December 12, 2018

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

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

Re: Limited Mold and Allergen Investigation Report
Clemson University
Pee Dee Research Center, Conference Room 240
Florence, South Carolina
Terracon Project No. 86187189G

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in the Conference Room 240 of the Pee Dee Research Center in Darlington, 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 Conference Room 240 of the Pee Dee Research Center on November 19, 2018. Reportedly, mold growth was observed on the walls facing the exterior and Clemson wishes to test the area for mold and allergens.

On our November 18th 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.

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 carpeting in the conference room 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). Additionally the samples were analyzed for mold spores.

Moisture Content in Building Materials

Excess moisture in building materials may result in the growth of fungi or bacteria. There are no regulations or standards for moisture content in installed building materials. Moisture content will vary building-to-building and across geography, depending largely on relative humidity and indoor environmental conditions. Terracon applied industry best practices and equipment manufacturer guidelines to determine the moisture content of materials in this facility.

A moisture meter was used to identify suspect water-impacted materials. Building materials have different absorptive and moisture retention properties and will come into equilibrium with environmental moisture (as indicated by relative humidity levels) or become wet by contact with water. A Delmhorst® Instrument Co., Moisture Check, direct-reading moisture meter was used to measure the moisture content of the building materials included in this evaluation. The moisture meter has both penetrating and non-penetrating surface meter modes.

Surface Mode - Using the moisture meter in surface mode allows the meter to be used on many different building materials and, unlike using the penetrating pin probe, does not scar surfaces. The surface mode uses a relative moisture scale from 0 - 300. An area known to be dry is tested and then compared to suspect areas; an increase greater than 10% above a known dry area is assumed to be excess moisture. When surface readings are inconclusive, the pin meter is used to determine moisture content.

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 an Extech Model 445580 IAQ instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- The conference room appeared to be clean with no odors noted.
- Small areas of mold growth and water damage were observed on the exterior wall and rear wall around the outlets/telecommunication boxes.
- Construction appeared to be carpet tiles over concrete, ceiling tiles in a metal grid system, and gypsum board walls.
- The exterior wall appeared to be constructed of multiple layers of gypsum with fiberglass insulation between them. The furthermost exterior layer had limited signs of water intrusion.
- Various areas were noted to have moisture in the gypsum board when scanned with handheld moisture meter. A diagram of moisture readings are attached.
- The exterior window system was noted to be damaged in limited areas along with limited areas of failing caulking/sealants.
- Photographs from the assessment are attached.

Mold Air Sampling

On the morning of November 19, 2018, Terracon collected four 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 – November 19, 2018

Sample #	240-A1	240-A2	240-A3	240-A4	240-O1	240-O2
Location Description	**Rear of Room 240**	**Front of Room 240**	**Main Hallway**	**Entry Foyer**	**Outdoor #1**	**Outdoor #2**
Spore Type	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**
Alternaria (Ulocladium)	--	--	40	--	--	--
Ascospores	40	--	--	40	200	540
Aspergillus/Penicillium	40	--	40	5,460	450	400
Basidiospores	400	300	200	--	20,200	39,100
Cladosporium	40	--	--	410	740	100
Curvularia	--	30	40	40	10	--
Myxomycetes	--	--	--	200	50	80
Pithomyces	--	--	--	--	40	--
Nigrospora	--	--	--	10	--	--
Total	**520**	**370**	**320**	**6,160**	**21,690**	**40,130**
Temperature (degrees F.)	67.4	68.7	69.2	69.4	67.2	73.5
Relative Humidity (%)	55.6	53.3	51.8	54.0	59.0	51.1

The total mold spore levels indoors were lower than the outdoor levels. In general, the predominant mold type identified outdoors and indoors was Basidiospores and Aspergillus/Penicillium like spores. The entry foyer had higher spore counts than the other indoor samples but it may be due to the area being unconditioned and frequently exposed to the exterior. The laboratory analytical report is attached.

Swab Sampling

One swab sample was collected from around an outlet on the rear wall of room 240. The sample results indicated that there were low counts of Cladosporium spores.

Temperature and Relative Humidity

The average indoor temperature was 68.4ºF and the relative humidity was 53.5%. The outdoor temperature was 70.4ºF and the relative humidity was 55.1%.

Allergen Sampling

On November 19, 2018, Terracon collected one dust sample from the carpeting in the Conference Room 240. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. Table 2 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information.

