July 21, 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
P&A Building
Room 156 and associated laboratories
Clemson, South Carolina
Terracon Project No. 86127158 – Task 92

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in an office and multiple associated lab rooms in the P&A Building, located on the main campus at Clemson University in Clemson, South Carolina. Reports of respiratory irritation have been reported from the occupants of these work spaces (Dr. Janie Hamilton and Chris Owens) 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. Benjamin Hestir conducted a limited mold and allergen investigation in Room 156 and the associated laboratory rooms (Rooms D132, D 133, D134 and D135) in the P&A Building, on June 12th and 23rd, 2017. This three story building constructed in 1955 contains approximately 65,000 square feet of classroom, office and lab space on each floor. The building is primarily occupied by the College of Agriculture. The office and lab rooms being investigated in this report are currently utilized by the genetics and biochemistry department. The labs are directly across a hallway from Room 156.

The investigation included measurements of temperature and relative humidity, the collection of spore trap samples and the collection of two (2) dust samples 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.

SAMPLING CRITERIA AND METHODS

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.

Two (2) dust samples for allergens analysis were collected from flooring and fixtures in Room 156 and also from flooring and fixtures in the associated laboratories (Rooms D132, D133, D134 and D135) 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 samples were 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.

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

- Spore trap air samples were collected in six (6) locations inside.
- Two additional spore trap air samples were collected outside for comparison.
- Allergen dust samples were collected from flooring and fixtures in five (5) room locations inside.
- The office of the complainants contained a significant number of potted house plants.
- No evidence of mold growth was observed or reported.
- Photographs from the assessment are attached.

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 – June 12, 2017

Sample #	156-1	156-2	156-3	156-4	156-5	156-6	156-7	156-8
Location Description	**Rm 156 – left desk**	**Rm 156 – right desk**	**Lab D133**	**Lab D132**	**Lab D134**	**Lab D135**	**Outside East entrance**	**Outside NE entrance**
Spore Type	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**
Alternaria	---	---	---	---	---	---	13	52
Ascospores	---	39	---	---	---	---	195	507
Basidiospores	156	117	39	13	39	39	3,780	1,170
Cladosporium	78	78	13	13	13	13	2,650	1,560
Curvularia	---	13	---	---	---	13	---	---
Epicoccum	---	---	---	---	---	---	26	26
Cercospora	---	---	---	---	---	---	---	13
Penicillium/ Aspergillus	39	156	39	---	78	39	351	273
Smuts/*Periconia*/ Myxomycetes	13	---	---	---	---	---	39	78
Rusts	---	---	---	---	---	---	13	---
Oidium	---	---	---	---	---	---	---	13
Polythrincium	---	---	---	---	---	---	13	---
Zygomycetes	---	---	---	---	---	---	234	169
Total	**286**	**403**	**91**	**26**	**130**	**104**	**7,310**	**3,860**
Temperature (ºF)	75.7	---	74.1	73.5	73.7	74.6	87.2	---
Relative Humidity (%)	48.7	---	57.9	60.5	60.8	60.1	51.2	---

The lowest outdoor total spore count was approximately 9.5 times higher than the highest total spore count inside. The dominant mold genera indoors were *Basidospores and Aspergillis/Penicillium.* The dominant mold spore types outdoors were *Cladosporium, Basidiospores* and *Aspergillis/Penicillium*. Conditions outside on the day we sampled were warm and sunny.

The laboratory analytical report is attached.

Dust Sampling

On the afternoon of June 23, 2017, Terracon collected a dust samples from the flooring and fixtures in the office (Room 156) and another from the same surfaces in the associated laboratories (Rooms D132, D133, D134 and D135). The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach. The office sample (Sample 156A-1) did not have enough dust for the lab to report allergen risk levels and thus is reported in nanograms per filter. The lab sample (Sample 156A-2) did have enough dust for the lab to report allergen risk levels, however, they are all identified as "low".

