February 19, 2019

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

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

Re: Limited Mold and Allergen Investigation Report
Clemson University
Sikes Hall, Suite 209
Clemson, South Carolina
Terracon Project No. 86187189L

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in Suite 209 of the Sikes Hall 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 conducted a limited mold and allergen investigation in Suite 209 of Sikes Hall on January 11, 2019. Reportedly, unidentified particulate was being deposited in offices of the suite from the mechanical system, and Clemson wishes to test the area for mold, allergens, and particulate composition.

On our January 11th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in two locations inside the office suite and the collection of two additional samples outside for comparison. We also collected one composite microvac dust sample for allergen analysis along with one bulk dust/debris sample of the particulate that was being deposited in the offices.

Standard of Care

This limited mold and allergen investigation was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. Terracon did not attempt to identify every potential exposure or hazard present in the subject building. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our sampling. Many factors, such as weather conditions, building occupancy, ventilation patterns and seasonal variations in fungal concentrations, can affect the conditions observed. The information contained in this report should not be relied upon to represent conditions that existed prior to or after this sampling. Terracon does not warrant the services of regulatory agencies, laboratories or other third parties supplying information that may have been used in the preparation of this report.

SAMPLING CRITERIA AND METHODS

Mold and Allergen Sampling

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

After collection, the spore trap samples were 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.

One composite allergen dust sample was collected from the carpeting in Office 209D using a high volume air sampling pump in conjunction with a 3-piece 37 millimeter dust sampling cassette preloaded with a 5.0 micrometer polyvinyl chloride (PVC) filter.

After composite dust sample collection, the allergen sample was shipped by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Allergen samples were analyzed by direct microscopic examination for allergens from dust mites, mouse, rat, cat, dog, and cockroach. Allergen results are reported in micrograms per gram of dust (µg/g).

One bulk particulate sample was collected from various areas within Office 209 where visible particulate was observed. This sample was also sent to EMSL for full particle identification via polarized light microscopy (PLM), stereo microscopy, scanning electron microscopy (SEM), and energy-dispersive x-ray spectrometry (EDX).

Temperature and Relative Humidity

Indoor air temperature and relative humidity are physical conditions important to the perception of comfort. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has published recommendations regarding thermal comfort. ASHRAE Standard 55, Thermal Environmental Conditions for Human Occupancy, identifies six primary factors that affect comfort: metabolic rate (affected by the activity being performed); clothing insulation; air temperature; radiant temperature; air speed; and humidity.

Although the relationships are complex, a temperature range between 73 and 79 degrees Fahrenheit (°F) with relative humidity between roughly 20 and 60 percent (%) are recommended for persons in a conditioned setting wearing light summer clothing. Higher temperatures require lower humidity for comfort. For persons in winter clothing, temperatures can range between 68 and 75°F, with relative humidity between 20% and 60%, with preferred conditions falling between 30% and 50% for both winter and summer temperatures. EPA recommends maintaining indoor humidity below 60%, ideally 30-50%, if possible.

Readings of temperature and relative humidity were collected with a Kestrel Model 3000 Portable Weather Meter instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- Office 209 was overall clean and uncluttered during the time of assessment.
- No smells or odors were noted in Office 209.
- Gray/black particulate debris was noted scattered about the office on flat surfaces and the carpeting. The debris was roughly the size of a pencil eraser.
- The occupants noted that that the particulate showed up at in-frequent times and there wasn't a specific day it was heavier than others. Sometimes it appears heavier after the HVAC filter change.
- The occupants did note that the particulate loading appeared to be heavier following the winter holiday, presumably after a routine filter change.
- A general assessment of the HVAC unit serving the office suite to be in good working order with no major deficiencies within the filter banks or filter media. Additionally an assessment of the light diffusers and their ducting indicated that they were clean (in localized areas accessed) and appeared to be functioning normally.
- Photographs from the assessment are attached.

Mold Air Sampling

On the morning of January 11, 2019, Terracon collected two mold spore trap samples inside the building 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 in the Air January 11, 2019

Sample #	702-A1	702-A2	Out-1	Out-2
Location Description	**Office 209D**	**209 Foyer**	**Outdoors #1**	**Outdoors #2**
Spore Type	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**	**Spores/m^3**
Ascospores	--	--	90	40
Aspergillus/Penicillium	200	200	400	40
Basidiospores	40	40	1,000	1,600
Cladosporium	100	40	--	--
Curvularia	--	10	--	--
Epicoccum	--	--	10	--
Myxomycetes	--	40	--	--
Rust	40	--	--	--
Unidentifiable Spores	40	--	--	--
Arthrospores	40	--	--	--
Torula-Like	--	--	--	10
Total	**460**	**330**	**1,540**	**1,690**

The total mold spore levels indoors were lower than the outdoor levels. The laboratory analytical report is attached.

Temperature and Relative Humidity

The average indoor temperature was 70.3ºF and the relative humidity was 25.2%. The average outdoor temperature was 42.3ºF and the relative humidity was 37.0%. The following Table summarizes the results.

