March 20, 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
Barre Hall
Rooms 2035 and 2037
Clemson University
Terracon Project No. 86127158 – Task 81

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in the offices of Jessi Wilson and Dr. Jan Urbanski in Barre Hall Rooms 2035 and 2037, respectively, on the main campus at Clemson University, Clemson, South Carolina. This service was conducted in general accordance with our Master Service Agreement with Clemson University.

PROJECT DESCRIPTION

Scope of Services

At the request of Clemson University, Terracon representative Mr. Benjamin Hestir conducted a limited mold and allergen investigation in the two rooms previously described on Wednesday, February 8, 2017 and again after a specialized cleaning on Monday, February 13, 2017.

On our February 8th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in five locations inside the offices and in nearby offices and the collection of two additional samples outside for comparison.

On our February 13th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in three locations inside the offices and in nearby offices and the collection of two additional samples outside for comparison. On February 13th, we also collected three surface dust samples, one each from accessible surfaces in Rooms 2033, 2035 and 2037, for allergen 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 Spore Sampling

Total mold spore trap samples were collected using Allergenco™ 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 collected on February 8th were hand delivered to Southeast Environmental Microbiology Laboratories, Inc. (SEEML), Greenville, SC. 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).

After collection, the spore trap samples collected on February 13th 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. 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.

Allergen Sampling

Additionally allergen dust samples were collected from carpet, chair fabrics and furniture surfaces in three offices (Rooms 2033, 2035 and 2037) 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 on February 13, 2017. After the dust sample collection, the allergen samples were 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. Allergen samples were analyzed by direct microscopic examination for allergens from dust mites, mouse, rat, cat, dog, and cockroach. Allergen results are reported in either nanograms per filter (ng/filter) or in micrograms of allergens per gram of dust (µg/g).

No state or federal exposure limits have been established for allergens. Laboratory provides guidance on risk levels associated with allergens based on their interpretation of information from the *Journal of Allergy and Clinical Immunology*, the *American Review of Respiratory Disease*, *Environmental Health Perspectives*, *Clinical and Experimental Allergy* and *Pediatric Allergy, Principles and Practice*. See the attached allergen lab report for additional details regarding the risk levels assigned by the lab based on the findings of the analyses.

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 on February 8, 2017

- Reportedly, both Ms. Wilson and Dr. Urbanski have experienced severe allergies of late, when spending time in their respective offices (2035 and 2037) which are adjacent to one another.
- Offices 2035 and 2037 were unoccupied and had HEPA air filtration units running upon our arrival for testing. The filtration units were turned off during the air sampling and turned back on afterwards.
- The offices were sparsely furnished and appeared clean with no signs of water intrusion or mold growth.
- Photographs from the assessment are attached.

Mold Air Sampling – February 8, 2017 (before specialized cleaning)

On the morning of February 8, 2017, Terracon collected five mold spore trap samples in Barre Hall 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 – February 8, 2017

Sample #	**2035-1**	**2035-2**	**2035-3**	**2035-4**	**2035-5**	**2035-6**	**2035-7**
Location Description	**Rm 2035 @ Desk**	**Rm 2037 @ Desk**	**Grad/ Visitor Office**	**Rm 2033 Desk**	**Mail/Copy Room**	**Outside NE Entrance**	**Outside McAdams**
Spore Type	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**
Ascospores	---	39	117	---	---	1,520	1,090
Basidiospores	78	39	---	104	---	42,700	20,600
Bipolaris/ Dreschlera	---	---	---	13	---	---	---
Cladosporium	13	26	13	78	156	117	351
Penicillium/ Aspergillus	78	---	39	78	---	312	195
Smuts/*Periconia*/ Myxomycetes	---	---	---	---	---	---	169
Rust	13	---	---	---	---	143	---
Stemphylium	---	---	---	---	---	13	---
Total	**182**	**104**	**169**	**273**	**156**	**44,800**	**22,400**

There was no visual evidence of water leaks or mold growth in the rooms sampled on February 8, 2017. The lowest outdoor total spore count was approximately 100 times higher than the highest total spore count inside. The dominant molds indoors were *Basidospores* and *Penicillium/Aspergillus* type spores. The dominant mold spore types outdoors were *Ascospores* and *Basidiospores*. The weather on the day we sampled was warm (61ºF), calm and rainy. The laboratory analytical report is attached.

