4221 Forbes Boulevard · Suite 250
Lanham, Maryland 20706
T: 202.558.7487 | http://atiinc.com/

June 17, 2019

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772
Attention: Mr. Alex Baylor

RE: Indoor Air Quality Screening, Cherokee Lane Elementary School
IFB: 022-19
ATI Project Number: ATI19-691

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) screening at Cherokee Lane Elementary School. The IAQ screening was conducted on May 31, 2019. Its key findings are enclosed in the Executive Summary on page three, and the official laboratory report for total fungal spore trap sampling is enclosed in Appendix A.

Thank you for the opportunity to provide Industrial Hygiene services for Prince George's County Public Schools. If you have any questions regarding this report, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Indoor Air Quality Screening Report

Prince George's County Public Schools
Cherokee Lane Elementary School
9200 25th Avenue
Adelphi, Maryland 20783

Prepared for:

Prince George's County Public Schools
13300 Old Marlboro Pike
Upper Marlboro, Maryland 20772

June 17, 2019

Submitted by:

ati

ATI Job # 19-691

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Table of Contents

Abbreviations and Acronyms

AHU	Air-Handling Unit
AIHA	American Industrial Hygiene Association
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
CO	Carbon Monoxide
CO_2	Carbon Dioxide
EMLAP	Environmental Microbiology Laboratory Accreditation Program
HVAC	Heating, Ventilating, And Air-Conditioning
IAQ	Indoor Air Quality
NIST	National Institute for Standards and Technology
NVLAP	National Voluntary Laboratory Accreditation Program
RH	Relative Humidity

Abbreviations involving scientific volume and measurements involving media or water sampling

Counts/m^3	Mold spores per cubic meter of air
LPM	Liters Per Minute
NTE	Not to exceed
°F	degree Fahrenheit
PPM	Parts Per Million

1. Executive Summary and Key Findings

ATI conducted a proactive Indoor Air Quality (IAQ) screening on May 31, 2019, at Cherokee Lane Elementary School, located at 9200 25th Avenue, Adelphi, MD 20783.

The screening included a visual assessment of randomly selected classrooms and other frequently occupied spaces, such as the cafeteria, the main office, and classrooms, for potential IAQ contributors and pathways. As part of the screening, ATI collected direct reading measurements for comfort parameters, including temperature, relative humidity, carbon dioxide, and carbon monoxide. Also, ATI collected total fungal air samples on spore trap cassettes for microbiological analysis.

The following is a summary of the key findings from this screening:

1. Most temperature measurements were within the ASHRAE guidelines for summer temperatures, between 73°F and 79°F. One location exceeded it and one fell short of the guidelines.
2. Relative humidity measurements were within ASHRAE guidelines, < 65%.
3. Three tested spaces exceeded recommended ASHRAE limit for carbon dioxide, which was 1,053 parts per million (PPM).
4. Carbon monoxide was not detected throughout the tested spaces.
5. Total concentrations detected in each tested space did not exceed the spore counts detected outdoors, 17,600 counts/m^3. Most spore types were detected at levels below the outdoor levels. Aspergillus/Penicillium, spores that may cause allergies, were detected in the cafeteria and in Room 11 at levels higher than outdoors, although the total concentrations of them were not too amplified.

2. Assessment Methods

Ms. Mikal Frater of ATI, Inc. conducted a visual assessment and air sampling on May 31, 2019. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Visual observations were made at the time the samples were collected. ATI references the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) *Standard 62.1 – 2016* and ASHRAE *Standard 55 – 2017* when providing IAQ services to clients. ASHRAE is an industry leader on energy efficiency and indoor air quality.

All measurements and air samples were collected between three-six feet from floor elevation, which represents the breathing zone, and away from air-supply and return diffusers. Real-time direct readings for temperature, relative humidity, carbon dioxide (CO_2), and carbon monoxide (CO), were obtained with a calibrated TSI Q-Trak 7575-X Meter and attached 982 Probe.

