July 26, 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
Clemson Institute for Environmental Toxicology
509 Westinghouse Road
Pendleton, South Carolina 29670
Terracon Project No. 86127158 – Task 96

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in multiple offices and an associated lab room in the Clemson Institute of Environmental Toxicology (CIET), located in Pendleton, South Carolina. Reports of respiratory irritation have been reported from multiple occupants of these work spaces in the recent past. Reportedly a building cold water chiller is not functioning and is scheduled for replacement. 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 including sample collection in Room E136, Graduate Student Cubicles, Lab L112 and Office L115 in the CIET Building, on July 7th, 2017. This one story building was constructed in 1989 and contains approximately 38,000 square feet of classroom, office and lab space. The office of Dawn White (Room E 136) was of special interest as Ms. White has reported significant respiratory irritation since the problem with the chiller has occurred.

The investigation included measurements of temperature and relative humidity, the collection of four (4) spore trap samples inside the facility, two (2) spore trap samples outside the facility and the collection of one (1) dust sample from Room E136 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.

One (1) dust sample for allergens analysis was collected from flooring and fixtures in Room E136 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.

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

- Relative humidity levels were elevated and a majority of site staff were not present or were working from other locations.
- According to the building manager (Mr. Norman Ellis) portions of the building, including Ms. Whites' office, were very recently remodeled and contained new furniture and new vinyl flooring.
- Suspected surficial mold growth was observed on a metal cabinet in a lab (Room L112).
- 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 – July 7, 2017

Sample #	CIET-1	CIET-2	CIET-3	CIET-4	CIET-5	CIET-6
Location Description	**Rm E156 – on desk**	**Grad Student Cubicles**	**Lab L112**	**Office L115**	**Outside front entrance**	**Outside Employee parking**
Spore Type	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/ m^3**	**Spores/m^3**
Ascospores	13	---	---	---	702	1,050
Basidiospores	---	---	39	13	3,350	5,110
Bipolaris/Dreschlera	---	---	---	---	---	13
Cladosporium	39	13	78	39	936	702
Curvularia	---	---	---	13	---	13
Penicillium/ Aspergillus	39	17,600	1,400	2,220	156	78
Smuts/*Periconia*/ Myxomycetes	---	---	---	---	26	13
Spegazzinia	---	---	---	---	---	13
Torula	---	---	---	---	13	---
Total	**91**	**17,600**	**1,520**	**2,290**	**5,310**	**6,990**
Temperature (ºF)	74.1	73.4	73.9	76.5	88.1	---
Relative Humidity (%)	78.8	77.9	77.7	76.8	62.3	---

The result in the graduate student cubicles is indicative of mold growth in this area. Excluding the air sample from the Graduate Student Cubicles, the lowest outdoor total spore count was approximately 2.3 times higher than the highest total spore count inside. The dominant mold genera indoors were *Cladosporium and Aspergillis/Penicillium* type spores. The dominant mold

spore types outdoors were *Basidiospores, Cladosporium,* and *Ascospores*. Conditions outside on the day we sampled were warm and sunny.

The laboratory analytical report is attached.

Dust Sampling

On the afternoon of July 7, 2017, Terracon collected a dust sample from the flooring and fixtures in the office (Room E136). The sample was analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach. The sample (Sample CIET-A-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 – July 7, 2017

Sample #	**CIET-A-1**	**CIET-A-1**
Location Description	**Composite from Room E136 office**	**See Risk Level Below**
Allergen Type/Antigen	**Concentrations (ug/g)**	**Allergen Risk Level assigned by the lab**
Dust Mites / Der fl	1.03	Low
Dust Mites / Der pl	ND	Low
Mouse / Mus ml	**154.60**	**High**
Rat / Rat nl	0.04	NA
Cat / Fel dl	**2.57**	**Moderate**
Dog / Can fl	0.62	Low
Cockroach / Bla G2	**0.27**	**Moderate**

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

Temperature and Relative Humidity

The highest indoor temperature was 76.5ºF and the highest indoor relative humidity was 78.8%. The outdoor temperature was 88.1ºF and the relative humidity was 62.3% (See Table 1 above for all readings).

