March 28, 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
Daniel Hall – Laboratory Area, Suite 113, and Suite 215
Clemson, South Carolina
Terracon Project No. 86187189Z

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in Suites 102, 104, 106, and 108 (laboratory area), Suite 113 (teacher assistant lounge), and Suite 215 (professor offices) of Daniel 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 the rooms previously described of Daniel Hall on March 15, 2019. Noticeable amounts of dust were reported throughout these portions of the building and building occupants have been experiencing allergy-like symptoms. Clemson wishes to test the areas for mold and allergens.

On our March 15th visit, Terracon collected measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in eight locations inside the suites and the collection of two additional samples outside for comparison. We also collected two composite microvac dust sample for allergen analysis along with one dust swab sample for surface mold analysis.

Standard of Care

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

SAMPLING CRITERIA AND METHODS

Mold and Allergen Sampling

Total mold spore trap samples were collected using 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.

A total of two composite allergen dust samples were collected 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. One composite allergen dust sample was collected from carpeting in Suites 104 and 106 and the other was collected from the floor of Suite 215.

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). Additionally the samples were analyzed for mold spores.

One swab sample was collected from a supply vent in Suite 102 where mold was suspected using a HealthLink Transporter sterile swab. The sample was also sent to EMSL for mold spore identification by direct microscopic examination.

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 TSI Q-Trak 7565 Indoor Air Quality Meter instrument which was calibrated by Pine Environmental, the environmental equipment rental company through which the instrument was acquired.

FINDINGS

General Observations

- Suites 104, 106, 108, and 113 appeared to be clean and uncluttered during the time of assessment.
- In Suite 102, visible amounts of dust and fibrous material were observed on one supply air vent, otherwise, the area appeared to be clean during the time of the assessment.
- In the first-floor hallway, dust was apparent on two supply air vents adjacent to Suite 102. The remaining first-floor areas appeared clean and uncluttered during the time of the assessment.
- In Suite 215 dust was apparent on furniture surfaces and in the corners of the room.
- The second-floor hallway appeared to be clean and uncluttered during the time of assessment.
- Photographs from the assessment are attached.

Mold Air Sampling

On the afternoon of March 15, 2019, Terracon collected eight 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 – March 15, 2019

Sample #	DH102	DH104	DH106	DH108	DH113	1HW	DH215	2HW	BGSW	BGNE
Location Description	Room 102	Room 104	Room 106	Room 108	Room 113	1st Floor Hallway	Room 215	2nd Floor Hallway	SW Side Building	NE Side Building
Spore Type	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³	Spores/m³
Ascospores	--	--	--	--	10	--	--	--	2500	2,800
Basidiospores	90	--	--	40	40	40	200	300	54,400	37,700
Bipolaris	--	--	--	--	40	--	--	--	--	--
Cladosporium	--	40	10	40	--	--	--	--	90	40
Myxomycetes	--	--	--	--	--	10	--	10	--	--
Pithomyces	--	--	--	--	--	--	--	--	10	--
Total	**90**	**40**	**10**	**80**	**90**	**50**	**200**	**310**	**57,000**	**40,540**

The total mold spore levels indoors were lower than the outdoor levels. The predominant mold type identified indoors and outdoors was Basidiospores. It should be noted due to light rain on the day of sampling the outdoor results may be skewed lower than normal. The laboratory analytical report is attached.

Swab Sampling

One swab sample was collected from the supply air vent in Suite 102. Visible amounts of dust and fibrous particles were observed covering the exterior of the vent. A swab sample was collected to determine if mold spores were present and, if so, to determine spore type. Analytical results indicated the presence of Cladosporium, Curvularia, and unidentifiable spores at rare concentrations.

Temperature and Relative Humidity

The average indoor temperature was 71.1ºF and the relative humidity was 57.4%. The average outdoor temperature was 65.1ºF and the relative humidity was 83.3%. The following Table summarizes the results.

Table 2: Summary of Temperature and Relative Humidity
March 15, 2019

Location Description	Room 102	Room 104	Room 106	Room 108	Room 113	1st Floor Hallway	Room 215	2nd Floor Hallway	SW Side Building	NE Side Building
Temperature (degrees F.)	69.6	70.3	70.0	70.4	73.7	71.7	71.6	71.5	64.8	65.3
Relative Humidity (%)	58.2	57.4	57.8	57.1	56.5	55.6	59.5	57.0	81.1	85.5

Allergen Sampling

On March 15, 2019, Terracon collected one dust sample from the carpeting in Suites 104 and 106 and another dust sample from the floor in Suite 215. 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 laboratory analytical report is attached and references additional information.