Total fungal air samples were collected with a Buck BioAire High-Volume Sampling Pump on Zefon Air-O-Cell spore-trap cassettes at a flow rate of 15 liters per minute for five minutes, for a sample volume of 75 liters. The samples were analyzed by direct microscopic examination (identifies and counts both viable and non-viable spores, which is then considered "total fungal"), via the American Society for Testing and Materials (ASTM) Standard D7391-09 by EMSL Analytical, Inc., (EMSL) located in Beltsville, MD.

EMSL participates in the National Institute of Standards and Technology's (NIST's) National Voluntary Laboratory Accreditation Program (NVLAP) for general laboratory performance and management and the American Industrial Hygiene Association (AIHA) Environmental Microbial Laboratory Accreditation Program (EMLAP, Certificate Number 102891).

Instrument calibration records are included in Appendix B of this report.

3. Visual Observations

Table 1: Visual Observations and Sampling Locations

Sample Location	Observations
Outside	• No traffic – foot or vehicle. • Children on playground nearby. • Parking lot surrounded by trees and grass. • One occupant in sampling area.
Main Office	• One rusted air return. Trace dirt load. • New Friedrich A/C model. • Door to corridor open. • Fax/printer is about 8ft. from sampling area. • Main office splits into six additional rooms. • Space is approximately 225 ft.^{2} • Outside of office and at end of hall – recently replaced ceiling tiles due to leakage.
Room 11	• Space is approximately 714 ft.^{2} • No stained ceiling tile or growth visible. • Older Friedrich A/C unit. • Three occupants in area during sampling. • One individual oscillating fan – OFF.
Room 5	• One air return. • Space is approximately 800 ft.^{2} • Fake plants scattered throughout room. • Room is housing caterpillars and butterflies. • No visible ceiling tile stains or growth visible.
Room 22	• Very faint brown stain on ceiling tile above computer. • Bathroom in room. • Friedrich A/C newer model – ON. • Two occupants in sampling area. • Space is approximately 754 ft.^{2}
Cafeteria	• Four A/C units. One older Friedrich model, three newer models. • Three air returns. • About 150 occupants in area. • No stained ceiling tiles or noticeable growth. • Space is approximately 2,192 ft.^{2}

4. Thermal Environmental Conditions for Human Occupancy

ASHRAE *Standard 55-2017, Thermal Environmental Conditions for Human Occupancy*, addresses thermal comfort in an office environment, which means that an employee wearing a normal amount of clothing feels neither too cold nor too warm. This standard discusses thermal comfort within the context of air temperature, humidity, and air movement and provides recommended ranges for temperature and humidity that are intended to satisfy most building occupants. The recommended ASHRAE ranges are referenced below by each comfort parameter.

4.1 Temperature

The ASHRAE standard establishes a winter comfort range of between 68°F and 75°F and a summer range of between 73°F and 79°F. The temperature measurements obtained during the May 31, 2019, screening are summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 72.55 – 80.1°F, with one location exceeding and one location falling under the ASHRAE summer comfort range.

Table 2: Temperature Measurements

Sample Location	May 31, 2019 °F			ASHRAE Standard °F
	Min	Max	Average	
Outside	82.2	83.0	82.6	N/A
Indoors				
Main Office	75.8	76.0	75.9	73 – 79
Room 11	80.0	80.2	80.1	73 – 79
Room 5	71.6	73.5	72.55	73 – 79
Room 22	72.6	74.4	73.5	73 – 79
Cafeteria	75.8	78.0	76.9	73 – 79

4.2 Relative Humidity

Relative humidity is a key factor for mold growth. Mold has the potential of growing on suitable surfaces with humidity levels above 65%. ASHRAE *Standard 62.1-2016*, *Ventilation for Acceptable Indoor Air Quality,* recommends a maximum indoor relative humidity of 65% to prevent condensation of moisture on surfaces. Relative humidity below 30% may result in drying of the mucous membranes and skin. Relative humidity measurements are summarized in Table 3. As indicated by the data in the table, relative humidity measurements averaged between 41.2% and 53.2%, below the ASHRAE maximum recommendation of 65% relative humidity.