Table 2: Summary of Temperature and Relative Humidity
January 11, 2019

Parameter	Office 209D	209 Foyer	Outdoors #1	Outdoors #2
Temperature (degrees F.)	70.1	70.4	40.2	44.3
Relative Humidity (%)	25.5	24.9	39.7	34.3

Particulate Sampling/Identification

A composite sample of the particulate debris found in Office 209D was analyzed for material composition. The laboratory concluded that the material was primarily composed of cotton fibers with mold spores attached. Smaller amounts of various minerals, metallic compounds, and building material components were also identified in lesser quantities. The laboratory analytical report is attached and provides more details.

Allergen Sampling

On January 11, 2019, Terracon collected one dust sample from the carpet in the Office 209D. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. Table 3 below summarizes the laboratory results. The carpet vacuum sample did not have sufficient loading to determine laboratory assigned allergen risk levels; however, low levels of various allergens were detected. The laboratory analytical report is attached and references additional information.

Table 3: Summary of Allergen Analyses – January 11, 2019

Sample #	Sike-CV
Location Description	**Office 209D**
Allergen Type/Antigen	**Concentration (ng/filter)**
Dust Mites / Der fl	0.36
Dust Mites / Der pl	ND
Mouse / Mus ml	0.02
Rat / Rat nl	ND
Cat / Fel dl	0.07
Dog / Can fl	0.94
Cockroach / Bla G2	ND

Note: ng = nanogram (10^{-9} grams), NA = Not Applicable, ND = not detected

CONCLUSIONS/RECOMMENDATIONS

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

- Results of the spore trap sampling, indicated indoor levels were lower than outdoor levels. This is considered normal. The slight elevation in *Cladosporium* spores in the office versus the outdoors may be contributed to the mold identified in the particulate sample.
- Temperature and humidity analysis showed the indoors were within the ASHRAE recommended ranges.
- Particulate sampling indicated that the debris was found to be cotton materials with mold spores. The mold associated in the dust did not appear to greatly influence airborne mold spores. Limited areas the HVAC system was accessed during our assessment and it appeared to be clean, however, other parts of the system may have a build-up of dust. It is our understanding when the HVAC system filters are changed this dust is observed in this office and in a conference room. This may be due to pressure/velocity change within the system from the filter change. Terracon recommends that the HVAC system ducts be assessed and cleaned to remove this particulate from the system.
- The carpet vacuum sample did not have sufficient loading to determine allergen risk levels; however low levels of various allergens were detected. General cleaning using HEPA vacuums should further reduce allergen levels.
- Based upon visual observations, that Office Suite 209 was overall clean and well maintained. Areas of particulate debris from the HVAC system were observed in various locations. Terracon recommends that a general cleaning of flat surfaces be conducted until the HVAC system can be assessed.

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

Sincerely,
Terracon Consultants, Inc.

Stephen N. Ellis
Staff Industrial Hygienist

FOR:
Jeffrey A. Gurrie, CIH
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 General view of the desk area in the foyer of Suite 209.



Photo #2 Typical view of particulate debris on cabinets in the office suite.



Photo #3 General view of the light diffusers and ceiling grid of the office suite.



Photo #4 General view of the space above the drop ceiling grid.



Photo #5 General view of filter bank and filter media in the HVAC unit.



Photo #6 General view of the duct system in the attic space over the suite.



Photo #7 General view of a flex duct serving a light diffuser.



Photo #8 View of small round trunk line serving the light diffusers.

Laboratory Results

EMSL Analytical, Inc.

200 Route 130 North, Cinnaminson, NJ 08077
Phone: (856) 858-4800

Attn.: *Jeff Gurrie*
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615
Jeff.gurrie@terracon.com
Phone: 864-292-2901 Fax: 864-292-6361

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Sample(s) Received:	1/15/2019
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Reported By:	C. Helou

- Laboratory Report -

Full Particle Identification

Project: 86187189L – CU Sikes 209

Conclusions:

- The material in sample "Sike-DS1" is composed primarily of mold and processed cellulose.
- Quartz, calcite/dolomite, gypsum/anhydrite, rust/iron oxides, titanium dioxide/paint, fibrous glass, starch, synthetic fibers, pollen, and skin fragments were identified in lesser amounts.
- Zinc oxide and/or carbonate, natural cellulose, paper pulp, and silver were identified as minor components.

Procurement of Samples and Analytical Overview:

The material for analysis (one sample total) arrived at EMSL Analytical (Cinnaminson, NJ) on January 15, 2019. The package arrived in satisfactory condition with no evidence of damage to the contents. The purpose of the analysis is to determine the identification of the individual components. The data reported herein has been obtained using the following equipment and methodologies.