Table 3: Summary of Allergen Analyses – March 15, 2019

Sample #	A-1		A-2	
Location Description	Rooms 104 and 106		Room 215	
Allergen Type/Antigen	Concentration (ug/g)	Laboratory assigned risk factor	Concentration (ug/g)	Laboratory assigned risk factor
Dust Mites / Der fl	ND	Low	ND	Low
Dust Mites / Der pl	0.02	Low	ND	Low
Mouse / Mus ml	ND	Low	ND	Low
Rat / Rat nl	ND	NA	ND	NA
Cat / Fel dl	0.31	Low	0.10	Low
Dog / Can fl	0.09	Low	0.02	Low
Cockroach / Bla G2	ND	Low	ND	Low

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

CONCLUSIONS/RECOMMENDATIONS

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

- Based upon visual observations, Suites 104, 106, 108, and 113 appeared to be clean and uncluttered during the time of the assessment.
- In Suite 102, visible amounts of dust were observed on one supply air vent, otherwise, the area appeared to be clean during the time of the assessment. Results of the swab sample collected from the supply air vent in Suite 102 indicated rare concentrations of Cladosporium, Curvularia, and unidentifiable spores. In the first-floor hallway, dust was apparent on two supply air vents adjacent to Suite 102. Terracon recommends that the dust and debris collected on the supply air vents be cleaned periodically to limit the dust/debris loading.
- In Suite 215 dust was apparent on furniture surfaces and in the corners of the room underneath desk spaces. Terracon recommends that the dust and debris collected on the furniture surfaces and in the corners of the room be cleaned periodically to limit the dust/debris loading.
- Temperature and humidity measurements showed the indoor areas were within the ASHRAE recommended ranges for winter/spring.
- Results of the spore trap sampling indicated the indoor samples detected mold spores at a lower concentration compared to the outdoor samples. It should be noted due to the light rain on the day of sampling the outdoor results may be skewed lower than normal. Additionally, the mold spores appeared to be of the same type in both the indoor and outdoor samples. This represents acceptable indoor mold spore levels.
- The composite vacuum sample from Suites 104 and 106 indicated low level allergens were observed within the area tested (cat, dog, and dust mites), and were characterized as a low risk level by the laboratory. The vacuum sample

collected from Suite 215 similarly indicated low level allergens in the area tested (cat and dog) and were characterized as a low risk level by the laboratory.

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.

Robert L. Patterson, CHMM
Senior Staff Industrial Hygienist

Jeffrey A. Gurrie, CIH
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 General view of Suite 102.



Photo #2 General view of Suite 104, similar layout to Suites 106 and 108.



Photo #3 General view of the first-floor hallway.



Photo #4 General view of Suite 113.



Photo #5 General view of the second-floor hallway.



Photo #6 View of the outdoor sample from northeast of the building.

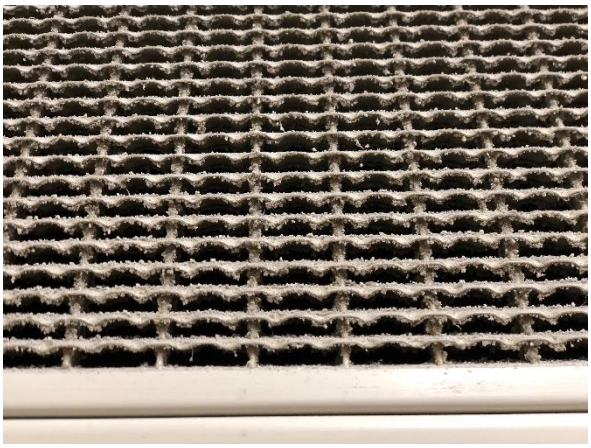


Photo #7 View of the supply air vent within Suite 102. Noticeable amounts of dust and debris.