Table 3: Relative Humidity Measurements

Sample Location	May 31, 2019 (%)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outside	48.2	49.8	49.0	N/A
Inside				
Main Office	47.6	47.8	47.7	< 65
Room 11	45.6	45.8	45.7	< 65
Room 5	48.1	51.3	49.7	< 65
Room 22	40.5	41.9	41.2	< 65
Cafeteria	52.8	53.6	53.2	< 65

4.3 Carbon Dioxide

Carbon dioxide measurements within an occupied building are a standard method used to gauge the efficiency of ventilation systems. Carbon dioxide is a by-product of human respiration and does not pose an acute health hazard alone. Elevated concentrations may suggest that insufficient fresh air is being supplied to an occupied space and/or that the ventilation system does not provide a sufficient rate of air exchange.

Research has indicated that buildings with adequately operating ventilation systems are able to remove odors generated by activities in an indoor office environment efficiently. ASHRAE *Standard 62.1-2016* states that comfort (odor) criteria with respect to human bioeffluents are likely to be satisfied if the ventilation results indoor carbon dioxide concentrations are less than 700 parts per million (ppm) above the outdoor air concentration.

Carbon dioxide measurements are summarized in Table 4. On the day of the screening, the average outdoor carbon dioxide concentration obtained was 353 ppm, which calculates to a maximum indoor concentration of 1,053 ppm (700 + 353). The carbon dioxide levels inside the school ranged from the average minimum detected, 517 ppm, to 2,122 ppm, the average maximum detected, with three locations exceeding the ASHRAE maximum recommended concentration of 1,053 ppm.

Table 4: Carbon Dioxide Measurements

Sample Location	May 31, 2019 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outside	311	395	353	N/A
Inside				
Main Office	1,143	1,151	1,147	1,053
Room 11	2,121	2,123	2,122	1,053
Room 5	501	515	517	1,053
Room 22	654	670	662	1,053
Cafeteria	1,908	2,010	1,959	1,053

4.4 Carbon Monoxide

Carbon monoxide is a colorless and odorless gas produced by the incomplete combustion of carbon containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are the major sources of carbon monoxide. ASHRAE recommends that carbon monoxide not exceed nine ppm indoors. As indicated by the data in Table 5, carbon monoxide was not detected throughout the school.

Table 5: Carbon Monoxide Measurements

Sample Location	May 31, 2019 Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outside	0	0	0	N/A
Inside				
Main Office	0	0	0	< 9
Room 11	0	0	0	< 9
Room 5	0	0	0	< 9
Room 22	0	0	0	< 9
Cafeteria	0	0	0	< 9

5. Total Fungal Air Sampling Results

Mold needs a food source, moisture, proper temperature and humidity, and at times, a source of light, to grow in an environment. Air infiltration through building entrances and exits, open windows and loading docks, and foot traffic into buildings, including the HVAC system all serve as primary pathways that can carry fungi indoors. Water leaks and humid conditions inside of buildings provide the moisture that fosters mold growth. The May 31, 2019 mold screening sampled air using spore trap cassettes in randomly selected classrooms and other areas throughout the facility. These cassettes collect both viable spores, those capable of producing more fungal colonies, and non-viable spores, which cannot reproduce. Based upon recognized industry practices, indoor mold concentrations are compared with those detected outdoors, which are also known as ambient or baseline samples.

In normal circumstances, the diversity of spores identified indoors and outdoors should be similar with some exceptions. The high concentration of one or two species of fungal spores identified indoors and the absence of the same species outdoors can indicate a moisture problem with the potential to degrade the air quality. Fungi species present indoors are typically found at levels ranging from approximately 10-50% of their levels in the outdoor air, reflecting the filtering by the building's HVAC system.