Methods & Equipment:
Polarized Light Microscopy (PLM)
Stereo Microscopy
Scanning Electron Microscopy (SEM)
Energy-dispersive X-Ray Spectrometry (EDX)

Analyzed by: Christen Helou — 1/29/2019
Christen Helou, Laboratory Analyst — *Date*

Reviewed/Approved: — 1/29/2019
Eugenia Mirica, Ph.D., Laboratory Manager — *Date*

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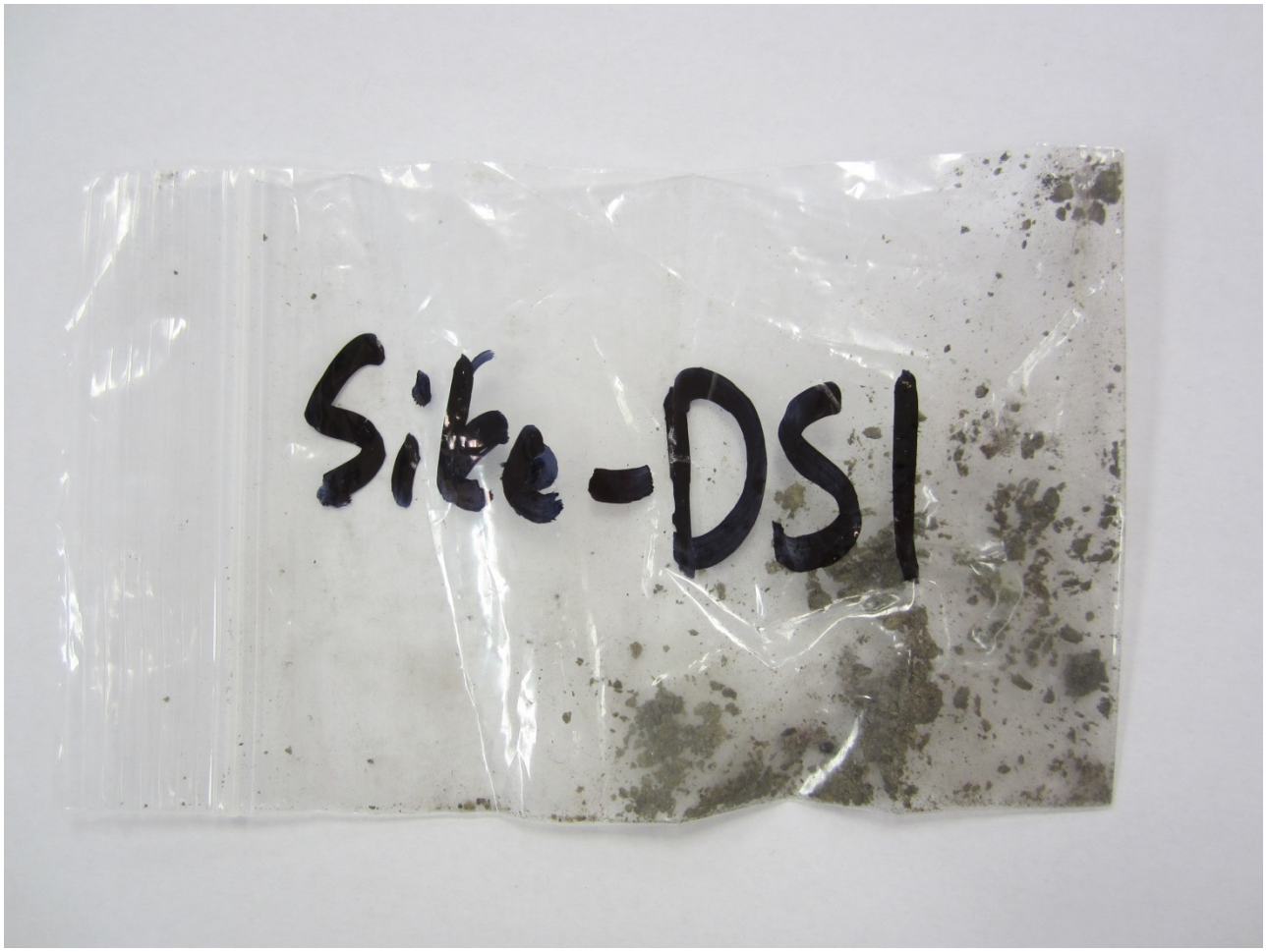


Figure 1: Photo of sample “Sike-DS1” as-received.

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Results:

EMSL Sample Identification:	361900123-0001
Sample Identification:	Sike-DS1
Sample Description:	Settled dust on furniture and carpet

Common Minerals/Construction Dust:	**(%)**
Quartz	5
Calcite/Dolomite	2
Gypsum/Anhydrite	1
Clays/Feldspars	ND
Mica	ND
Rust/Iron Oxides	1
Titanium Dioxide/Paint	2
Aluminum Oxide/Hydroxides	ND
Zinc Oxide/Carbonate	<1

Fibrous Particulate:		**(%)**
Asbestos:	(Total)	ND
MMVF's:	Fibrous Glass	5
	Mineral Wool	ND
	RCF's	ND
Cellulosic:	Processed/Cotton	30
	Natural	<1
	Wood	ND
	Paper Pulp	<1
	Starch	1
Synthetic:	(Total)	5
Hair:	Human	ND
	Animal	ND

Biological:	**(%)**
Mold	36
Pollen	1
Diatoms	ND
Insect Fragments	ND
Dust Mites	ND
Skin Fragments	5

Additional Particulate:		**(%)**
(sample specific)	Silver fragment	<1

Unidentified Inert Organics: 1

Unidentified Inorganics: 1

LOQ: 1%

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Definitions:

Quartz: Crystalline form of silicon dioxide/silica (SiO_2), the second most common mineral in Earth's crust; commonly found in sand/soils, various rocks, concrete and mortar.