Temperature and Relative Humidity – February 8, 2017

The indoor temperature was 72ºF and the relative humidity was 48%. The outdoor temperature was 61ºF and the relative humidity was 70%.

General Observations on February 13, 2017

- Offices 2035 and 2037 appeared exceptionally clean.
- Office 2033 was occupied at the time of our testing.
- Offices 2035 and 2037 were unoccupied and had HEPA air filtration units running upon our arrival for testing. The filtration units were turned off during the air sampling and turned back on afterwards.
- Photographs from the assessment are attached.

Mold Air Sampling – February 13, 2017 (after specialized cleaning)

On the afternoon of February 13, 2017, Terracon collected three mold spore trap samples in Barre Hall and two samples in outdoor locations for comparison. The results of the total spore count samples analyses are summarized in Table 2 below:

Table 2: Summary of Total Spore Count Analyses – February 13, 2017

Sample #	**2035R-1**	**2035R-3**	**2035R-5**	**2035R-7**	**2035R-8**
Location Description	**Rm 2035 @ Desk**	**Rm 2037 @ Desk**	**Rm 2033 @ Desk**	**Outside NE Entrance**	**Outside McAdams**
Spore Type	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**
Alternaria	---	---	---	10	---
Ascospores	---	---	---	100	200
Basidiospores	---	---	---	1,400	1,200
Cladosporium	---	---	---	90	200
Epicoccum	---	---	---	---	10
Smuts/*Periconia*/ Myxomycetes	---	10	---	---	---
Nigrospora	---	---	---	---	10
Unidentifiable Spores	---	---	---	40	---
Total	***	**10**	**ND**	**1,640**	**1,620**

*** **Sample cassette checked in and then lost by laboratory** ND = None detected

There was no visual evidence of water leaks or mold growth in the rooms sampled on February 13, 2017. A vendor for the university, JBR, reportedly conducted specialized cleaning in Rooms 2035 and 2037 on the morning of February 13, 2017. Indoor total spore counts were ranged from none detected to 10 spores/m^3. The dominant mold spore types outdoors were *Ascospores* and *Basidiospores*. The weather on the day we sampled was warm (68ºF), calm and sunny. The laboratory analytical report is attached.

Temperature and Relative Humidity – February 13, 2017

The indoor temperature was 73ºF and the relative humidity was 30%. The outdoor temperature was 68ºF and the relative humidity was 21%.

Dust Sampling – February 13, 2017

On the afternoon of February 13, 2016, Terracon collected three (3) dust samples from the carpeting, chair fabric and furniture in Rooms 2035, 2037 and 2033. They were designated as 2035R-2, 2035R-4 and 2035R-6, respectively. Again, please note that offices 2035 and 2037 were professionally cleaned prior to sampling. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. With the exception of Sample 2035R-6, the quantity of dust collected was not enough for the lab to assign allergen risk levels. Allergens detected in Sample 2035R-6 were assigned a “Low” risk level by the lab except for cat allergens, which were assigned a “Moderate” risk level. Table 3 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information.

Table 3: Summary of Allergen Analyses – February 13, 2017

Sample #	**2035R-2**	**2035R-4**	**2035R-6**
Location Description	**Room 2035 (Jessi Wilson)**	**Room 2037 (Jan Urbanski)**	**Room 2033 (Natasha Sianko)**
Allergen Type/Antigen	**Concentrations (ng/filter)**	**Concentrations (ng/filter)**	**Concentrations (ug/g)**
Dust Mites / Der fl	ND	ND	1.33
Dust Mites / Der pl	ND	ND	0.015
Mouse / Mus ml	ND	0.02	ND
Rat / Rat nl	ND	ND	ND
Cat / Fel dl	ND	ND	1.49
Dog / Can fl	0.24	ND	0.36
Cockroach / Bla G2	ND	ND	ND

Note: ng = nanogram (10^{-9} grams)
Note: ug/g = micrograms (10^{-6} grams) per gram

CONCLUSIONS

The following conclusions are provided based on our assessment:

- The results of mold spore air sampling from both sampling dates indicated that total airborne mold spore concentrations inside the building were well 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.