The official laboratory report with spore trap samples collected on May 31, 2019, is presented in Appendix A. Total concentrations detected in each tested space did not exceed the spore counts detected outdoors, 17,600 counts/m^3.

Ascospores, Basidiospores and Cladosporium had the highest concentrations, although they did not exceed those detected outdoors. These three spore types are commonly found indoors. Each are known to cause allergies yet are not associated with water damaged materials in buildings.

Aspergillus/Penicillium, also known to cause allergies, was detected indoors in two locations higher than the ambient sample, which detected 80 counts/m^3. Room 11 and the cafeteria detected 200 counts/m^3 and 300 counts/m^3, respectively. The Aspergillus/Penicillium indoor concentrations are not very amplified, but nonetheless, exceed the outdoor sample. Low concentrations of other spores, such as Pithomyces and Epicoccum, were also detected indoors but not outdoors. These low concentrations do not pose a concern.

6. Summary of Findings

Most temperature measurements were within the ASHRAE guidelines for summer temperatures, between 73°F and 79°F. One location exceeded it and one fell short of the guidelines. Relative humidity measurements were within ASHRAE guidelines, < 65%. Three tested spaces exceeded recommended ASHRAE limit for carbon dioxide, which was 1,053 parts per million (PPM). Carbon monoxide was not detected throughout the tested spaces.

Total concentrations detected in each tested space did not exceed the spore counts detected outdoors, 17,600 counts/m^3. Most spore types were detected at levels below the outdoor levels. Aspergillus/Penicillium, spores that may cause allergies, were detected in the cafeteria and in Room 11 at levels higher than outdoors, although the total concentrations of them were not too amplified.

We appreciate the opportunity to provide these IAQ testing services for you. If you have any questions, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Appendix A:
Laboratory Report and Chain of Custody

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

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

EMSL Order: 191906343
Customer ID: ATII25A
Customer PO:
Project ID:

Attn: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 19-691 - PGCPS - CHEROKEE LANE ELM

Phone: (202) 832-1433
Fax:
Collected: 05/31/2019
Received: 06/04/2019
Analyzed: 06/07/2019

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

Lab Sample Number:	191906343-0001			191906343-0002			191906343-0003		
Client Sample ID:	19-691-01			19-691-02			19-691-03		
Volume (L):	75						75		
Sample Location	OUTSIDE PARKING LOT			FIELD BLANK			MAIN OFFICE		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	1	40	0.2	-	-	-	-	-	-
Ascospores	53	2200	12.5	-	-	-	7	300	31.6
Aspergillus/Penicillium	2	80	0.5	-	-	-	1	40	4.2
Basidiospores	341	14400	81.8	-	-	-	7	300	31.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	20	840	4.8	-	-	-	6	300	31.6
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	1*	10*	1.1
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Bispora	-	-	-	-	-	-	-	-	-
Torula-like	1	40	0.2	-	-	-	-	-	-
Total Fungi	**418**	**17600**	**100**	**-**	**No Trace**	**-**	**22**	**950**	**100**
Hyphal Fragment	-	-	-	-	-	-	1	40	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1	40	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	0	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	-	-	-	2	-
Fibrous Particulate (1-4)	-	1	-	-	-	-	-	1	-
Background (1-5)	-	1	-	-	-	-	-	2	-

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

Stefanie Schneider

Stefanie Schneider, Microbiology 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. Beltsville, MD AIHA-LAP, LLC --EMLAP Accredted #102891

Initial report from: 06/07/2019 12:11:22

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

EMSL Analytical, Inc.