Calcite/Dolomite: A mineral which contains calcium carbonate ($CaCO_3$). This is an abundant mineral on the earth surface. Dolomite is a mineral which contains calcium magnesium carbonate $CaMg(CO_3)_2$. Calcite and dolomite are very similar minerals, used for ornamental stones, in concrete mixes, in soil remediation projects.

Gypsum: Calcium sulfate dehydrate mineral ($CaSO_4 \bullet 2H_2O$) commonly used for wallboard in buildings; concrete for highways, bridges, soil conditioner.

Clays: Large group of hydrous silicates composed mainly of silica, alumina, and water with varying amount of iron, alkaline, and alkaline earth elements; used commonly in construction materials, manufacturing of paper, refractories, rubber, dinnerware and pottery, floor and wall tile, sanitary wear, absorbent and filtering materials, and cosmetics.

Rust/Iron Oxides: A mixture of iron oxides formed by the redox reaction of iron (from metal surfaces) and oxygen (from air) in the presence of water or air moisture.

Skin fragments: Shed human skin cells.

MMVF's (Man Made Vitreous fibers): Synthetic vitreous/amorphous inorganic fibrous materials, primarily silica-based containing various amounts of other oxides (e.g., aluminum, boron, calcium, or iron oxides). Fibrous glass and mineral wool are typically used as insulating materials.

Organic Dust: carbon-based compounds found within natural and engineered environments. It is matter composed of organic compounds that come from the remains of organisms such as plants, animals and their waste products in the environment, polymers, and rubber.

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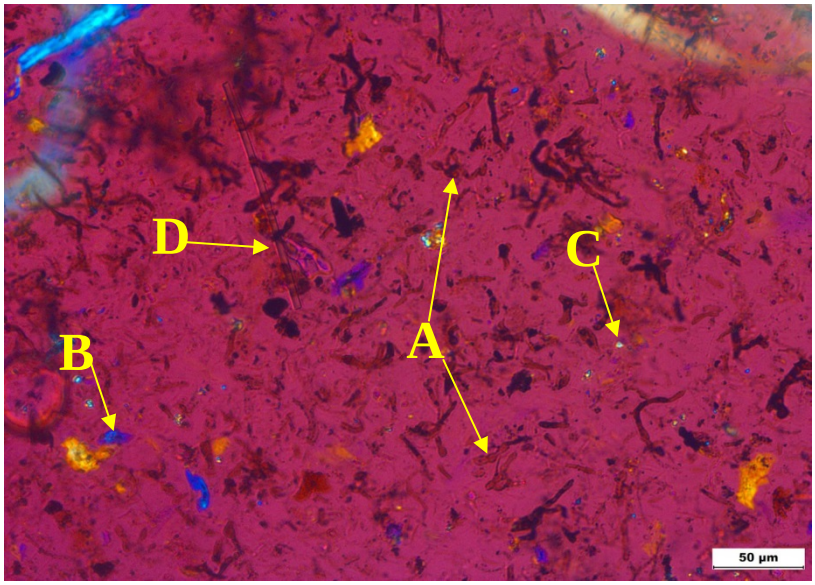


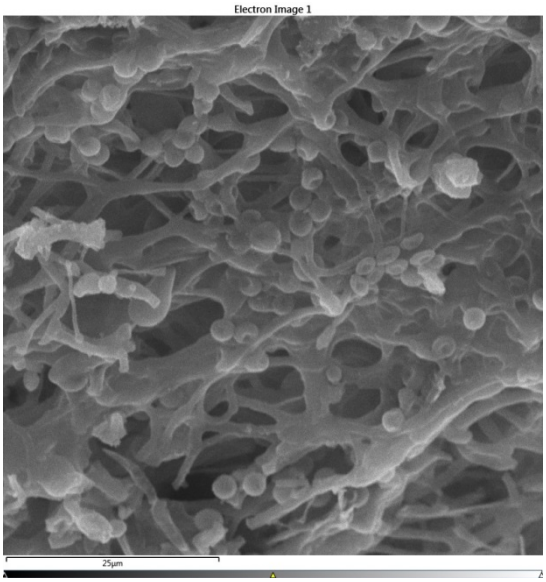
Figure 2: PLM image of particles in sample "Sike-DS1"
A: Mold
B: Quartz
C: Calcite/Dolomite
D: Fibrous glass