CONCLUSIONS

The following conclusions are provided based on our assessment:

- With the exception of the graduate student cubicle sample, 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 (with one exception noted below).
- Aspergillus/penicillium type mold spores were elevated in the indoor samples in comparison to outdoor levels. Elevated aspergillus/penicillium type mold spores may be contributed to elevated and sustained humidity levels above 60% as these types of molds are generally the first to colonize in high humidity conditions.
- The analytical result from the total spore count sample collected in the graduate student cubicle space is an indicator of active mold growth in this area, possibly due to the high humidity.
- Levels of dust in allergen Sample CIET-A-1 collected in Room E136 were found to contain mouse allergens at a high risk level and cat and cockroach allergens at a moderate risk level.
- Temperature levels measured were within ASHRAE guideline ranges. Relative humidity levels measured indoors exceeded EPA guideline ranges.

RECOMMENDATIONS

The following recommendations are provided based on our assessment:

- The replacement of the chiller should resolve the relative humidity issues according to the building manager. The university should consider temporary dehumidifiers and air filtration using HEPA filters to reduce humidity levels and control potential mold growth until such time that the chiller can be replaced.
- Specialized cleaning and air filtration with HEPA filters of the graduate student cubicle space, metal cabinets in a lab (Room L112), and Room E136 should help resolve any lingering respiratory irritation issues due to mold and/or allergens.
- Pest control may be needed to address issues with mice and/or cockroaches in Room E136 and other areas not tested in the building. A thorough cleaning should reduce allergens once the issue has been corrected.

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 Front entrance of CIET facing north



Photo #2 Possible mold growth on metal cabinet in Lab Room L112



Photo #3 Graduate student cubicle sample location



Photo #4 View of laboratory L112



Photo #5 View of office in Room L115

Laboratory Results

SEEML Reference Number:
170710059

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: 07/10/17

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.

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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: 07/07/17
Terracon	Date Received: 07/10/17
72 Pointe Circle	Date Analyzed: 07/10/17
Greenville, SC 29615	Date Reported: 07/10/17
	Date Revised:
	Project Name: CIET
	Project Number: 86127158 Task 96
	Project City, State, ZIP:
	SEEML Reference # : 170710059

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

Client Sample ID	CIET-1			CIET-2			CIET-3		
Location	Rm E136 Office			Grad Student Cubicles			L112 Lab		
Lab Sample ID	170710059-163			170710059-164			170710059-165		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments	1	13							
Pollen									
Spore Trap Used	Allergenco			Allergenco			Allergenco		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores	1	13	14						
Basidiospores							3	39	3
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	3	39	43	1	13	<1	6	78	5
Curvularia									
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	3	39	43	1350	17600	100	108	1400	92
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy									
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	2			2			2		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	7	**91**		1351	**17600**		117	**1520**	

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: 07/07/17
Terracon	Date Received: 07/10/17
72 Pointe Circle	Date Analyzed: 07/10/17
Greenville, SC 29615	Date Reported: 07/10/17
	Date Revised:
	Project Name: CIET
	Project Number: 86127158 Task 96
	Project City, State, ZIP:
	SEEML Reference # : 170710059

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

Client Sample ID	CIET-4			CIET-5			CIET-6		
Location	L115 Office			Outside South Entrance			Outside Employee Parking		
Lab Sample ID	170710059-166			170710059-167			170710059-168		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments									
Pollen							3	39	
Spore Trap Used	Allergenco			Allergenco			Allergenco		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores				54	702	13	81	1050	15
Basidiospores	1	13	<1	258	3350	63	393	5110	73
Bipolaris/Drechslera							1	13	<1
Chaetomium									
Cladosporium	3	39	2	72	936	18	54	702	10
Curvularia	1	13	<1				1	13	<1
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	171	2220	97	12	156	3	6	78	1
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy				2	26	<1	1	13	<1
Spegazzinia							1	13	<1
Stachybotrys									
Stemphylium									
Tetraploa									
Torula				1	13	<1			
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes				10	130	2			
Pithomyces									
Background debris (1-5)3	3			3			3		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	176	**2290**		409	**5310**		538	**6990**	

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
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AIHA-LAP, LLC EMLAP # 173667

Southeast Environmental Microbiology Laboratories
Chain of Custody

SEEML Labs
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 #: 170710059	Lab ID: 163 - 168