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 – June 23, 2017

Sample #	156A-1	156A-2	156A-2
Location Description	Composite from Room 156 office	Composite from Labs (4 rooms)	See Risk Level Below
Allergen Type/Antigen	Concentrations (ng/filter)	Concentrations (ug/g)	Allergen Risk Level assigned by the lab
Dust Mites / Der fl	ND	ND	Low
Dust Mites / Der pl	ND	0.02	Low
Mouse / Mus ml	ND	0.03	Low
Rat / Rat nl	0.02	0.01	NA
Cat / Fel dl	ND	0.52	Low
Dog / Can fl	0.38	0.16	Low
Cockroach / Bla G2	ND	ND	Low

Note: ug = microgram (10^{-6} grams), ng = nanogram (10^{-9} grams), ND = Not detected

Temperature and Relative Humidity

The highest indoor temperature was 75.7ºF and the highest indoor relative humidity was 60.8%. The outdoor temperature was 87.2ºF and the relative humidity was 51.2% (See Table 1 above for all readings).

CONCLUSIONS

The following conclusions are provided based on our assessment:

- 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 and concentrations of mold spore types inside the building were less than the highest corresponding outdoor mold spore levels measured. This is considered to be a favorable condition in the indoor environment.

- Levels of dust in allergen Sample 156A-1 collected in Room 156 were too low for the laboratory to assign risk levels. Dust mite, mouse, rat, cat, and dog allergens were detected in small concentrations in the sample collected.

- All risk levels for the common allergens identified from allergen Sample 156A-2 collected in the P&A laboratories were in the “low” category. Rat and dog allergens were detected.

- Temperature levels measured were within ASHRAE guideline ranges. Three of the five relative humidity levels measured indoors exceeded EPA guideline ranges.

RECOMMENDATIONS

The following recommendations are provided based on our assessment:

- Removal of the house plants located in Room 156 may reduce the number of potential allergens present.

- Relative humidity spot measurements at the time of testing indicated humidity levels above 60%. Sustained humidity above 60% indoors could lead to mold growth. Adjustments to the air handler may be necessary to reduce the relative humidity in the laboratories if humidity levels remain above 60%.

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 sample location on left desk in Room 156 – P&A Building (sample 156-1)



Photo #2 One of several potted plants in Room 156

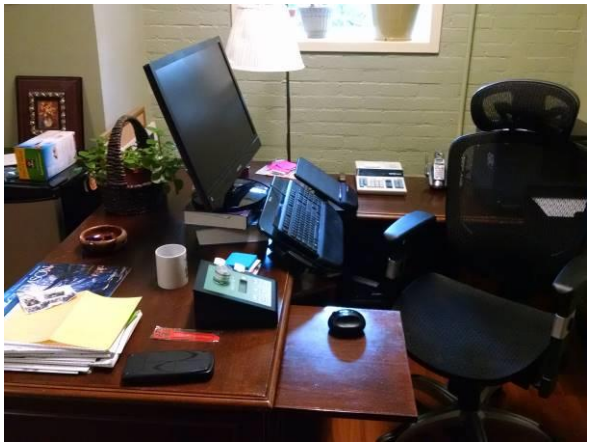


Photo #3 View of sample location on right desk in Room 156 – P&A Building (sample 156-2)



Photo #4 More plants in the office



Photo #5 More plants in the office



Photo #6 More plants in the office



Photo #7 More plants in the office



Photo #8 View of sample location 156-3 in Lab D133



Photo #9 View of sample location 156-4 in Lab D132



Photo #10 View of sample location 156-5 in Lab D134



Photo #11 View of location of outside sample 156-7, east of P&A Building

Laboratory Results

SEEML Reference Number:
170613045

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
- ☐ Quantitative Fungal Report
- ☐ Andersen Fungal Report
- ☐ Quantitative Direct Exam Report

Lab Manager Review: Rafael Berrios Date: 06/13/17

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:
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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: 06/12/17
Terracon	Date Received: 06/13/17
72 Pointe Circle	Date Analyzed: 06/13/17
Greenville, SC 29615	Date Reported: 06/13/17
	Date Revised:
	Project Name: P&A- Room 156
	Project Address: 86127158- Task 92
	Project City, State, ZIP:
	SEEML Reference # : 170613045

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

Client Sample ID	156-1			156-2			156-3		
Location	Rm 156- Left Desk			Rm 156- Right Desk			Rm D133		
Lab Sample ID	170613045-113			170613045-114			170613045-115		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments				1	13				
Pollen				1	13				
Spore Trap Used	AOC			AOC			AOC		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores				3	39	10			
Basidiospores	12	156	55	9	117	29	3	39	43
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	6	78	27	6	78	19	1	13	14
Curvularia				1	13	3			
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	3	39	14	12	156	39	3	39	43
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy	1	13	5						
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	3			3			2		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	22	**286**		31	**403**		7	**91**	

