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, Allergen and Bedbug Investigation Report
Holmes Dormitory Room 107
Clemson University
Clemson, South Carolina
Terracon Project No. 86187189B

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold, allergen and bedbug investigation in dormitory room 107 of Holmes Dormitory on the main campus of Clemson University in Clemson, South Carolina. Reportedly, the occupants of this dormitory room (107) have reported respiratory irritation and/or allergic type health symptoms. 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, allergen, and bedbug investigation in the dormitory room on Thursday, October 18, 2018.

On our October 18th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in two locations inside and the collection of two additional samples outside for comparison. We also collected a composite dust samples for allergen analysis and a composite dust swab sample for bedbug 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.

SAMPLING CRITERIA AND METHODS

Mold and Allergen 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 shipped by overnight courier to the 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. 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.

A composite allergen dust sample was collected from flooring, carpet, chair fabrics and furniture surfaces in the occupied offices using a high volume air sampling pump in conjunction with a 3-piece 37 millimeter dust sampling cassette preloaded with a 5.0 micrometer polyvinyl chloride (PVC) filter.

After composite dust sample collection, the allergen sample was shipped 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. The allergen sample was analyzed by direct microscopic examination for allergens from dust mites, mouse, rat, cat, dog, and cockroach. Allergen results are reported in micrograms per gram of dust (µg/g).

A dust swab sample was collected from bedding, bed furniture and horizontal surfaces near the bed using a HealthLink Transporter sterile swab.

After collection the swab sample was shipped by overnight courier to Research Associates Laboratory (RAL) in Allen, Texas. RAL has been providing DNA analysis to the veterinary industry and others since 1992 and they hold the patent for Bedbug DNA testing. The swab sample was tested for the DNA of the common bedbug (*Cimex lectilarius* and *Cimex hemipterus*) using quantitative real time polymerase chain reaction technology (qPCR).

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, 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 a Kestrel Model 3500 Weather Meter instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- One occupant was in the room at the time of the assessment.
- No evidence of mold growth or water damage was observed.
- The room appeared to be cluttered and had a mix of personal belongings and general debris scattered throughout the room.
- A general unclean odor was noted in the room but it did not smell like a musty, moist, or chemically based odor.
- Two small portable fans were noted in the room.
- No dirt or mold-like debris were noted on the HVAC registers in the room.

Mold Air Sampling

On the morning of October 18, 2018, Terracon collected two mold spore trap samples inside Holmes Dormitory (Room 107 and the 1st Floor hallway) and two 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 – October 18, 2018

Sample #	**H107-A1**	**H107-A2**	**H107-O1**	**H107-O2**
Location Description	**Dorm Room**	**1st Floor Hallway**	**Outdoors 1**	**Outdoors 2**
Spore Type	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**
Alternia	---	---	40	40
Ascospores	---	---	1,500	1,100
Basidiospores	1,500	400	8,620	5,610
Cladosporium	490	400	3,300	1,500
Curvularia	100	---	40	---
Epicoccum	---	---	---	40
Fusarium	100	---	---	40
Ganoderma	---	---	90	40
Penicillium/ Aspergillus	840	40	1,100	490
Myxomycetes	90	---	570	100
Pithomyces	10	---	40	100
Rust	---	---	---	40
Polythrincium	---	---	---	10
Tripospermum	---	---	---	40
Total	**3,320**	**840**	**15,020**	**9,150**
Temperature (degrees F.)	73.8	76.0	65.8	76.2
Relative Humidity (%)	46.4	40.6	47	38.5

The highest outdoor total spore count was approximately one third times the highest total spore count inside. The predominant mold types indoors and outdoors were *Basidiospores.* The weather on the day we sampled was warm, sunny and breezy. The laboratory analytical report is attached.

Temperature and Relative Humidity

The average indoor temperature was 74.9ºF and the average relative humidity was 43.5%. The average outdoor temperature was 71ºF and the relative humidity was 42.8%.

Allergen Sampling

On the morning of October 18, 2018, Terracon collected a dust sample from the carpeting in Holmes Dormitory Room 107. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. Table 2 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information.

