southeast Environmental Microbiology Laboratories
Chain of Custody

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For Lab Use Only			
Condition of samples is acceptable	☑ YES ☐ NO	SEEML Ref #: 171009199	Lab ID: 752 - 757

Company Information	Client Information		Environmental Conditions	
(Project Manager) **Ben Hestir**	Date Sampled:	10/6/2017	Precipitation in last 16hrs:	N/A
(Company Name) **Terracon**	Project Name:	Hunter Hall Room 477	Relative Humidity I/O:	43.9% / 46.7%
(Address) **72 Pointe Circle**	Project Address:	86127158 - Task 113	Temperature I/O:	71.2° / 78.1°
(City, State, Zip) **Greenville, SC 29615**	City, State, Zip:	Clemson, SC	Wind Conditions	Light
(Phone) **(864) 293-7348**				
(Email) **ben.hestir@terracon.com**				

Sample Type Abbreviations:
A- Allergenco **S**-Swab **AP**-Andersen Plate
AOC- Air O Cell **T**-Tape **W**- Water
M5- Micro 5 **B**- Bulk **D**- Dust

Analysis Type:
1. SporeTrap, Air Sample Analysis-Same Day
2. Direct Exam Surface Sample Analysis -Same Day
3. Culturable Air / Surface Samples -7-10 days

Sample ID	Sample Location	Sample Type	Analysis Type	*Area	**Volume (L)	Notes
477-A1	Room 477	A	1		75	
477-A2	"	A	1		75	
477-A3	Exterior #1	A	1		75	
477-A4	Exterior #2	A	1		75	
477-A5	Blank	A	1		0	
477-S1	Slot Diffuser	S	2	2 in²		

Relinquished By:	Date/Time	Recieved By:	Date/Time
	10-9-17		10-9-17

* Area is only required for culturable surface samples.
** Volume = Pump setting (L/min) x minutes