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: 06/12/17
Terracon	Date Received: 06/13/17
72 Pointe Circle	Date Analyzed: 06/13/17
Greenville, SC 29615	Date Reported: 06/13/17
	Date Revised:
	Project Name: P&A- Room 156
	Project Address: 86127158- Task 92
	Project City, State, ZIP:
	SEEML Reference # : 170613045

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

Client Sample ID	156-4			156-5			156-6		
Location	Rm D132			Rm D134			Rm D135		
Lab Sample ID	170613045-116			170613045-117			170613045-118		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments									
Pollen									
Spore Trap Used	AOC			AOC			AOC		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores									
Basidiospores	1	13	50	3	39	30	3	39	38
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	1	13	50	1	13	10	1	13	13
Curvularia							1	13	13
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus				6	78	60	3	39	38
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy									
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	1			1			2		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	2	**26**		10	**130**		8	**104**	

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: 06/12/17
Terracon	Date Received: 06/13/17
72 Pointe Circle	Date Analyzed: 06/13/17
Greenville, SC 29615	Date Reported: 06/13/17
	Date Revised:
	Project Name: P&A- Room 156
	Project Address: 86127158- Task 92
	Project City, State, ZIP:
	SEEML Reference # : 170613045

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

Client Sample ID	156-7			156-8					
Location	Outside E Entrance			Outside NE Corner P&A					
Lab Sample ID	170613045-119			170613045-120					
Detection Limit (spores/m^3)	13			13					
Hyphal Fragments									
Pollen									
Spore Trap Used	AOC			AOC					
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%			
Alternaria	1	13	<1	4	52	1			
Ascospores	15	195	3	39	507	13			
Basidiospores	291	3780	52	90	1170	30			
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	204	2650	36	120	1560	40			
Curvularia									
Epicoccum	2	26	<1	2	26	<1			
Cercospora				1	13	<1			
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	27	351	5	21	273	7			
Polythrincium	1	13	<1						
Rusts	1	13	<1						
Smuts/Periconia/Myxomy	3	39	<1	6	78	2			
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium				1	13	<1			
Zygomycetes	18	234	3	13	169	4			
Pithomyces									
Background debris (1-5)3	3			3					
Sample Volume(liters)	75			75					
TOTAL SPORES/M^3	563	**7310**		297	**3860**				

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
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Fax: (864) 233-6589
AIHA-LAP, LLC EMLAP # 173667

Southeast Environmental Microbiology Laboratories

Chain of Custody

506 Laurens Rd, Greenville, SC 29607

Phone : 864-233-3770, Fax: 864-233-6589, www.seeml.com, AIHA-LAP, LLC (EMLAP) #173667

For Lab Use Only

Condition of samples is acceptable	☑ YES ☐ NO	SEEML Ref #: 170613045	Lab ID: 113-120

Company Information		Client Information		Environmental Conditions	
(Project Manager)	Ben Hestir	Date Sampled:	6/12/17	Precipitation in last 16hrs:	no
(Company Name)	Terracon	Project Name:	P+A - Room 156	Relative Humidity I/O:	60%/51%
(Address)	72 Pointe Circle	Project Address:	86127158 - Task 92	Temperature I/O:	75°/87°
(City, State, Zip)	Greenville, SC 29615	City, State, Zip:		Wind Conditions	light breeze
(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
156-1	Rm 156 left desk	A	1		75	
156-2	Rm 156 - right desk	"	"		"	
156-3	Rm D133	"	"		"	
156-4	Rm D132	"	"		"	
156-5	Rm D134	"	"		"	
156-6	Rm D135	"	"		"	
156-7	Outside E entrance	"	"		"	
156-8	Outside NE corner P+A	"	"		"	

Relinquished By:	Date/Time	Recieved By:	Date/Time
Ben Hestir	6/13/17 1000		6-13-17

* Area is only required for culturable surface samples.