Table 2: Summary of Allergen Analyses – November 19, 2018

Sample #	PA91-5	
Location Description	**Rear of Room 240**	
Allergen Type/Antigen	**Concentration (ug/g)**	**Laboratory assigned risk factor**
Dust Mites / Der fl	ND	Low
Dust Mites / Der pl	ND	Low
Mouse / Mus ml	ND	Low
Rat / Rat nl	ND	N/A
Cat / Fel dl	0.02	Low
Dog / Can fl	0.04	Low
Cockroach / Bla G2	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, Conference Room 240 overall appeared to be clean and had limited signs of moisture damage/mold growth. The moisture appeared to be originating from the exterior due to failing window systems or moisture migration through the building shell. A diagram of moisture readings are attached. As such the moisture may be causing mold growth around the outlets. Visible mold should be cleaned until the water infiltration is corrected.
- It is Terracon's understanding the moisture related issues from the window system is already a known issue and facilities is discussing repair options. At the time of repairs interior wall cuts should be made to verify if hidden mold is present in the wall cavity where elevated moisture readings were detected and around the outlets with visible mold.
- Temperature and humidity analysis showed the indoors were typically within the ASHRAE recommended ranges for fall/winter heating and cooling cycles. However, these ranges can vary due to comfort levels of the individuals occupying the building. Continue to maintain relative humidity levels below 60%.
- Results of the spore trap sampling, showed that the indoors had mold spores at a lower concentration compared to the outdoors. Additionally the mold spores appeared to be of the same type in both the indoor and outdoor samples. At this time water infiltration from the window system does not appear to be affecting indoor airborne mold levels. Aspergillus/Penicillium like spores in the entry foyer

may be due to the area being unconditioned and frequently exposed to the exterior elements.

- Carpet vacuum samples indicated low level allergens (cat and dog) were observed within the area tested, but are reported at low levels according to the laboratory and generally are not considered an allergen concern to the general occupants.

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
Moisture Mapping
Laboratory Results

Photographs



Photo #1 General view of the Conference Room 240.

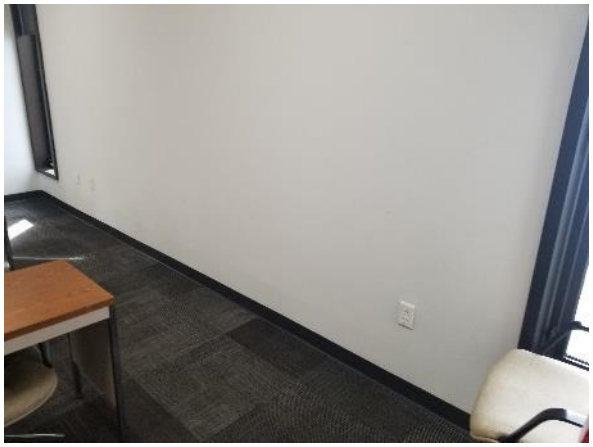


Photo #2 View of the rear corner of the Conference Room where impacts were noted.

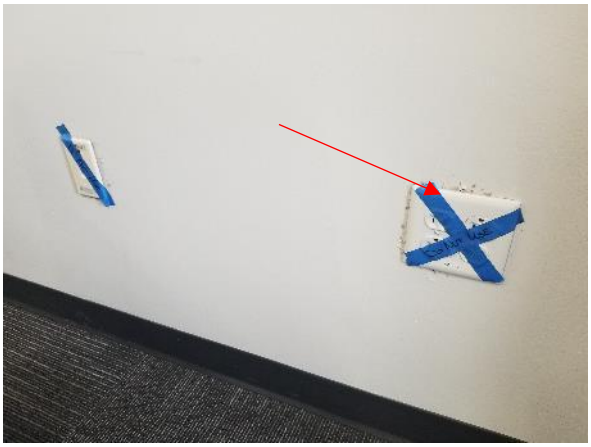


Photo #3 Typical view of outlet boxes with mold growth around the edges.



Photo #4 General view of the entry foyer.



Photo #5 View of the front façade of the building with a focus on the exterior wall of the Conference Room.