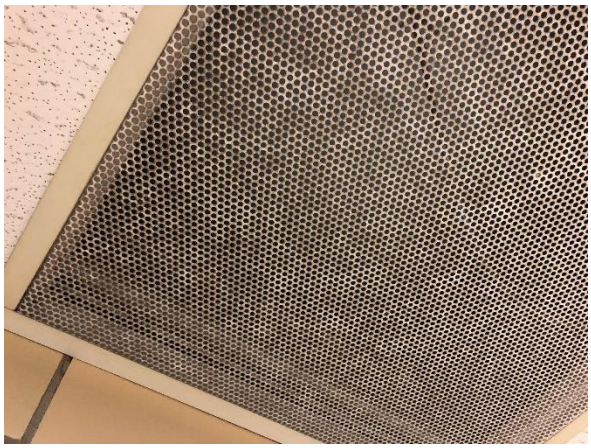


Photo #8 View of an air vent outside of Suite 102. Noticeable amounts of dust.

Laboratory Results

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

Order ID:	371904726
Customer ID:	GTER78
Customer PO:	86187189Z
Project ID:	

Attn: Rob Patterson
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 03/15/2019
Received: 03/16/2019
Analyzed: 03/16/2019

Proj: Clemson - Daniel Hall

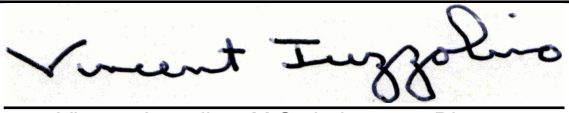
Test Report: Microscopic Examination of Fungal Spores, Fungal Structures, Hyphae, and Other Particulates from Swab Samples (EMSL Method MICRO-SOP-200)

Lab Sample Number:	371904726-0014				
Client Sample ID:	S-1				
Sample Location:	Room 102 Swab				
Spore Types	Category	-	-	-	-
Alternaria (Ulocladium)	-	-	-	-	-
Ascospores	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-
Basidiospores	-	-	-	-	-
Bipolaris++	-	-	-	-	-
Chaetomium	-	-	-	-	-
Cladosporium	Rare	-	-	-	-
Curvularia	Rare	-	-	-	-
Epicoccum	-	-	-	-	-
Fusarium	-	-	-	-	-
Ganoderma	-	-	-	-	-
Myxomycetes++	-	-	-	-	-
Pithomyces++	-	-	-	-	-
Rust	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-
Unidentifiable Spores	Rare	-	-	-	-
Zygomycetes	-	-	-	-	-
Hyphal Fragment	-	-	-	-	-
Insect Fragment	-	-	-	-	-
Pollen	-	-	-	-	-

Category: Count/per area analyzed - Rare: 1 to 10 Low: 11 to 100 Medium: 101 to 1000 High: >1000

- Denotes Not Detected.
++ = Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.
* = Sample contains fruiting structures and/or hyphae associated with the spores.

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



Vincent Iuzzolino, M.S., Laboratory Director
or Other Approved Signatory

Samples received in good condition unless otherwise noted. 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 of the data contained in this report is the responsibility of the client.

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

Initial report from: 03/18/2019 09:20:31

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

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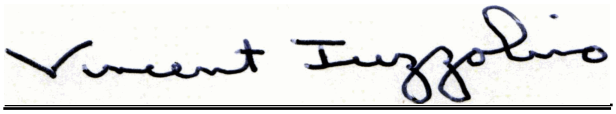
Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 03/15/2019
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Analyzed: 03/16/2019

Project: Clemson - Daniel Hall

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

Lab Sample Number:	371904726-0001			371904726-0002			371904726-0003		
Client Sample ID:	106			104			102		
Volume (L):	75			75			75		
Sample Location	Classroom			Classroom			Classroom		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	-	-	-	-	-	-	2	90	100
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	1*	10*	100	1	40	100	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**1**	**10**	**100**	**1**	**40**	**100**	**2**	**90**	**100**
Hyphal Fragment	2	90	-	1*	10*	-	1	40	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	1	-	-	2	-

++ 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: 03/18/2019 09:20:31

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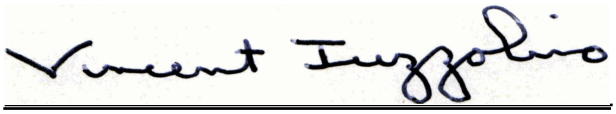
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Analyzed: 03/16/2019

Project: Clemson - Daniel Hall

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

Lab Sample Number:	371904726-0004			371904726-0005			371904726-0006		
Client Sample ID:	108			1 HW			215		
Volume (L):	75			75			75		
Sample Location	Classroom			Hallway 1st Floor			Professor Officers		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	1	40	50	1	40	80	4	200	100
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	1	40	50	-	-	-	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	1*	10*	20	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**2**	**80**	**100**	**2**	**50**	**100**	**4**	**200**	**100**
Hyphal Fragment	1	40	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	1	40	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	3	-
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.

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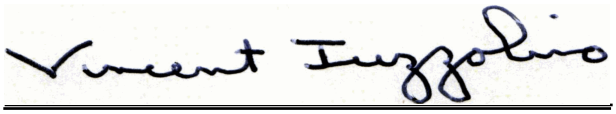
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Project: Clemson - Daniel Hall

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

Lab Sample Number:	371904726-0007			371904726-0008			371904726-0009		
Client Sample ID:	2 HW			113			BGSW		
Volume (L):	75			75			75		
Sample Location	Hallway 2nd Floor			Teacher Assistant Lounge			Background SW Side Building		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	-	-	-	1*	10*	11.1	56	2500	4.4
Aspergillus/Penicillium	-	-	-	-	-	-	-	-	-
Basidiospores	7	300	96.8	1	40	44.4	1230	54400	95.4
Bipolaris++	-	-	-	1	40	44.4	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-	2	90	0.2
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1*	10*	3.2	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	1*	10*	0
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**8**	**310**	**100**	**3**	**90**	**100**	**1289**	**57000**	**100**
Hyphal Fragment	1*	10*	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1*	10*	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	2	-	-	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: 03/18/2019 09:20:31

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

EMSL Analytical, Inc.

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http://www.EMSL.com / cinnmicrolab@emsl.com

EMSL Order: 371904726
Customer ID: GTER78
Customer PO: 86187189Z
Project ID:

Attn: Rob Patterson
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

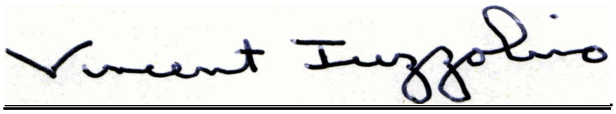
Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 03/15/2019
Received: 03/16/2019
Analyzed: 03/16/2019

Project: Clemson - Daniel Hall

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

Lab Sample Number:	371904726-0010			371904726-0011					
Client Sample ID:	BGNE			FB					
Volume (L):	75								
Sample Location	Background NE Side Building			Field Blank					
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**			
Alternaria (Ulocladium)	-	-	-	-	-	-			
Ascospores	63	2800	6.9	-	-	-			
Aspergillus/Penicillium	-	-	-	-	-	-			
Basidiospores	853	37700	93	-	-	-			
Bipolaris++	-	-	-	-	-	-			
Chaetomium	-	-	-	-	-	-			
Cladosporium	1	40	0.1	-	-	-			
Curvularia	-	-	-	-	-	-			
Epicoccum	-	-	-	-	-	-			
Fusarium	-	-	-	-	-	-			
Ganoderma	-	-	-	-	-	-			
Myxomycetes++	-	-	-	-	-	-			
Pithomyces++	-	-	-	-	-	-			
Rust	-	-	-	-	-	-			
Scopulariopsis/Microascus	-	-	-	-	-	-			
Stachybotrys/Memnoniella	-	-	-	-	-	-			
Unidentifiable Spores	-	-	-	-	-	-			
Zygomycetes	-	-	-	-	-	-			
Total Fungi	**917**	**40540**	**100**	**-**	**No Trace**	**-**			
Hyphal Fragment	-	-	-	-	-	-			
Insect Fragment	1	40	-	-	-	-			
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, 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: 03/18/2019 09:20:31

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EMSL Order #:	**371904726**
Customer ID:	**GTER78**
Customer PO:	**86187189Z**

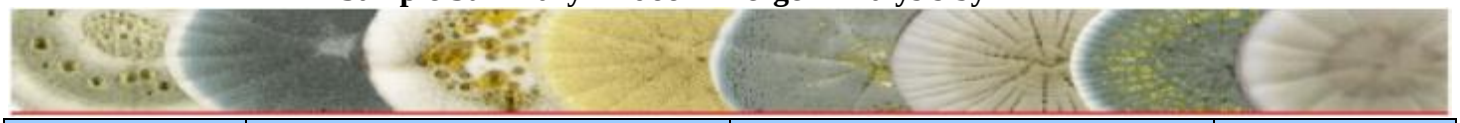
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72 Pointe Circle
Greenville, SC 29615

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

Project: **Clemson - Daniel Hall**

Date Collected: **3/15/2019**
Date Received: **3/16/2019**
Date Analyzed: **3/22/2019**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371904726-0012	A-1	104 & 106	Bulk
371904726-0013	A-2	Room 215	Bulk

Report Date	Report Revision	Revision Comments
3/25/2019	R0	Initial Report

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

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Project: **Clemson - Daniel Hall**

Date Collected: **3/15/2019**
Date Received: **3/16/2019**
Date Analyzed: **3/22/2019**

EMSL Sample #: **371904726-0012**
Client ID: **A-1**
Location: **104 & 106**

Sample Type: **Bulk**
Sample Size: **54**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**ND**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**0.02**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**0.31**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**0.09**	µg/g	☑
Cockroach Allergen	Bla g2	0.024	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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Report Date	**Report Revision**	**Revision Comments**
3/25/2019	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
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Project: **Clemson - Daniel Hall**

Date Collected: **3/15/2019**
Date Received: **3/16/2019**
Date Analyzed: **3/22/2019**

EMSL Sample #: **371904726-0013**
Client ID: **A-2**
Location: **Room 215**

Sample Type: **Bulk**
Sample Size: **53**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**ND**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	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	**0.10**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**0.02**	µg/g	☑
Cockroach Allergen	Bla g2	0.024	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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Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Clemson - Daniel Hall**

Date Collected: **3/15/2019**
Date Received: **3/16/2019**
Date Analyzed: **3/22/2019**



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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Project: **Clemson - Daniel Hall**

Date Collected: **3/15/2019**
Date Received: **3/16/2019**
Date Analyzed: **3/22/2019**

Important Terms, Conditions, and Limitations

A. Sample Retention
Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation
All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

C. Warranty
EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

D. Limits of Liability
In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable the original sample delivery group (SDG) samples. In no event shall EMSL be liable to a client orvalue of any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

E. Indemnification
Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL's services, the test result data or its use by client.

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Report Date	Report Revision	Revision Comments
3/25/2019	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
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OrderID: 371904726

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Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371904726

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

Company Name: Terracon Consultants, 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): Rob Patterson	**Telephone #:** 864-292-2901
Email Address: rob.patterson@terracon.com	**Fax #:** 864-292-6361 **Purchase Order:**
Project Name/Number: Clemson - Daniel Hall	**Please Provide Results:** ☐ Fax ☒ Email
U.S. State Samples Taken: SC **Project Zip Code:** 29634	**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

Mold Allergen

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

RECEIVED EMSL CINNAMINSON, N.J. 2019 MAR 16 A 9:49

Name of Sampler: Rob Patterson **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	
106	Class Room	AIR	☐ P ☐ NP	M001	75L	3/15/19 9:45	
104	"	"	☐ P ☐ NP	"	"	10:05	
102	"	"	☐ P ☐ NP	"	"	10:20	
108	"	"	☐ P ☐ NP	"	"	10:30	
1HW	Hallway 1st Floor	"	☐ P ☐ NP	"	"	10:52	
215	Professor Offices	"	☐ P ☐ NP	"	"	12:01	

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

Relinquished (Client): Rob Patterson **Date:** 3/15/19 **Time:** 1630
Received (Lab): UPS - FX **Date:** 3-16-19 **Time:** 10A

Comments/Special Instructions: *Samples A-1 + A-2 request 2 week TAT (RLP)
~~M345~~ (254) AIR
1SW, 1AOC, 2 dust

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OrderID: 371904726

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371904726

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

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
2HW	Hallway 2nd Floor	AIR	☐P ☐NP	M001	75L	3/15/19 ~~12:32~~ ~~9:41~~	
113	Teacher Assistant Lounge		☐P ☐NP			12:44	
BGSW	Background SW side building		☐P ☐NP			11:37	
BGNE	Background NE side building		☐P ☐NP			11:47	
FB	Field Blank		☐P ☐NP	M001	—	~~9:41~~	
A-1*	~~All DH~~ 104 + 106	DUST	☐P ☐NP	M044‡	—	9:55	
A-2*	Room 215	DUST	☐P ☐NP	M044‡	—	12:07	
S-1	Room 102 Swab	SWAB	☐P ☐NP	M041	—	10:18	
			☐P ☐NP				
			☐P ☐NP				
			☐P ☐NP				
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Comments/Special Instructions: *SAMPLES A-1 + A-2 request ~~2~~ 1 week turn around time.
‡ Also analyze dust samples for Rat/Mouse Allergens ~~M245~~ (254) AIR

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