Table 2: Summary of Allergen Analyses – October 18, 2018

Sample #	**686-4**	
Location	**Room 686 composite**	
Allergen Type/Antigen	**Concentration (ug/g)**	**Laboratory assigned risk factor**
Dust Mites / Der fl	0.15	Low
Dust Mites / Der pl	ND	Low
Cat / Fel dl	0.11	Low
Dog / Can fl	0.32	Low
Cockroach / Bla g2	ND	Low

Note: ug = microgram (10^{-6} grams), NA = Not Applicable, ND = not detected

Bedbug DNA Sampling

On the morning of October 18, 2018, Terracon collected a swab sample from the bed frame in Holmes Dormitory Room 107. The sample was analyzed for DNA of the two most common bedbug species, *Cimex lectilarius* and *Cimex Hemipterus*.

Bedbug DNA was not identified in the sample. The laboratory analytical report is attached.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are provided based on our assessment:

- The results of mold air sampling indicated that the airborne mold spore concentrations indoors were lower than outdoor levels. The predominant mold types indoors and outdoors were *Basidiospores*.
- Dust mite, cat, and dog allergens were identified from the dust samples collected in the building. The allergen risk levels assigned by the lab were "low". The remaining allergens that were sampled for, were below the analytical sensitivity of the laboratory **and are categorized as a "low" risk level**.
- DNA from two common species of bedbugs was not detected in the dust wipe samples from the bedding, bed furniture and other horizontal surfaces in the vicinity of the bed.
- Temperature and relative humidity levels were within ASHRAE and EPA guideline ranges, respectively.
- No evidence of mold growth or water damage was observed. Additionally, no musty odors were observed; however, a general unclean odor was noted in the room. General cleaning and housekeeping is suggested to reduce the odors within the room.

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

Sincerely,
Terracon Consultants, Inc.

Stephen N. Ellis
Staff Industrial Hygienist

FOR:
Jeffrey A. Gurrie, CIH
Senior Industrial Hygienist

Attachments: Laboratory Results
Photographs

Laboratory Results

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-0262

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

EMSL Order: 371819119
Customer ID: GTER78
Customer PO: 86187189B
Project ID:

Attn: Stephen Ellis
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

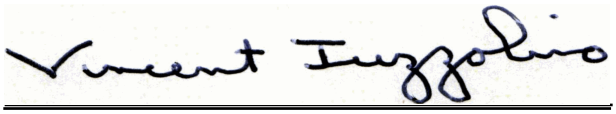
Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 10/18/2018
Received: 10/19/2018
Analyzed: 10/19/2018

Project: 86187189B / CU Holmes 107

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

Lab Sample Number:	371819119-0001			371819119-0002			371819119-0003		
Client Sample ID:	H107-A1			H107-A2			H107-O1		
Volume (L):	75			75			75		
Sample Location	Center Of Dorm Room			Hallway/Corridor			Outdoors 1		
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
Ascospores	7	300	9	-	-	-	35	1500	10
Aspergillus/Penicillium	19	840	25.2	1	40	4.8	26	1100	7.3
Basidiospores	35	1500	45	9	400	47.6	187	8260	55
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	11	490	14.7	9	400	47.6	74	3300	22
Curvularia	3	100	3	-	-	-	1	40	0.3
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	2	90	0.6
Myxomycetes++	2	90	2.7	-	-	-	13	570	3.8
Pithomyces++	1*	10*	0.3	-	-	-	1	40	0.3
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	1	40	0.3
Polythrincium	-	-	-	-	-	-	1	40	0.3
Tripospermum	-	-	-	-	-	-	-	-	-
Total Fungi	**78**	**3330**	**100**	**19**	**840**	**100**	**342**	**15020**	**100**
Hyphal Fragment	5	200	-	1	40	-	6	300	-
Insect Fragment	1	40	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	3	-	-	2	-	-	1	-

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



Vincent Iuzzolino, M.S., 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. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 10/21/2018 19:17:09

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

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-0262

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

EMSL Order: 371819119
Customer ID: GTER78
Customer PO: 86187189B
Project ID:

Attn: Stephen Ellis
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

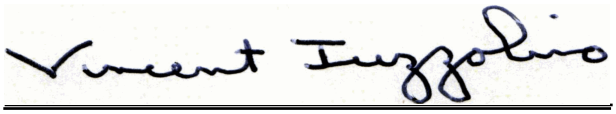
Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 10/18/2018
Received: 10/19/2018
Analyzed: 10/19/2018

Project: 86187189B / CU Holmes 107

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

Lab Sample Number:	371819119-0004			371819119-0005		
Client Sample ID:	H107-O2			BL		
Volume (L):	75					
Sample Location	Outdoors 2			Blank		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	1	40	0.4	-	-	-
Ascospores	25	1100	12	-	-	-
Aspergillus/Penicillium	11	490	5.4	-	-	-
Basidiospores	127	5610	61.3	-	-	-
Bipolaris++	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	35	1500	16.4	-	-	-
Curvularia	-	-	-	-	-	-
Epicoccum	1	40	0.4	-	-	-
Fusarium	1	40	0.4	-	-	-
Ganoderma	1	40	0.4	-	-	-
Myxomycetes++	3	100	1.1	-	-	-
Pithomyces++	3	100	1.1	-	-	-
Rust	1	40	0.4	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-
Polythrincium	1*	10*	0.1	-	-	-
Tripospermum	1	40	0.4	-	-	-
Total Fungi	**211**	**9150**	**100**	**-**	**No Trace**	**-**
Hyphal Fragment	6	300	-	-	-	-
Insect Fragment	-	-	-	-	-	-
Pollen	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	0	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-
Skin Fragments (1-4)	-	1	-	-	-	-
Fibrous Particulate (1-4)	-	1	-	-	-	-
Background (1-5)	-	2	-	-	-	-

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



Vincent Iuzzolino, M.S., 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. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 10/21/2018 19:17:09

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

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #:	**371819119**
Customer ID:	**GTER78**
Customer PO:	**86187189B**

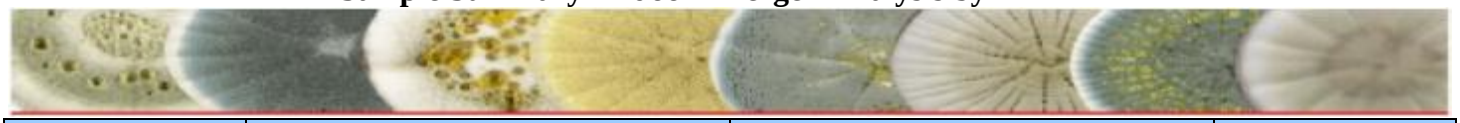
Attn: **Stephen Ellis**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189B / CU Holmes 107**

Date Collected: **10/18/2018**
Date Received: **10/19/2018**
Date Analyzed: **10/22/2018**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371819119-0006	H107-CV	Dorm Room Carpet	Bulk

Report Date	Report Revision	Revision Comments
10/26/2018	R0	Initial Report

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

About Us

EMSL Analytical, Inc. offers a full line of analytical solutions for over 30 years across North America. For more information about our nationally accredited locations, vast line of testing services, and our food safety solutions please visit www.EMSL.com or call



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.

Please visit our website at http://www.microbiologytestinglab.com/
© 2016, EMSL Analytical, Inc., All rights reserved. No part of this report may be reproduced or otherwise distributed or used without the express written consent of EMSL.

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #: **371819119**
Customer ID: **GTER78**
Customer PO: **86187189B**

Attn: **Stephen Ellis**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189B / CU Holmes 107**

Date Collected: **10/18/2018**
Date Received: **10/19/2018**
Date Analyzed: **10/22/2018**

EMSL Sample #: **371819119-0006**
Client ID: **H107-CV**
Location: **Dorm Room Carpet**

Sample Type: **Bulk**
Sample Size: **52**
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	**0.15**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	µg/g	☑
Cat Allergen	Fel d1	0.004	µg/g	**0.11**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**0.32**	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.

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.

This report has been prepared by EMSL Analytical, Inc. at the request of and for the exclusive use of the client named in this report. Completely read the important terms, conditions, and limitations that apply to this report

Report Date	**Report Revision**	**Revision Comments**
10/26/2018	R0	Initial Report

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

Please visit our website at http://www.microbiologytestinglab.com/
© 2016, EMSL Analytical, Inc., All rights reserved. No part of this report may be reproduced or otherwise distributed or used without the express written consent of EMSL.

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #: **371819119**
Customer ID: **GTER78**
Customer PO: **86187189B**

Attn: **Stephen Ellis**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189B / CU Holmes 107**

Date Collected: **10/18/2018**
Date Received: **10/19/2018**
Date Analyzed: **10/22/2018**



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

Please visit our website at http://www.microbiologytestinglab.com/
© 2016, EMSL Analytical, Inc., All rights reserved. No part of this report may be reproduced or otherwise distributed or used without the express written consent of EMSL.

EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #: **371819119**
Customer ID: **GTER78**
Customer PO: **86187189B**

Attn: **Stephen Ellis**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189B / CU Holmes 107**

Date Collected: **10/18/2018**
Date Received: **10/19/2018**
Date Analyzed: **10/22/2018**

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.

This report has been prepared by EMSL Analytical, Inc. at the request of and for the exclusive use of the client named in this report. Completely read the important terms, conditions, and limitations that apply to this report.

Report Date	Report Revision	Revision Comments
10/26/2018	R0	Initial Report

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

Please visit our website at http://www.microbiologytestinglab.com/
© 2016, EMSL Analytical, Inc., All rights reserved. No part of this report may be reproduced or otherwise distributed or used without the express written consent of EMSL.

OrderID: 371819119

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371819119

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: 1-800-220-3675
FAX: (856) 786-5974

Company Name: Terracon Consultans, 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: 72 Pointe Circle			
City: Greenville	**State/Province:** SC	**Zip/Postal Code:** 29615	**Country:** US
Report To (Name): Stephen Ellis		**Telephone #:** 864.292.2901	
Email Address: stephen.ellis@terracon.com		**Fax #:** 864.292.6361	**Purchase Order:**
Project Name/Number: 86187189B - CU Holmes 107		**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

Mold + Dust

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*)

Allergens

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: Stephen Ellis **Signature of Sampler:**

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	
H107-A1	Center of Dorm Room	Air	☐ P ☐ NP	M001	75L	10-18-18	
H107-A2	Hallway/Corridor	Air	☐ P ☐ NP	M001	75L	10-18-18	
H107-O1	Outdoors 1	Air	☐ P ☐ NP	M001	75L	10-18-18	
H107-O2	Outdoors 2	Air	☐ P ☐ NP	M001	75L	10-18-18	
BL	Blank	Air	☐ P ☐ NP	M001	UL	10-18-18	
H107-CV	Dorm Room Carpet	Dust/Vac	☐ P ☐ NP	M044**	N/A	10-18-18	

Client Sample # (s): **Total # of Samples:** 6 **Samples Received Chilled?** Yes / No

Relinquished (Client): **Date:** 10-18-18 **Time:** 1700

Received (Lab): **Date:** 10/19/18 **Time:** 1015

Comments/Special Instructions:

** - Please analyze for dust M041 and also analyze for Rat/Mouse Allergens M254

Research Associates Laboratory
(R.A.L.,Inc.)

411 East McDermott Drive Ste B. Allen, TX 75002
Phone: (972)960-2221 Fax: (972)960-1997
www.vetdna.com

TEST RESULTS

Acct ID:**P219**

TERRACON CONSULTANTS INC.
Attn:
72 POINTE CIRCLE
GREENVILLE, SC 29615
Phone: 864-292-2901
Fax: --
Email: BEN.HESTIR@TERRACON.COM

Owner Name: **TERRACON CONSULTANTS INC**
Lab ID: **287848**
Test Date: **10/19/2018**
Animal Name:
Species: **ENVIRONMENTAL**
Medium: **Swab**

Test Description	Result	Comments
Bed Bug - (C. lectularius and C. hemipterus)	**Negative**	

DIAGNOSTIC ANALYSIS PERFORMED BY QUANTITATIVE REAL TIME POLYMERASE CHAIN REACTION (qPCR)

Photographs

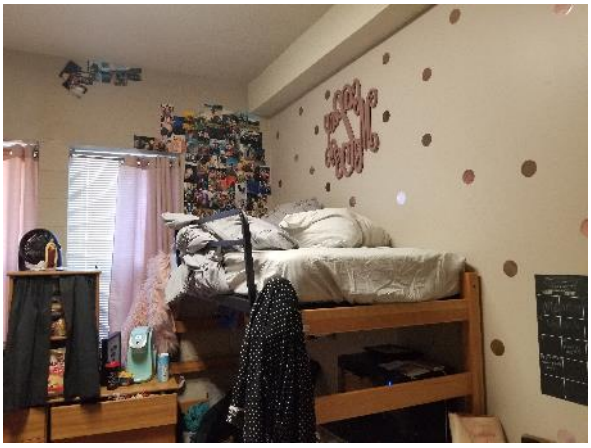


Photo #1 General view of the dorm room.



Photo #2 General view of the bathroom, shared by the adjacent room.



Photo #3 General view of the debris and clutter noted throughout the room.



Photo #4 General view of the HVAC register. No dirt or debris was noted on the registers.