- Cat allergens were the highest levels of the allergens identified from the dust samples in the three offices. This allergen detection was in the office (2033) that was not cleaned by JBR as previously described.

- Samples collected in Offices 2035 and 2037 were reported in nanograms per filter, (ng/filter) due to the low levels of dust collected after the specialized cleaning of these rooms. The dust samples from Office 2033 were more substantial, and are reported in micrograms of allergen per gram of dust (ug/g).

- Temperature levels were within ASHRAE guideline ranges and relative humidity levels were within EPA guideline ranges.

- The offices appeared to be in good condition with no obvious water leaks or mold growth.

- Offices 2035 and 2037 received a cleaning, apparently consisting of damp wiping of horizontal surfaces and HEPA vacuuming prior to the February 13th sampling event. The lower levels of both mold spores and allergen dust in these areas may be attributed to this cleaning effort.

RECOMMENDATIONS

The following recommendations are provided based on our assessment:

- Allergens detected in Sample 2035R-6 collected in Office 2033 were assigned a “Low” risk level (dust mites and dog) by the lab with the exception of cat allergens, which were assigned a “Moderate” risk level. Please share the results with the occupant of the room and discuss potential cat allergies.

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.

Benjamin Hestir, P.E.
Project Industrial Hygienist

Jeffrey A. Gurrie
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 New vinyl floor in Room 2035 Barre Hall (replaced previous carpet in Jessi Wilson's office)



Photo #2 Sample location 2035-2 (February 8th) – Room 2037 desk (Dr. Urbanski's office)

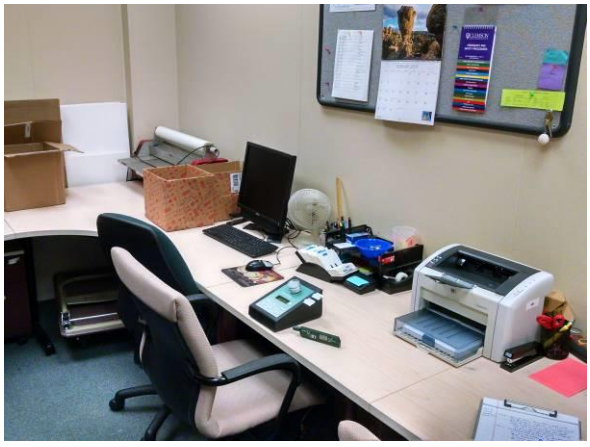


Photo #3 Sample location for 2035-3 (February 8th) in grad/visitors office



Photo #4 Sample location for 2035-5 in mail/copy room (February 8th)



Photo #5 Location of sample 2035R-2 in Room 2035 (February 13th)



Photo #6 Location of outside sample 2035R-7 – NW corner of Barre Hall at entrance (February 13th)

Laboratory Results

SEEML Reference Number:
170210006

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: 02/10/17

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.