** Volume = Pump setting (L/min) x minutes

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 #:	**371713308**
Customer ID:	**GTER78**
Customer PO:	**86127158-Task92**

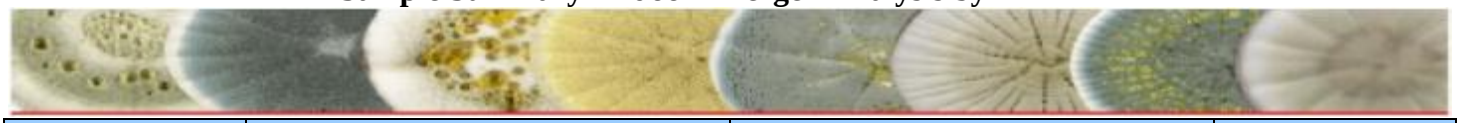
Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **P&A Room 156**

Date Collected: **6/23/2017**
Date Received: **6/29/2017**
Date Analyzed: **7/11/2017**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371713308-0001	156A-1	Office - Room 156	Bulk
371713308-0002	156A-2	Lab Composite	Bulk

Report Date	Report Revision	Revision Comments
7/14/2017	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/
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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 #: **371713308**
Customer ID: **GTER78**
Customer PO: **86127158-Task92**

Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **P&A Room 156**

Date Collected: **6/23/2017**
Date Received: **6/29/2017**
Date Analyzed: **7/11/2017**

EMSL Sample #: **371713308-0001**
Client ID: **156A-1**
Location: **Office - Room 156**

Sample Type: **Bulk**
Sample Size: **1 Filter**
Sample Units: **Filter**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.03	ng/filter	**ND**	ng/filter	†
Dust Mites Allergen	Der p1	0.03	ng/filter	**ND**	ng/filter	†
Mouse Allergen	Mus m1	0.005	ng/filter	**ND**	ng/filter	†
Rat Allergen	Rat n1	0.01	ng/filter	**0.02**	ng/filter	†
Cat Allergen	Fel d1	0.01	ng/filter	**ND**	ng/filter	†
Dog Allergen	Can f1	0.03	ng/filter	**0.38**	ng/filter	†
Cockroach Allergen	Bla g2	0.03	ng/filter	**ND**	ng/filter	†

†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.

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Report Date	Report Revision	Revision Comments
7/14/2017	R0	Initial Report

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

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Fax: **864-292-6361**

Project: **P&A Room 156**

Date Collected: **6/23/2017**
Date Received: **6/29/2017**
Date Analyzed: **7/11/2017**

EMSL Sample #: **371713308-0002**
Client ID: **156A-2**
Location: **Lab Composite**

Sample Type: **Bulk**
Sample Size: **46**
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	**0.02**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**0.03**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**0.01**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**0.52**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**0.16**	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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7/14/2017	R0	Initial Report

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Project: **P&A Room 156**

Date Collected: **6/23/2017**
Date Received: **6/29/2017**
Date Analyzed: **7/11/2017**



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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Project: **P&A Room 156**

Date Collected: **6/23/2017**
Date Received: **6/29/2017**
Date Analyzed: **7/11/2017**



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
7/14/2017	R0	Initial Report

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Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 371713308

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 858-3502

OrderID: 371713308

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: P&A Room 156		**Email Results To:** ben.hestir@terracon.com	**U.S. State where Samples Collected:** SC
# Samples in Shipment: 2	**Date of Shipment:** 6/27/17	**Purchase Order:** 86127158 - Task 92	**Sampled By (Signature):** Ben Hestir

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:

Manufacturer/Part #: **Lot #:**

Client Sample ID	Location/Description	Analyte / Method	Media	Flow (lpm)	Sample Time On	Sample Time Off	Volume / Area	Sample Type	Sample Date	Comments
156A-1	Office - Room 156	M038, M039, M044	Dust cas		1327	1333	Bulk	☑ Area ☐ Personal	6/23/17	Small office - two desks
156A-2	Lab composite	M038, M039, M044	Dust cas		1340	1349	Bulk	☑ Area ☐ Personal	6/23/17	Four labs composite from floors primarily
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		

RECEIVED EMSL CINNAMINSON, N.J. 2017 JUN 29 A 10:22

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
Ben Hestir Ben Hestir	6/27/17		6/29/17

Comments:

2