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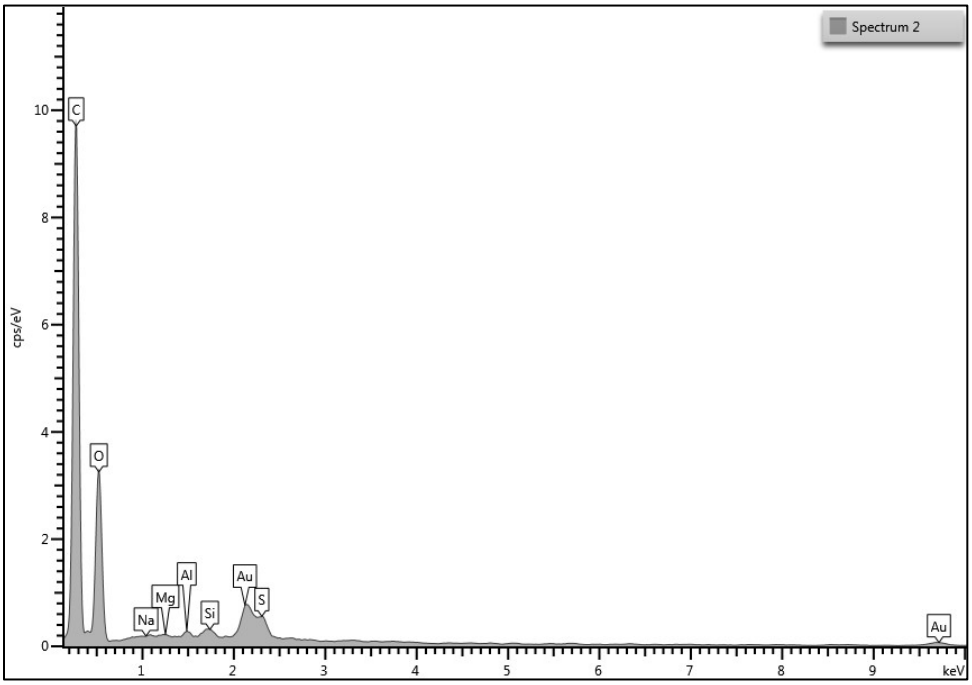


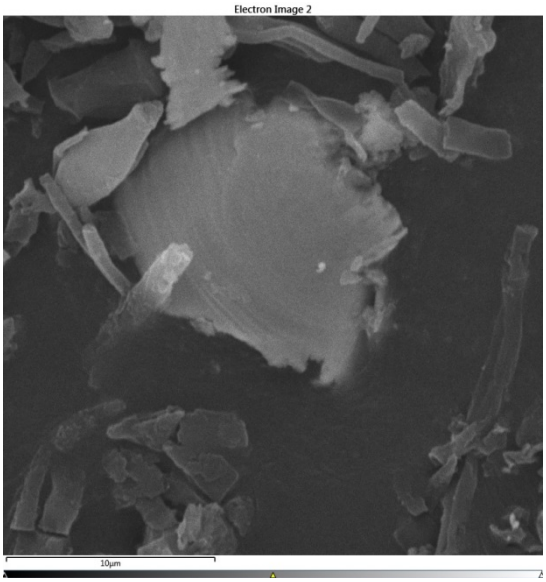
Figure 3: Overall SEM/EDX elemental spectrum of material from sample "Dike-DS1" showing carbon (C) as the main component, associated with mold. Oxygen (O), sodium (Na), magnesium (Mg), aluminum (Al), silicon (Si), and sulfur (S) are also present. The sample was coated with gold (Au) to minimize electron charging.

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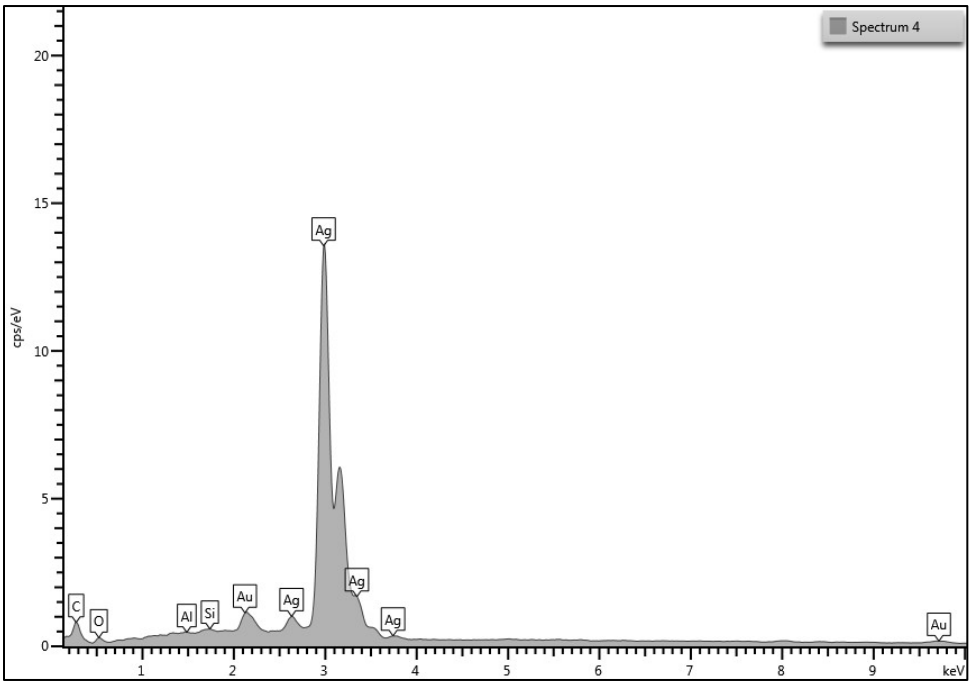