10768 Baltimore Avenue Beltsville, MD 20705

Tel/Fax: (301) 937-5700 / (301) 937-5701

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Project: 19-691 - PGCPS - CHEROKEE LANE ELM

Phone: (202) 832-1433
Fax:
Collected: 05/31/2019
Received: 06/04/2019
Analyzed: 06/07/2019

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

Lab Sample Number:	191906343-0004			191906343-0005			191906343-0006		
Client Sample ID:	19-691-04			19-691-05			19-691-06		
Volume (L):	75			75			75		
Sample Location	ROOM 11			ROOM 5			ROOM 22		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	1*	10*	0.5	-	-	-	-	-	-
Ascospores	10	420	20.9	14	590	37.8	9	400	28.2
Aspergillus/Penicillium	5	200	10	-	-	-	1	40	2.8
Basidiospores	16	680	33.8	21	890	57.1	13	550	38.7
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	15	630	31.3	2	80	5.1	10	420	29.6
Curvularia	1	40	2	-	-	-	-	-	-
Epicoccum	1*	10*	0.5	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1*	10*	0.5	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	1*	10*	0.7
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Bispora	1*	10*	0.5	-	-	-	-	-	-
Torula-like	-	-	-	-	-	-	-	-	-
Total Fungi	**51**	**2010**	**100**	**37**	**1560**	**100**	**34**	**1420**	**100**
Hyphal Fragment	1*	10*	-	-	-	-	-	-	-
Insect Fragment	2	80	-	-	-	-	1	40	-
Pollen	1	40	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	4	-	-	1	-	-	2	-
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.

Stefanie Schneider

Stefanie Schneider, Microbiology 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: 06/07/2019 12:11:22

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Phone: (202) 832-1433
Fax:
Collected: 05/31/2019
Received: 06/04/2019
Analyzed: 06/07/2019

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

Lab Sample Number:	**191906343-0007**		
Client Sample ID:	**19-691-07**		
Volume (L):	**75**		
Sample Location	**CAFETERIA**		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-
Ascospores	2	80	6.5
Aspergillus/Penicillium	6	300	24.4
Basidiospores	1	40	3.3
Bipolaris++	-	-	-
Chaetomium	1	40	3.3
Cladosporium	14	590	48
Curvularia	1	40	3.3
Epicoccum	-	-	-
Fusarium	-	-	-
Ganoderma	-	-	-
Myxomycetes++	3	100	8.1
Pithomyces++	1	40	3.3
Rust	-	-	-
Scopulariopsis/Microascus	-	-	-
Stachybotrys/Memnoniella	-	-	-
Unidentifiable Spores	-	-	-
Zygomycetes	-	-	-
Bispora	-	-	-
Torula-like	-	-	-
Total Fungi	**29**	**1230**	**100**
Hyphal Fragment	1	40	-
Insect Fragment	-	-	-
Pollen	1	40	-
Analyt. Sensitivity 600x	-	42	-
Analyt. Sensitivity 300x	-	13*	-
Skin Fragments (1-4)	-	4	-
Fibrous Particulate (1-4)	-	1	-
Background (1-5)	-	2	-

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

Stefanie Schneider

Stefanie Schneider, Microbiology 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: 06/07/2019 12:11:22

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

OrderID: 191906343

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*): 191906343

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Company Name: ATI, Inc		**EMSL-Bill to:** ☐ Same ☐ Different If Bill to is Different note instructions in Comments	
Street: 4221 Rumsey Road, Suite 250		*Third Party Billing requires written authorization from third party.*	
City: Lanham	**State/Province:** MD	**Zip/Postal Code:** 20706	**Country:**
Report To (Name): Courtney McCall / Mikal Frater		**Telephone #:** 202-558-7489	
Email Address: Courtney@atiinc.com & Mikal@atiinc.com		**Fax #:**	**Purchase Order:**
Project Name/Number: 19-691- PGCPS - Cherokee Lane ES		**Please Provide Results:** ☐ Fax ☒ Email	
U.S. State Samples Taken:	**Project Zip Code:**	**Connecticut Samples:** ☒ Commercial ☐ Residential	

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
M030 Micro 5
M174 MoldSnap
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: Mikal Frater **Signature of Sampler:** Mikal Frater