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: 02/08/17
Terracon	Date Received: 02/10/17
72 Pointe Circle	Date Analyzed: 02/10/17
Greenville, SC 29615	Date Reported: 02/10/17
	Date Revised:
	Project Name: CU- Barre Hall
	Project Address: 86127158
	Project City, State, ZIP: Task 81
	SEEML Reference # : 170210006

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

Client Sample ID	2035-1			2035-2			2035-3		
Location	Room 2035 (Wilson)			Room 2037 (Urbaaski)			Grad/ Visitor Office		
Lab Sample ID	170210006-025			170210006-026			170210006-027		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments				1	13				
Pollen									
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	38	9	117	69
Basidiospores	6	78	43	3	39	38			
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	1	13	7	2	26	25	1	13	8
Curvularia									
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	6	78	43				3	39	23
Polythrincium									
Rusts	1	13	7						
Smuts/Periconia/Myxomy									
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	3			3			3		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	14	**182**		8	**104**		13	**169**	

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: 02/08/17
Terracon	Date Received: 02/10/17
72 Pointe Circle	Date Analyzed: 02/10/17
Greenville, SC 29615	Date Reported: 02/10/17
	Date Revised:
	Project Name: CU- Barre Hall
	Project Address: 86127158
	Project City, State, ZIP: Task 81
	SEEML Reference # : 170210006

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

Client Sample ID	2035-4			2035-5			2035-6		
Location	Room 2033 (Sianko)			Mail/ Copy Room			NE Entrance to Barre Hall		
Lab Sample ID	170210006-028			170210006-029			170210006-030		
Detection Limit (spores/m^3)	13			13			13		
Hyphal Fragments	5	65		1	13		1	13	
Pollen							3	39	
Spore Trap Used	AOC			AOC			AOC		
	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%	raw ct.	spores/m^3	%
Alternaria									
Ascospores							117	1520	3
Basidiospores	8	104	38				3286	42700	95
Bipolaris/Drechslera	1	13	5						
Chaetomium									
Cladosporium	6	78	29	12	156	100	9	117	<1
Curvularia									
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	6	78	29				24	312	<1
Polythrincium									
Rusts							11	143	<1
Smuts/Periconia/Myxomy									
Spegazzinia									
Stachybotrys									
Stemphylium							1	13	<1
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	3			3			3		
Sample Volume(liters)	75			75			75		
TOTAL SPORES/M^3	21	**273**		12	**156**		3448	**44800**	

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

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

Spore Trap Report

Attention: Ben Hestir	Date Sampled: 02/08/17
Terracon	Date Received: 02/10/17
72 Pointe Circle	Date Analyzed: 02/10/17
Greenville, SC 29615	Date Reported: 02/10/17
	Date Revised:
	Project Name: CU- Barre Hall
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	Project City, State, ZIP: Task 81
	SEEML Reference # : 170210006

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

Client Sample ID	2035-7								
Location	W Entrance to McAdams Hall								
Lab Sample ID	170210006-031								
Detection Limit (spores/m^3)	13								
Hyphal Fragments	1	13							
Pollen									
Spore Trap Used	AOC								
	raw ct.	spores/m^3	%						
Alternaria									
Ascospores	84	1090	5						
Basidiospores	1581	20600	92						
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	27	351	2						
Curvularia									
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	15	195	<1						
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy	13	169	<1						
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes									
Pithomyces									
Background debris (1-5)3	3								
Sample Volume(liters)	75								
TOTAL SPORES/M^3	1720	**22400**							

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

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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

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Greenville, SC 29607
Phone: (864) 233- 3770
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: 864-233-3779, www.seeml.com, AIHA-LAP, LLC. (EMLAP) #173667

For Lab Use Only			
Condition of samples is acceptable	☑ YES ☐ NO	SEEML Ref #: 170210006	Lab ID: 025-031

Company Information		Client Information		Environmental Conditions	
(Project Manager)	Ben Hestir	Date Sampled:	2/8/17	Precipitation in last 16hrs:	Yes
(Company Name)	Terracon	Project Name:	CU-Barre Hall	Relative Humidity I/O:	49% / 70%
(Address)	72 Pointe Circle	Project Address:	8612 7158	Temperature I/O:	72° / 62°
(City, State, Zip)	Greenville SC 29615	City, State, Zip:	Task 81	Wind Conditions	calm
(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
2035-1	Room 2035 (Wilson)	A	1		75	
2035-2	Room 2037 (Urbanski)	"	"		"	
2035-3	Grad/Visitor office	"	"		"	
2035-4	Room 2033 (Sianko)	"	"		"	
2035-5	Mail/Copy Room	"	"		"	
2035-6	NE entrance to Barre Hall	"	"		"	
2035-7	W entrance to McAdams Hall	"	"		"	

Relinquished By:	Date/Time	Received By:	Date/Time
Ben Hestir	2/9/17 12:52		2-10-17

* 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
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Order ID: 371703072
Customer ID: GTER78
Customer PO: 86127158
Project ID:

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

Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 02/13/2017
Received: 02/17/2017
Analyzed: 02/24/2017

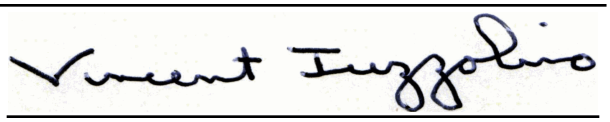
Proj: CU-2035 Barre Hall Revisit

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	371703072-0003			371703072-0005			371703072-0007		
Client Sample ID:	2035R-3			2035R-5			2035R-7		
Volume (L):	75			75			75		
Sample Location:	Desk in Room 2037			Desk in Room 2033			Outside NE Entrance to Barre Hall		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	1*	10*	0.6
Ascospores	-	-	-	-	-	-	3	100	6.1
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	-	-	-	-	-	-	33	1400	85.4
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-	2	90	5.5
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1*	10*	100	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	1	40	2.4
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Total Fungi	**1**	**10**	**100**	**-**	**None Detected**	**-**	**40**	**1640**	**100**
Hyphal Fragment	-	-	-	1	40	-	1	40	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	12	520	-
Analyt. Sensitivity 600x	-	43	-	-	43	-	-	43	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	3	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	2	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

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



Vincent Iuzzolino, M.S., Laboratory Director
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. 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: 02/24/2017 15:52:37

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

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Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 02/13/2017
Received: 02/17/2017
Analyzed: 02/24/2017

Proj: CU-2035 Barre Hall Revisit

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	**371703072-0008**		
Client Sample ID:	**2035R-8**		
Volume (L):	**75**		
Sample Location:	**Outside West Entrance to McAdams**		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-
Ascospores	4	200	12.3
Aspergillus/Penicillium	-	-	-
Basidiospores	27	1200	74.1
Bipolaris++	-	-	-
Chaetomium	-	-	-
Cladosporium	4	200	12.3
Curvularia	-	-	-
Epicoccum	1*	10*	0.6
Fusarium	-	-	-
Ganoderma	-	-	-
Myxomycetes++	-	-	-
Pithomyces	-	-	-
Rust	-	-	-
Scopulariopsis	-	-	-
Stachybotrys	-	-	-
Torula	-	-	-
Ulocladium	-	-	-
Unidentifiable Spores	-	-	-
Zygomycetes	-	-	-
Nigrospora	1*	10*	0.6
Total Fungi	**37**	**1620**	**100**
Hyphal Fragment	2	90	-
Insect Fragment	-	-	-
Pollen	6	300	-
Analyt. Sensitivity 600x	-	43	-
Analyt. Sensitivity 300x	-	13*	-
Skin Fragments (1-4)	-	1	-
Fibrous Particulate (1-4)	-	1	-
Background (1-5)	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

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

Vincent Iuzzolino, M.S., Laboratory Director
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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. 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: 02/24/2017 15:52:37

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Project: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
Date Received: **2/16/2017**
Date Analyzed: **2/22/2017**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371703072-0002	2035R-2	Office - Room 2035	Bulk
371703072-0004	2035R-4	Office - Room 2037	Bulk
371703072-0006	2035R-6	Office - Room 2033	Bulk

Report Date	Report Revision	Revision Comments
2/24/2017	R0	Initial Report
3/2/2017	R1	Change to Collection Date

Vincent Iuzzolino, M.S., Laboratory Director
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Project: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
Date Received: **2/16/2017**
Date Analyzed: **2/22/2017**

EMSL Sample #: **371703072-0002**
Client ID: **2035R-2**
Location: **Office - Room 2035**

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	**ND**	ng/filter	†
Cat Allergen	Fel d1	0.01	ng/filter	**ND**	ng/filter	†
Dog Allergen	Can f1	0.03	ng/filter	**0.24**	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.

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Report Date	Report Revision	Revision Comments
2/24/2017	R0	Initial Report
3/2/2017	R1	Change to Collection Date

Vincent Iuzzolino, M.S., Laboratory Director
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Project: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
Date Received: **2/16/2017**
Date Analyzed: **2/22/2017**

EMSL Sample #: **371703072-0004**
Client ID: **2035R-4**
Location: **Office - Room 2037**

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	**0.02**	ng/filter	†
Rat Allergen	Rat n1	0.01	ng/filter	**ND**	ng/filter	†
Cat Allergen	Fel d1	0.01	ng/filter	**ND**	ng/filter	†
Dog Allergen	Can f1	0.03	ng/filter	**ND**	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.

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Report Date	Report Revision	Revision Comments
2/24/2017	R0	Initial Report
3/2/2017	R1	Change to Collection Date

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Project: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
Date Received: **2/16/2017**
Date Analyzed: **2/22/2017**

EMSL Sample #: **371703072-0006**
Client ID: **2035R-6**
Location: **Office - Room 2033**

Sample Type: **Bulk**
Sample Size: **37**
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	**1.33**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**0.015**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**1.49**	µg/g	⚠
Dog Allergen	Can f1	0.012	µg/g	**0.36**	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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Project: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
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Date Analyzed: **2/22/2017**



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: **CU-2035 Barre Hall Revisit**

Date Collected: **2/13/2017**
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Date Analyzed: **2/22/2017**

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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.

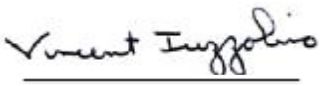
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D. Limits of Liability
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E. Indemnification
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Report Date	Report Revision	Revision Comments
2/24/2017	R0	Initial Report
3/2/2017	R1	Change to Collection Date



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): 371703072

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

Report To Contact Name: Ben Hestir			**Bill To Company:** Terracon		**Client ID #:**
Company Name: Terracon			**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: CU - 2035 Barre Hall Revisit			**Email Results To:** ben.hestir@terracon.com		**U.S. State where Samples Collected:** SC
# Samples in Shipment: 8	**Date of Shipment:** 2/15/17		**Purchase Order:** 86127158 - Task 81	**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
2035R-1	Desk in Rm 2035	M032	Allergen	15	1515	1520	75	☑ Area ☐ Personal	2/13/17	
2035R-2	Office - Rm 2035	M038, M039, M044	Dust Cas	NA	1524	1532	NA	☑ Area ☐ Personal	2/13/17	Chairs, floor, desk
2035R-3	Desk in Rm 2037	M032	Allergen	15	1537	1542	75	☑ Area ☐ Personal	2/13/17	
2035R-4	Office - Rm 2037	M038, M039, M044	Dust Cas	NA	1545	1552	NA	☑ Area ☐ Personal	2/13/17	Chairs, floor, desk
2035R-5	Desk in Rm 2033	M032	Allergen	15	1559	1604	75	☑ Area ☐ Personal	2/13/17	
2035R-6	Office - Rm 2033	M038, M039, M044	Dust Cas	NA	1606	1611	NA	☑ Area ☐ Personal	2/13/17	Chairs, carpet, desk
2035R-7	Outside NE entrance to Barre Hall	M032	Allergen	15	1626	1631	NA	☑ Area ☐ Personal	2/13/17	
2035R-8	Outside West entrance to McAdams Hall	M032	Allergen	15	1634	1639	NA	☑ Area ☐ Personal	2/13/17	

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	2/15/17	QRM BP	2/16/17 920

Comments:

RECEIVED EMSL CINNAMINSON, NJ 17 FEB 16 PM 10:42

OrderID: 371703072