Company Information		Client Information		Environmental Conditions	
(Project Manager)	Ben Hestir	Date Sampled:	7/7/17	Precipitation in last 16hrs:	Yes
(Company Name)	Terracon	Project Name:	CIET	Relative Humidity I/O:	78.8%/d 62.3%
(Address)	72 Pointe Circle	Project Address:	86127158 Task 956	Temperature I/O:	76.5°/88.1°
(City, State, Zip)	Greenville, SC 29615	City, State, Zip:	08 29607	Wind Conditions	5-10 mph
(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
MS- 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
CIET-1	RM E136 office	A	1		75	
CIET-2	Grad Student Cubicles	"	"		"	
CIET-3	L112 lab	"	"		"	
CIET-4	L115 office	"	"		"	
CIET-5	Outside South Entrance	"	"		"	
CIET-6	Outside Employee Parking	"	"		"	

Relinquished By:	Date/Time	Recieved By:	Date/Time
Ben Hestir	1:00pm 7/10/17		7-10-17

* 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 #:	**371714057**
Customer ID:	**GTER78**
Customer PO:	**86127158-Task96**

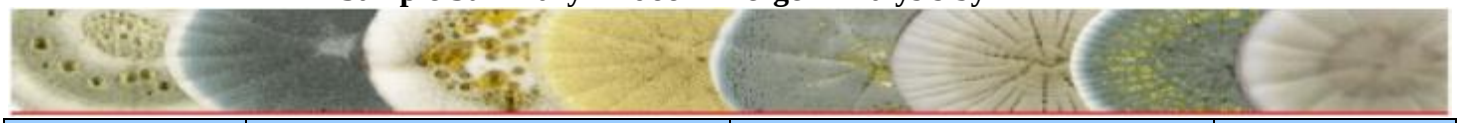
Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **CIET Room E136**

Date Collected: **7/7/2017**
Date Received: **7/11/2017**
Date Analyzed: **7/24/2017**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371714057-0001	CIET-A-1	Office - Room E136	Bulk

Report Date	Report Revision	Revision Comments
7/25/2017	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 Order #: **371714057**
Customer ID: **GTER78**
Customer PO: **86127158-Task96**

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

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

Project: **CIET Room E136**

Date Collected: **7/7/2017**
Date Received: **7/11/2017**
Date Analyzed: **7/24/2017**

EMSL Sample #: **371714057-0001**
Client ID: **CIET-A-1**
Location: **Office - Room E136**

Sample Type: **Bulk**
Sample Size: **30**
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	**1.03**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**154.60**	µg/g	⊘
Rat Allergen	Rat n1	0.004	µg/g	**0.04**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**2.57**	µg/g	⚠
Dog Allergen	Can f1	0.012	µg/g	**0.62**	µg/g	☑
Cockroach Allergen	Bla g2	0.012	µg/g	**0.27**	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**
7/25/2017	R0	Initial Report

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

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EMSL Order #: **371714057**
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Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **CIET Room E136**

Date Collected: **7/7/2017**
Date Received: **7/11/2017**
Date Analyzed: **7/24/2017**

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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EMSL Order #: **371714057**
Customer ID: **GTER78**
Customer PO: **86127158-Task96**

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

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

Project: **CIET Room E136**

Date Collected: **7/7/2017**
Date Received: **7/11/2017**
Date Analyzed: **7/24/2017**



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
7/25/2017	R0	Initial Report

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

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EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 371714057

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

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: CIET Room E136		Email Results To: ben.hestir@terracon.com		U.S. State where Samples Collected: SC	
# Samples in Shipment: 1	Date of Shipment: 7/10/17	Purchase Order: 86127158 - Task 96	Sampled By (Signature): Ben Hestir		

Turnaround Time (TAT) – Please Check: If No Selection Made, Standard 2 Week TAT Will Apply							Media Type:
☑ 2 Week	☐ 1 Week	☐ 4 Day	☐ 3 Day	☐ 2 Day	☐ 1 Day	☐ Other (Call Lab)	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
CIET-A-1	Office - Room E136	M038, M039, M044	Dust cas		1456	1506	Bulk	☑ Area ☐ Personal	7/7/17	Newly renovated office (Dawn White)
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		
								☐ Area ☐ Personal		

RECEIVED EMSL CINNAMINSON, NJ 2017 JUL 11 A 11:08

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	7/10/17	[illegible]	7/11/17 0410

Comments:

OrderID: 371714057