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	
19-691-01	Outside Parking Lot	Air	☐ P ☐ NP	M001	75L	05-31-19 - 11:19	
19-691-02	Field Blank	Air	☐ P ☐ NP	M001	75L	05-31-19 -	
19-691-03	Main Office	Air	☐ P ☐ NP	M001	75L	05-31-19 - 12:17	
19-691-04	Room 11	Air	☐ P ☐ NP	M001	75L	05-31-19 - 11:37	
19-691-05	Room 5	Air	☐ P ☐ NP	M001	75L	05-31-19 - 11:48	

Client Sample # (s): - 7 **Total # of Samples:** 7 **Samples Received Chilled?** Yes / No (Lab Use Only)

Relinquished (Client): M. FRATER **Date:** 5-31-19 **Time:** 2:45 pm

Received (Lab): [signature] **Date:** 5/31/19 **Time:** 2:45 pm

Comments/Special Instructions:

Controlled Document – COC-34 Micro R8 11/14/2017

OrderID: 191906343

EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Microbiology Chain of Custody

EMSL Order Number (*Lab Use Only*):

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX:(856) 786-0262

Additional pages of the chain of custody are only necessary if needed for additional sample information.

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable (Only for Waters)	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
19-691-06	Room 22	Air	☐ P ☐ NP	M001	75L	05-31-19 - 12:01	
19-691-07	Cafeteria	Air	☐ P ☐ NP	M001	75L	05-31-19 - 12:10	
		Air	☐ P ☐ NP	M001	75L		
		Air	☐ P ☐ NP	M001	75L		
			☐ P ☐ NP				
			☐ P ☐ NP				
			☐ P ☐ NP				
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Comments/Special Instructions:

Controlled Document – COC-34 Micro R8 11/14/2017

Appendix B:
Instrument Calibration Records

Certificate of Calibration

(✓) ~~Buck™~~ BioAire Pump Calibration Rotameter

( ) Buck™ BioSlide Pump Calibration Rotameter

Serial number: R14057

Date Calibrated: 1/22/19 **Calibration Due Date:** 1/22/20

Flow Calibration

This is to certify that the rotameter listed above has been calibrated using a Buck Primary calibrator listed below which is calibrated according to A.P. Buck, Inc. calibration procedure APB-1, Ver. 6.2 and is traceable to the National Institute of Standards & Technology (N.I.S.T). A.P. Buck guarantees the accuracy of the rotameter to be within ± 5% of the actual flow rate.

AMBIENT CONDITIONS: Temperature 74±3° F Relative Humidity 50±10%

Description	MFR.	Model	Serial #
Primary Calibrator	A.P. Buck Inc.	M30B	☐ A40020 ☑ ~~A40021~~

QA Approval By:

A.P. BUCK, INC.
7101 Presidents Drive, Suite 110
Orlando, FL 32809
Phone: 407-851-8602
Fax: 407-851-8910

BUCK
A.P. BUCK, INC.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID 27136
Description TSI 982 Probe
Calibrated 5/28/2019 12:36:30PM

Manufacturer Tsi
Model Number 982
Serial Number/ Lot Number p13220024
Location Maryland
Department

State Certified
Status Pass
Temp °C 22
Humidity % 53

Calibration Specifications

Group # 1
Group Name CO
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
100.0 / 100.0	PPM	100.0	PPM	108.0	100.0	0.00%	Pass

Group # 2
Group Name CO2
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
1000 / 1000	PPM	1000	PPM	982	1,000	0.00%	Pass

Test Instruments Used During the Calibration

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	(As Of Cal Entry Date) Last Cal Date/ Opened Date	Next Cal Date / Expiration Date
MD 2GAS CO 100PPM/CO2 1000PPM	MD 2GAS CO 100PPM/CO2 1000PPM - LBI-375-2	Pine Environmental Services, Inc.	31657	LBI-375-2		11/21/2022
MD ZERO AIR FBI-1-25	MD ZERO AIR	Pine Environmental Services, Inc.	34LS-1	FBI-1-25		

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Ryan Armstrong

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID 27136
Description TSI 982 Probe
Calibrated 5/28/2019 12:36:30PM