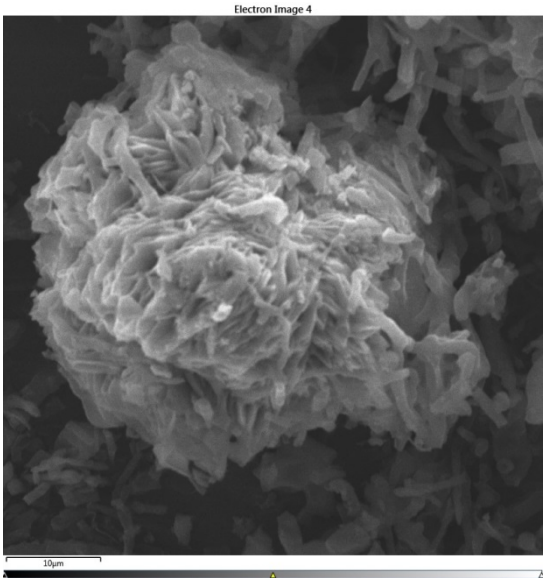
Figure 4: SEM/EDX elemental spectrum of material from sample "Dike-DS1" showing silver (Ag) as the main component. The sample was coated with gold (Au) to minimize electron charging.

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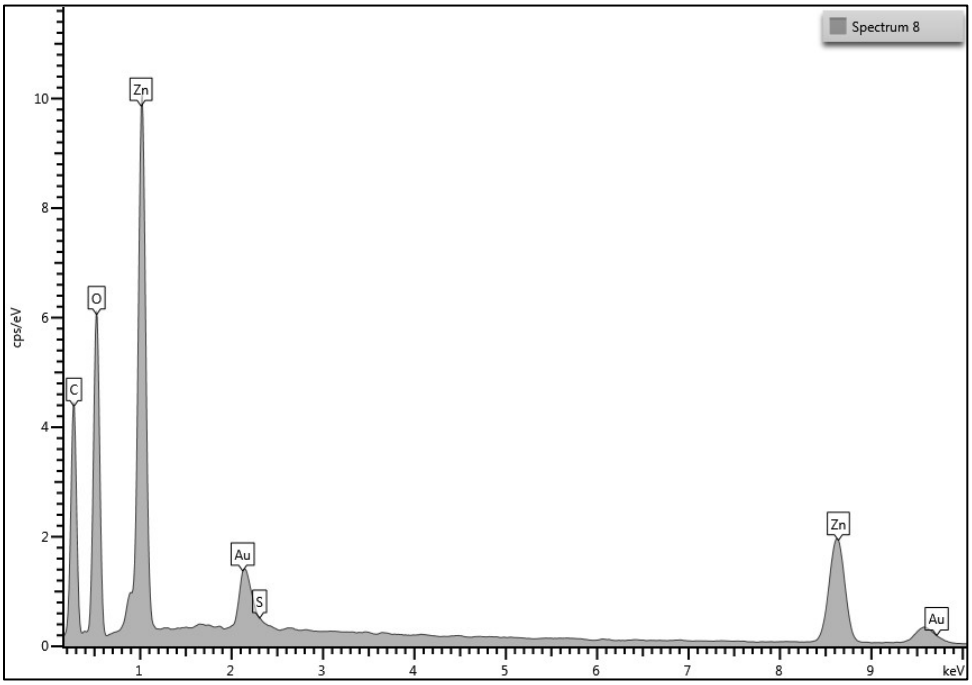


Figure 5: SEM/EDX elemental spectrum of material from sample "Dike-DS1" showing zinc (Zn) as the main component, most likely as zinc oxide and/or carbonate ($ZnO/ZnCO_3$). Sulfur (S) is present in trace amount. The sample was coated with gold (Au) to minimize electron charging.

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Descriptions & Definitions:

None Detected (ND) denotes the absence of analyte in the subsample analyzed.

Limit of Detection (LOD): The minimum concentration that can be theoretically achieved for a given analytical procedure in the absence of matrix or sample processing effects. Particle analysis is limited to a single occurrence of an analyte particle in the sub-sample analyzed.

Limit of Quantitation (LOQ): The minimum concentration of an analyte that can be measured within specified limits of precision and accuracy during routine laboratory operating conditions

Trace concentration: denotes the presence of an analyte above LOD but below LOQ. When results are reported as Trace Concentration, at least one particle was detected in the collection of particles that represents the sample.

Concentrations for bulk samples are derived from Visual Area Estimation (VAE) unless otherwise noted. Air sample concentrations are calculated to particles per unit volume.

VAE technique estimates the relative projected area of a certain type of particulate from a mixture of particulate by comparison to data derived from analysis of calibration materials having similar texture and particulate content. Due to bi-dimensional nature of the measurements, in some cases the particle thickness could affect the results.

Important Terms, Conditions, and Limitations:

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 may be returned to the client immediately. EMSL reserves the right to charge a sample disposal or return shipping fee.

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.

Warranty: EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures, when available. 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.

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 value of the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client or 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.

The data and other information contained in this report, as well as any accompanying documents, represent only the samples analyzed. They are reported upon the condition that they are not to be reproduced wholly or in part for advertising or other purposes without the written approval from the laboratory.

OrderID: 361900123

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Materials Science Chain of Custody

EMSL Order Number *(Lab Use Only)*: 361900123

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

Company : Terracon Consultans, Inc.		**EMSL-Bill to:** ☑ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*	
Street: 72 Pointe Circle			
City: Greenville	**State/Province:** SC	**Zip/Postal Code:** 29615	**Country:** US
Report To (Name): Jeff Gurrie		**Fax #:** 864.292.6361	
Telephone #: 864.292.2901		**Email Address:** jeff.gurrie@terracon.com	
Project Name/Number: 86187189L - CU Sikes 209			
Please Provide Results: ☐ Fax ☑ Email	**Purchase Order:**	**U.S. State Samples Taken In:** SC	

Turnaround Time (TAT) Options – Please Check

☑ 2 Week ☐ Expedited (Please call for information) TAT: _____

Test Type

☐ Common Particle ID (large particles)	☐ Physical Testing (Tensile, Compression, etc.)	☐ MMVF's (fibrous glass, mineral wool, RCF's)
☑ Full Particle ID (environmental dust)	☐ FTIR/NIR (Polymers, Lubricants)	☐ Particle Size (Sieve, Microscopy, or Laser-select one)
☐ Basic Material ID (solids)	☐ X-Ray Fluorescence (elemental analysis)	☐ Combustible Dust (Core Module, MIE, MEC, Kst, etc.)
☐ Advanced Material ID (liquids and solids, industrial residues)	☐ X-Ray Diffraction (Crystalline Particles)	☐ Petrographic Examination of Concrete, Soil, Stone

Combustion-by-products (soot, char, ash, carbon black)
☐ Level 1 ☐ Level 2 ☐ Level 3 ☐ Level 4

☐ Other (Please Explain):

RECEIVED EMSL CINNAMINSON, N.J. 2019 JAN 15 A 10: 34

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Samplers Name: Stephen Ellis **Samplers Signature:** [signature]

Sample #	Sample Description	Volume	Date/Time Sampled
1 Sike-DS1	Settled dust on Furniture and Carpet		1-11-19

Client Sample # (s): - **Total # of Samples:** 1

Relinquished (Client): [signature] **Date:** 1-11-19 **Time:** 1600

Received (Lab): [signature] **Date:** 1/15/19 **Time:** 1035

Comments: (1)

Page 1 of 1 **pages**

Controlled Document – Material Science COC – R4 – 9/16/2014

EMSL Analytical, Inc.

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

EMSL Order: 371900715
Customer ID: GTER78
Customer PO: 86187189L
Project ID:

Attn: Jeff Gurrie
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

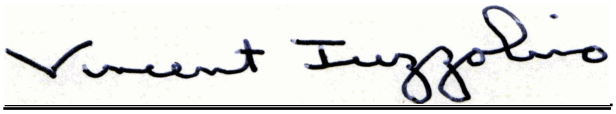
Phone: (864) 360-7572
Fax: (864) 292-6361
Collected: 01/11/2019
Received: 01/15/2019
Analyzed: 01/15/2019

Project: 86187189L-CU Sikes Hall Suite 209

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

Lab Sample Number:	371900715-0001			371900715-0002			371900715-0003		
Client Sample ID:	Sike-A1			Sike-A2			Out-1		
Volume (L):	75			75			75		
Sample Location	Rm 209D			Room 209 Foyer			Outdoors 1		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	2	90	5.8
Aspergillus/Penicillium	5	200	43.5	5	200	60.6	10	440	28.6
Basidiospores	1	40	8.7	1	40	12.1	23	1000	64.9
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	3	100	21.7	1	40	12.1	-	-	-
Curvularia	-	-	-	1*	10*	3	-	-	-
Epicoccum	-	-	-	-	-	-	1*	10*	0.6
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	1	40	12.1	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	1	40	8.7	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	1	40	8.7	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Arthrospores	1	40	8.7	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**12**	**460**	**100**	**9**	**330**	**100**	**36**	**1540**	**100**
Hyphal Fragment	2	90	-	2	90	-	1	40	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-	-	1	-

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



Vincent Iuzzolino, M.S., Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 01/16/2019 08:20:49

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

EMSL Analytical, Inc.

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

EMSL Order: 371900715
Customer ID: GTER78
Customer PO: 86187189L
Project ID:

Attn: Jeff Gurrie
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: (864) 360-7572
Fax: (864) 292-6361
Collected: 01/11/2019
Received: 01/15/2019
Analyzed: 01/15/2019

Project: 86187189L-CU Sikes Hall Suite 209

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

Lab Sample Number:	371900715-0004			371900715-0005		
Client Sample ID:	Out-2			BL		
Volume (L):	75					
Sample Location	Outdoors 2			Blank		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-
Ascospores	1	40	2.4	-	-	-
Aspergillus/Penicillium	1	40	2.4	-	-	-
Basidiospores	37	1600	94.7	-	-	-
Bipolaris++	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-
Curvularia	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-
Rust	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-
Arthrospores	-	-	-	-	-	-
Torula-like	1*	10*	0.6	-	-	-
Total Fungi	**40**	**1690**	**100**	**-**	**No Trace**	**-**
Hyphal Fragment	1	40	-	-	-	-
Insect Fragment	-	-	-	-	-	-
Pollen	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	0	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-
Skin Fragments (1-4)	-	1	-	-	-	-
Fibrous Particulate (1-4)	-	1	-	-	-	-
Background (1-5)	-	1	-	-	-	-

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

Vincent Iuzzolino

Vincent Iuzzolino, M.S., Laboratory Manager
or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. "*" Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

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Initial report from: 01/16/2019 08:20:49

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

EMSL Order #:	**371900715**
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Attn: **Jeff Gurrie**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189L-CU Sikes Hall Suite 209**

Date Collected: **1/11/2019**
Date Received: **1/15/2019**
Date Analyzed: **1/21/2019**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371900715-0006	Sike-CV	Room 209D Carpet	Bulk

Report Date	Report Revision	Revision Comments
1/22/2019	R0	Initial Report

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

About Us

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Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #: **371900715**
Customer ID: **GTER78**
Customer PO: **86187189L**

Attn: **Jeff Gurrie**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189L-CU Sikes Hall Suite 209**

Date Collected: **1/11/2019**
Date Received: **1/15/2019**
Date Analyzed: **1/21/2019**

EMSL Sample #: **371900715-0006**
Client ID: **Sike-CV**
Location: **Room 209D Carpet**

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	**0.36**	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	**0.07**	ng/filter	†
Dog Allergen	Can f1	0.03	ng/filter	**0.94**	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
1/22/2019	R0	Initial Report

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

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Attn: **Jeff Gurrie**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

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

Project: **86187189L-CU Sikes Hall Suite 209**

Date Collected: **1/11/2019**
Date Received: **1/15/2019**
Date Analyzed: **1/21/2019**



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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200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
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72 Pointe Circle
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Project: **86187189L-CU Sikes Hall Suite 209**

Date Collected: **1/11/2019**
Date Received: **1/15/2019**
Date Analyzed: **1/21/2019**

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Report Date	Report Revision	Revision Comments
1/22/2019	R0	Initial Report

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

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OrderID: 371900715

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Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371900715

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

Company Name: Terracon Consultans, Inc.		**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments** *Third Party Billing requires written authorization from third party*	
Street: 72 Pointe Circle			
City: Greenville	**State/Province:** SC	**Zip/Postal Code:** 29615	**Country:** US
Report To (Name): Jeff Gurrie		**Telephone #:** 864.292.2901	
Email Address: jeff.gurrie@terracon.com		**Fax #:** 864.292.6361	**Purchase Order:**
Project Name/Number: 86187189L - CU Sikes Hall Suite 209		**Please Provide Results:** ☐ Fax ☐ Email	
U.S. State Samples Taken: SC	**Project Zip Code:**	**Connecticut Samples:** ☐ Commercial ☐ Residential	

**Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide. TATs are subject to methodology requirements*

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ **Biocide Used in Source (specify):** _____ ☐

Public Water Supply Samples: ☐ **Note: All results may automatically be reported to DOH if required by state.**

Turnaround Time (TAT) Options * - Please Check

☐ 3 Hour	☐ 6 Hour	■ 24 Hour	☐ 48 Hour	☐ 72 Hour	☐ 96 Hour	■ 1 Week	☐ 2 Week

Microbiology Test Codes

M001 Air-O-Cell
M174 MoldSnap
M030 Micro 5
M032 Allergenco-D
M041 Fungal Direct Examination
M169 Pollen ID & Enumeration
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi - Air Samples (Genus ID & Count)
M006 Viable Fungi - Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent
M012 Pseudomonas aeruginosa (P/A***)

M024 Pseudomonas aeruginosa (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & E. coli (Colilert P/A***)
M018 Total Coliform & E. coli (MFT*)
M114 Total Coliform & E. coli Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal Streptococcus (MFT*)
M029 Enterococci (MFT*)
M129 Enterococci (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)

M115 Sewage Screen - Water (P/A***)
M116 Sewage Screen - Water (MPN**)
M117 Sewage Screen - Swab (P/A***)
M013 Sewage Screen - Swab (MFT*)
M133 Methicillin-resistant Staph. aureus (MRSA)
M031 Rapid-growing non-TB Mycobacteria Detection & Enumeration
M014 Endotoxin Analysis
M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
Other See Analytical Price Guide
Legionella Analysis *Please use EMSL* Legionella COC

*MFT= Membrane Filtration Technique
**MPN= Most Probable Number
***P/A= Presence/Absence

Name of Sampler: Stephen Ellis **Signature of Sampler:**

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (only for waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
Example A1	Kitchen Sink/Tap	Water	☒ P ☐ NP	M017	100 mL	9/1/13 4:00 PM	
Sike-A1	Rm 209D	Air	☐ P ☐ NP	M001	75L	1-11-19	
Sike-A2	Room 209 Foyer	Air	☐ P ☐ NP	M001	75L	1-11-19	
Out-1	Outdoors 1	Air	☐ P ☐ NP	M001	75L	1-11-19	
Out - 2	Outdoors 2	Air	☐ P ☐ NP	M001	75L	1-11-19	
BL	Blank	Air	☐ P ☐ NP	M001	UL	1-11-19	
Sike-CV	Room 209D Carpet	Dust	☐ P ☐ NP	M044**	N/A	1-11-19	

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

Relinquished (Client): **Date:** 1-11-19 **Time:** 1600

Received (Lab): **Date:** 1-15-19 **Time:** 930

Comments/Special Instructions:

Please also analyze for Rat/Mouse Allergen - M254

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