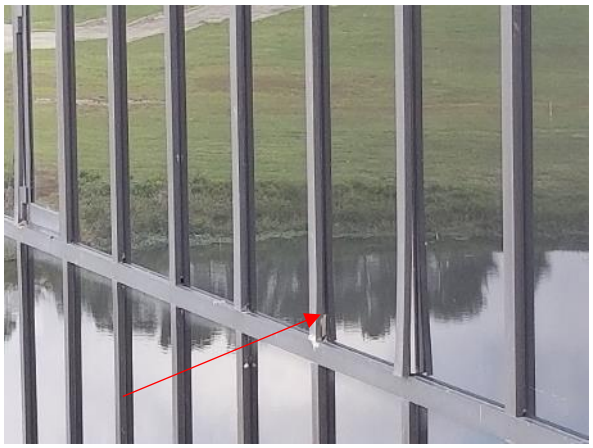


Photo #6 General view of the damaged window system on the façade.



Photo #7 General view of the space above the drop ceiling.



Photo #8 Additional view of the space above the drop ceiling.



Photo #9 View of a small damaged section on the exterior wall of Conference Room.



Photo #10 View of the double gypsum wall system with fiberglass insulation between them.



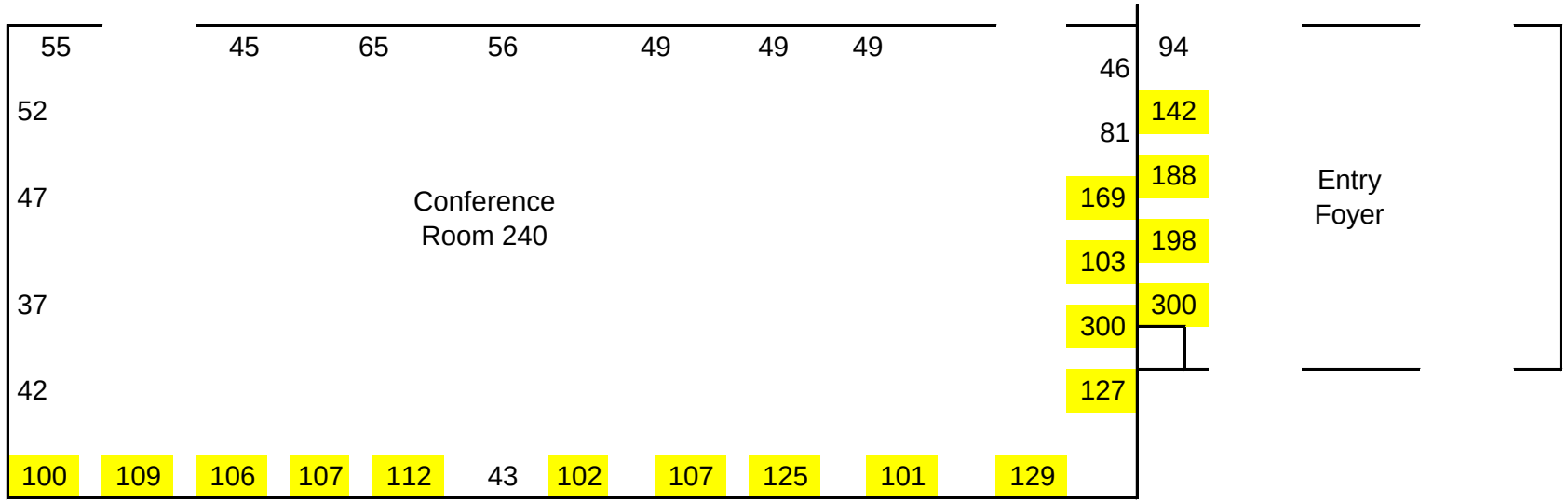
Photo #11 View of previously water damaged gypsum board against the exterior windows.



Photo #12 General view of the space above the hard ceiling in the entry foyer.

Moisture Mapping

Elevated Building Moisture Readings





Room layout and moisture locations are approximated.

Project Manager: JAG	Project No. 86187189G
Drawn By: SNE	Scale: N.T.S.
Checked By: JAG	File Name:
Approved By:	Date: 12/7/2018

Terracon
Consulting Engineers & Scientists
72 Pointe Circle Greenville, SC 29615
PH. (864) 292-2901 FAX. (864) 292-6361

General Layout / Sample Locations

Clemson University
Pee Dee Research Center Room 240
2200 Pocket Road
Florence, South Carolina

Figure 1

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:	371821521
Customer ID:	GTER78
Customer PO:	86187189G
Project ID:	

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

Phone:	(864) 292-2901
Fax:	(864) 292-6361
Collected:	11/19/2018
Received:	11/20/2018
Analyzed:	11/21/2018

Proj: 86187189G Pee Dee Research 240

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

Lab Sample Number:	371821521-0008				
Client Sample ID:	240-S1				
Sample Location:	Outlet on Rear Wall				
Spore Types	Category	-	-	-	-
Alternaria (Ulocladium)	-	-	-	-	-
Ascospores	-	-	-	-	-
Aspergillus/Penicillium	-	-	-	-	-
Basidiospores	-	-	-	-	-
Bipolaris++	-	-	-	-	-
Chaetomium	-	-	-	-	-
Cladosporium	*Low*	-	-	-	-
Curvularia	-	-	-	-	-
Epicoccum	-	-	-	-	-
Fusarium	-	-	-	-	-
Ganoderma	-	-	-	-	-
Myxomycetes++	-	-	-	-	-
Pithomyces++	-	-	-	-	-
Rust	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-
Zygomycetes	-	-	-	-	-
Hyphal Fragment	-	-	-	-	-
Insect Fragment	Rare	-	-	-	-
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: 11/21/2018 10:02:12

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

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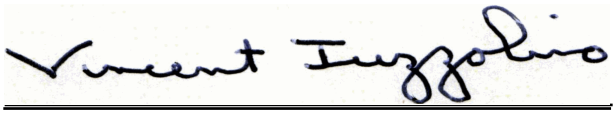
Phone: (864) 360-7572
Fax: (864) 292-6361
Collected: 11/19/2018
Received: 11/20/2018
Analyzed: 11/21/2018

Project: 86187189G Pee Dee Research 240

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

Lab Sample Number:	371821521-0001			371821521-0002			371821521-0003		
Client Sample ID:	240-A1			240-A2			240-A3		
Volume (L):	75			75			75		
Sample Location	Rear of Rm. 240			Front of Rm. 240			Main Hallway		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	1	40	12.5
Ascospores	1	40	7.7	-	-	-	-	-	-
Aspergillus/Penicillium	1	40	7.7	-	-	-	1	40	12.5
Basidiospores	9	400	76.9	8	300	81.1	4	200	62.5
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	1	40	7.7	-	-	-	-	-	-
Curvularia	-	-	-	2*	30*	8.1	1	40	12.5
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	1	40	10.8	-	-	-
Total Fungi	**12**	**520**	**100**	**11**	**370**	**100**	**7**	**320**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	2	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	1	-	-	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: 11/21/2018 10:02:12

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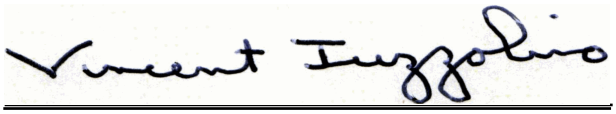
Phone: (864) 360-7572
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Collected: 11/19/2018
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Analyzed: 11/21/2018

Project: 86187189G Pee Dee Research 240

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

Lab Sample Number:	371821521-0004			371821521-0005			371821521-0006		
Client Sample ID:	240-A4			240-O1			240-O2		
Volume (L):	75			75			75		
Sample Location	Entry Foyer			Outdoors 1			Outdoors 2		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	1	40	0.6	4	200	0.9	11	450	1.1
Aspergillus/Penicillium	-	-	-	11	450	2.1	9	400	1
Basidiospores	133	5460	88.6	492	20200	93.1	954	39100	97.4
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	10	410	6.7	18	740	3.4	3	100	0.2
Curvularia	1	40	0.6	1*	10*	0	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	4	200	3.2	4*	50*	0.2	2	80	0.2
Pithomyces++	-	-	-	1	40	0.2	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Nigrospora	1*	10*	0.2	-	-	-	-	-	-
Total Fungi	**150**	**6160**	**100**	**531**	**21690**	**100**	**979**	**40130**	**100**
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	1	40	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	41	-	-	41	-	-	41	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	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.

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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: 371821521
Customer ID: GTER78
Customer PO: 86187189G
Project ID:

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

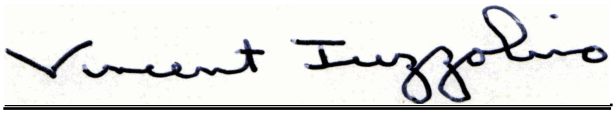
Phone: (864) 360-7572
Fax: (864) 292-6361
Collected: 11/19/2018
Received: 11/20/2018
Analyzed: 11/21/2018

Project: 86187189G Pee Dee Research 240

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

Lab Sample Number:	371821521-0007		
Client Sample ID:	BL		
Volume (L):			
Sample Location	Blank		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-
Ascospores	-	-	-
Aspergillus/Penicillium	-	-	-
Basidiospores	-	-	-
Bipolaris++	-	-	-
Chaetomium	-	-	-
Cladosporium	-	-	-
Curvularia	-	-	-
Epicoccum	-	-	-
Fusarium	-	-	-
Ganoderma	-	-	-
Myxomycetes++	-	-	-
Pithomyces++	-	-	-
Rust	-	-	-
Scopulariopsis/Microascus	-	-	-
Stachybotrys/Memnoniella	-	-	-
Unidentifiable Spores	-	-	-
Zygomycetes	-	-	-
Nigrospora	-	-	-
Total Fungi	**-**	**No Trace**	**-**
Hyphal Fragment	-	-	-
Insect Fragment	-	-	-
Pollen	-	-	-
Analyt. Sensitivity 600x	-	0	-
Analyt. Sensitivity 300x	-	0*	-
Skin Fragments (1-4)	-	-	-
Fibrous Particulate (1-4)	-	-	-
Background (1-5)	-	-	-

++ 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: 11/21/2018 10:02:12

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

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Project: **86187189G Pee Dee Research 240**

Date Collected: **11/19/2018**
Date Received: **11/20/2018**
Date Analyzed: **11/27/2018**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371821521-0009	240-CV	Carpet in Rm. 240	Bulk

Report Date	Report Revision	Revision Comments
11/28/2018	R0	Initial Report

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

About Us

EMSL Analytical, Inc. offers a full line of analytical solutions for over 30 years across North America. For more information about our nationally accredited locations, vast line of testing services, and our food safety solutions please visit



Disclaimers

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable. EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

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Project: **86187189G Pee Dee Research 240**

Date Collected: **11/19/2018**
Date Received: **11/20/2018**
Date Analyzed: **11/27/2018**

EMSL Sample #: **371821521-0009**
Client ID: **240-CV**
Location: **Carpet in Rm. 240**

Sample Type: **Bulk**
Sample Size: **50**
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	**0.02**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**0.04**	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**
11/28/2018	R0	Initial Report

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

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Date Collected: **11/19/2018**
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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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Date Collected: **11/19/2018**
Date Received: **11/20/2018**
Date Analyzed: **11/27/2018**

Important Terms, Conditions, and Limitations

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

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

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

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

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

This report has been prepared by EMSL Analytical, Inc. at the request of and for the exclusive use of the client named in this report. Completely read the important terms, conditions, and limitations that apply to this report.

Report Date	Report Revision	Revision Comments
11/28/2018	R0	Initial Report

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OrderID: 371821521

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EMSL ANALYTICAL, INC.
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Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 371821521

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: 86187189G Pee Dee Research 240		**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

AOC Swab — Allergens

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

RECEIVED EMSL CINNAMINSON, N.J. NOV 8 AM 11:8

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	
240-A1	Rear of Rm 240	Air	☐ P ☐ NP	M001	75L	11-19-18	
240-A2	Front of Rm 240	Air	☐ P ☐ NP	M001	75L	11-19-18	
240-A3	Main Hallway	Air	☐ P ☐ NP	M001	75L	11-19-18	
240-A4	Entry Foyer	Air	☐ P ☐ NP	M001	75L	11-19-18	
240-O1	Outdoors 1	Air	☐ P ☐ NP	M001	75L	11-19-18	
240-O2	Outdoors 2	Air	☐ P ☐ NP	M001	75L	11-19-18	

Client Sample # (s): **Total # of Samples:** 9 **Samples Received Chilled? Yes / No**

Relinquished (Client): ARM F **Date:** 11-14-18 **Time:** 1800

Received (Lab): **Date:** 11-20-18 **Time:** 1015

Comments/Special Instructions:

Page 1 of 2

Controlled Document – COC-34 Micro R7.2 8/23/2017

7C 15 13

OrderID: 371821521

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Microbiology Chain of Custody

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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)
BL	Blank	Air	☐P ☐NP	M001	0L	11-19-18	
240-S1	Outlet on Rear Wall	Swab	☐P ☐NP	M041	N/A	11-19-18	
240-CV	Carpet in Rm 240	Dust	☐P ☐NP	M044*	N/A	11-19-18	
			☐P ☐NP	*M254 per COC PM			
			☐P ☐NP				
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2018 NOV 20 A 11: 18

Comments/Special Instructions:

* - Please also analyze for Rat/Mouse Allergens M254