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 27136
Description TSI 982 Probe
Calibrated 12/12/2018

Manufacturer TSI
Model Number 982
Serial Number P13220024
Location New Jersey
Temp 71

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 22

Calibration Specifications

Group # 1
Group Name Carbon Dioxide
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	ppm	0.00	ppm	0.00	0.00	0.00%	Pass
1000.00 / 1000.00	ppm	1000.00	ppm	1,009.00	1,002.00	0.20%	Pass

Group # 2
Group Name Carbon Monoxide
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
0.00 / 0.00	ppm	0.00	ppm	4.60	0.00	0.00%	Pass
100.00 / 100.00	ppm	100.00	ppm	96.00	100.10	0.10%	Pass

Group # 3
Group Name Relative Humidity
Stated Accy Pct of Reading
Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
50.00 / 30.80	%	30.80	%	31.00	30.80	0.00%	Pass

Group # 4
Group Name Temperature
Stated Accy Plus / Minus
Range Acc % 0.0000
Reading Acc % 0.0000
Plus/Minus 1.00

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
65.00 / 72.30	°F	72.30	°F	69.80	72.30	0.00%	Pass

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
CO/CO2_34LS-375	100 ppm CO, 1000 ppm CO2	Calgaz	MAO-375-1		6/9/2019
MICHELL DM-509-TX-01	Relative Humidity Meter	Michell	273296	9/17/2018	9/17/2019
NITROGEN	Nitrogen 99.999%	Liquid Technology	7727-37-9	6/1/2016	6/1/2019
ZERO_AIR_105	Zero Grade Air THC <1.0 PPM	Liquid Technology	KAP-A-10	10/1/2015	10/20/2019
L-1					

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID 27136
Description TSI 982 Probe
Calibrated 12/12/2018

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Advanced Labs, Inc.

Pine Environmental Services, Inc

Instrument ID R20401
Description TSI 7575 -X Q-Trak
Calibrated 8/22/2018

Manufacturer TSI
Model Number 7575-X
Serial Number 7575X1130009
Location New Jersey
Temp 77

Classification
Status pass
Frequency Yearly EOM
Department Lab
Humidity 41

Calibration Specifications

Group # 1
Group Name Barometric Pressure
Stated Accy Pct of Reading

Range Acc % 0.0000
Reading Acc % 3.0000
Plus/Minus 0.000

Nom In Val / In Val	In Type	Out Val	Out Type	Fnd As	Lft As	Dev%	Pass/Fail
30.000 / 29.610	inHg	29.610	inHg	29.620	29.610	0.00%	Pass

Test Instruments Used During the Calibration

Test Instrument ID	Description	Manufacturer	Serial Number	(As Of Cal Entry Date) Last Cal Date	Next Cal Date
OMEGA HX93AC/DP25-E	Omega HX93AC/DP25-E	Omega Engineering	1010368 035025 035026	9/15/2016	9/15/2018
OMEGA PX02K1-16A5T /DP25-E-A	Omega PX02K1-16A5T/DP25-E-A	Omega Engineering	168377/8375030	9/15/2016	9/15/2018
OMEGA WT4401-D	Omega WT4401-D	Omega Engineering	101105	9/15/2016	9/15/2018

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Kevin Cole

Advanced Labs, Inc. hereby certifies that this instrument is calibrated and functions to meet the manufacture's specifications using NIST traceable standards, or is derived from accepted values of physical constants.

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC
798 Cromwell Park Dr.
Suite R & S
Glen Burnie, MD 21061

Pine Environmental Services, Inc.

Instrument ID R20401
Description TSI 7575 Q-Trak
Calibrated 5/28/2019 12:35:31PM

Manufacturer Tsi
Model Number 7575
Serial Number/ Lot Number 7575X1130009
Location Maryland
Department

State Certified
Status Pass
Temp °C 22
Humidity % 53

Calibration Specifications

Group # 1
Group Name Functional Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	(As Of Cal Entry Date) Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Ryan Armstrong

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance