September 14, 2016

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

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

Re: Limited Mold Investigation Report
Redfern Health Center – Room 15
Clemson, South Carolina
Terracon Project No. 86127158 – Task 67

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold investigation in Redfern Health Center Room 15 on the Clemson University campus in 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 investigation in Room 15 within Redfern Health Center at Clemson University on August 22, 2016. Ms. Bonnie Lanier occupies this office and she has expressed concern regarding indoor air quality in this area of the building.

Terracon conducted airborne mold sampling which consisted of collecting spore trap air samples in two indoor locations inside Redfern Health Center (Room 15 and at the front reception desk), and the collection of two additional samples outside for comparison.

Standard of Care

This limited mold 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 Sampling

Total mold spore trap samples were collected using Air-O-Cell™ spore trap cassettes specifically designed for the collection of airborne mold spores. Air samples were collected using a calibrated Zefon Bio-Pump™ at a flow rate of 15 liters per minute (LPM) for 5 minutes at each location.

After air sample collection, the samples 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).

To help interpret the 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 an HVAC[1]-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.

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

[1] heating, ventilating, and air-conditioning

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.

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. The readings reported were collected on Tuesday, September 6, 2016 in Room 15, as a meter was unavailable on August 22, 2016.

FINDINGS

Mold Air Sampling

On the afternoon of August 22, 2016 Terracon collected two mold spore trap samples in Redfern Health Center 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 – August 22, 2016

Sample #	Redfern15-1	Redfern15-2	Redfern15-3	Redfern15-4
Location Description	**Room 15**	**Reception Desk**	**Outside entrance**	**Outside in parking lot**
Spore Type	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**
Alternaria	---	---	13	91
Ascospores	26	13	1,720	1,600
Basidiospores	156	26	13	10,300
Bipolaris/Drechslera	---	---	---	---
Chaetomium	78	13	2,690	---
Cladosporium	---	13	26	3,860
Curvularia	---	13	---	13
Epicoccum	---	---	---	13
Nigrospora	---	---	---	26
Aspergillus / Penicillium	78	39	---	182
Smuts/*Periconial*/ Myxomycetes	13	13	26	65
Torula	---	---	39	---
Pithomyces	---	---	---	13
Zygomycetes	---	---	---	26
Total	**351**	**130**	**4,530**	**16,200**

The highest indoor total spore count was approximately 8% of the lowest total spore count outside. The dominant mold types indoors were Basidiospores and *Aspergillus/Penicillium*. The dominant mold types outdoors were *Chaetomium* and Basidiospores. The weather on the day we sampled was hot and sunny with a light breeze (winds less than 10 mph).

The laboratory analytical report is attached. Photos from the sampling event are attached.

Temperature and Relative Humidity

The indoor temperature in the area sampled was 75.9ºF and the relative humidity was 48.8%. The outdoor temperature was 93.0ºF and the relative humidity was 84%.

CONCLUSIONS

The following conclusions are provided based on our assessment:

- Total spore counts inside were lower than outdoor air and the types of the molds detected were similar inside and out.
- Temperature and relative humidity were within acceptable ASHRAE guidelines.
- The office (Room 15) appeared to be in good condition with no obvious dust accumulations or moisture infiltration issues. An HVAC supply duct is located directly above the complainant's desk.

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

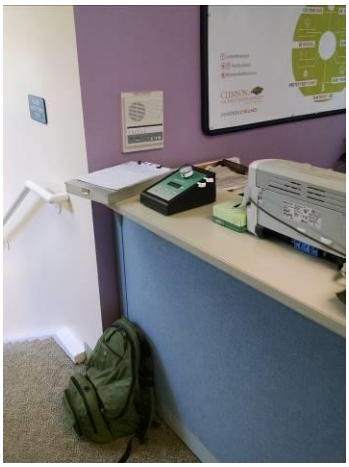


Photo #1 View of location of air sample Redfern 15-2



Photo #2 View of location of air sample Redfern 15-3



Photo #3 View of location of air sample Redfern 15-4

Laboratory Results

SEEML Reference Number:
150823078

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: 08/23/16

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

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

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

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

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

Spore Trap Report

Attention: Ben Hestir	Date Sampled: 08/22/16
Terracon	Date Received: 08/23/16
72 Pointe Circle	Date Analyzed: 08/23/16
Greenville, SC 29615	Date Reported: 08/23/16
	Date Revised:
	Project Name: Redfern-Rm 15
	Project Address: 86127158 Task 67
	Project City, State, ZIP:
	SEEML Reference # : 160823078

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

Client Sample ID	Redfern 15-1			Redfern 15-2			Redfern 15-3		
Location	Room 15 Desk			Redfern Lobby			Outside Entrance		
Lab Sample ID	160823087-266			160823087-267			160823087-268		
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							1	13	<1
Ascospores	2	26	7	1	13	10	132	1720	38
Basidiospores	12	156	44	2	26	20	1	13	<1
Bipolaris/Drechslera									
Chaetomium	6	78	22	1	13	10	207	2690	59
Cladosporium				1	13	10	2	26	<1
Curvularia				1	13	10			
Epicoccum									
Cercospora									
Fusarium									
Memnoniella									
Nigrospora									
Penicillium/Aspergillus	6	78	22	3	39	30			
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy	1	13	4	1	13	10	2	26	<1
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula							3	39	<1
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	27	**351**		10	**130**		348	**4530**	

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: 08/22/16
Terracon	Date Received: 08/23/16
72 Pointe Circle	Date Analyzed: 08/23/16
Greenville, SC 29615	Date Reported: 08/23/16
	Date Revised:
	Project Name: Redfern-Rm 15
	Project Address: 86127158 Task 67
	Project City, State, ZIP:
	SEEML Reference # : 160823078

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

Client Sample ID	Redfern 15-4								
Location	Outside Parking								
Lab Sample ID	160823078-269								
Detection Limit (spores/m^3)	13								
Hyphal Fragments									
Pollen									
Spore Trap Used	AOC								
	raw ct.	spores/m^3	%						
Alternaria	7	91	<1						
Ascospores	123	1600	10						
Basidiospores	792	10300	64						
Bipolaris/Drechslera									
Chaetomium									
Cladosporium	297	3860	24						
Curvularia	1	13	<1						
Epicoccum	1	13	<1						
Cercospora									
Fusarium									
Memnoniella									
Nigrospora	2	26	<1						
Penicillium/Aspergillus	14	182	1						
Polythrincium									
Rusts									
Smuts/Periconia/Myxomy	5	65	<1						
Spegazzinia									
Stachybotrys									
Stemphylium									
Tetraploa									
Torula									
Ulocladium									
Colorless/Other Brown 2									
Oidium									
Zygomycetes	2	26	<1						
Pithomyces	1	13	<1						
Background debris (1-5)3	3								
Sample Volume(liters)	75								
TOTAL SPORES/M^3	1245	**16200**							

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
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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 #: 160823078	Lab ID: 266- 269

Company Information		Client Information		Environmental Conditions	
(Project Manager)	Ben Hestir	Date Sampled:	8/22/16	Precipitation in last 16hrs:	
(Company Name)	Terracon	Project Name:	Redfern - Rm 15	Relative Humidity I/O:	/
(Address)	72 Pointe Circle	Project Address:	86127158 Task 67	Temperature I/O:	/
(City, State, Zip)	Greenville, SC 29615	City, State, Zip:		Wind Conditions	
(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
Redfern 15-1	Room 15 desk	AOC	1		75	
Redfern 15-2	Redfern lobby	"	"		"	
Redfern 15-3	Outside entrance	"	"		"	
Redfern 15-4	Outside parking	"	"		"	

Reliquished By:	Date/Time	Recieved By:	Date/Time
Ben Hestir	8/23/16 10:53 am		8-23-16

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