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

June 11, 2019

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

RE: Indoor Air Quality Screening, James McHenry Elementary School
IFB: 022-19
ATI Project Number: ATI19-663, Revision 1

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) screening at James McHenry Elementary School. The IAQ screening was conducted on May 15, 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.

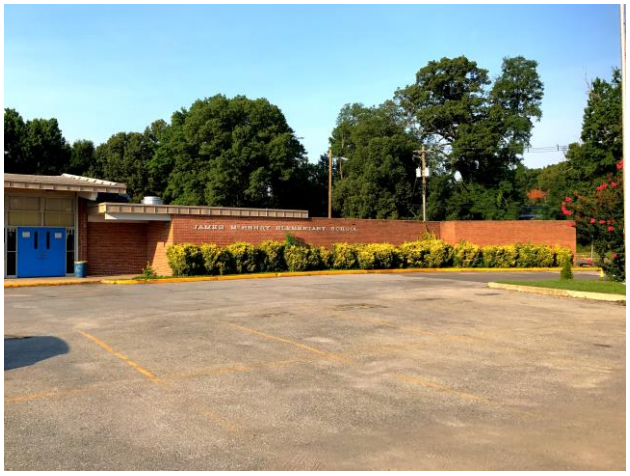
Thank you for the opportunity to provide Industrial Hygiene services for Prince George's County Public Schools. If you have any questions regarding this report, please contact us at (202) 643-4283.

Sincerely,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Indoor Air Quality Screening Report



Prince George's County Public Schools
James McHenry Elementary School
8909 McHenry Lane
Lanham, Maryland 20706

Prepared for:

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

June 11, 2019

Revision 1

Submitted by:

ATI Job # 19-663

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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
Rev.	Revision

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

1. Executive Summary and Key Findings

ATI conducted a proactive Indoor Air Quality (IAQ) screening on May 15, 2019, at James McHenry Elementary School, located at 8909 McHenry Lane, Lanham, MD 20706.

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. Temperature measurements were slightly below and on the lower end of ASHRAE guidelines for summer temperatures, between 73°F and 79°F;
2. Humidity measurements were within ASHRAE guidelines, <65%.
3. Carbon dioxide measurements in two locations exceeded the ASHRAE maximum for the day of the screening, 1,100 parts per million (ppm).
4. Carbon monoxide was not detected throughout the tested spaces.
5. Total spore concentrations detected in each tested space did not exceed the spore counts detected outdoors, 13,080 counts/m^3. Most spore types were detected at levels below the outdoor level. Cladosporium and Aspergillus/Penicillium, spores that may cause allergies, were detected in some tested areas at levels higher than outdoors.

2. Assessment Methods

Mr. Brian Chapman and Ms. Mikal Frater of ATI, Inc., conducted a visual assessment and air sampling on May 15, 2019. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms. 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	• Clear skies. • Parking lot surrounded by trees. • No vehicle or foot traffic. • Sunny with light winds. • Eight air handling units can be seen on rooftop from outside.
Main Office	• Two wall units. • One air diffuser with light dirt accumulation. • Five occupants in room during sampling. • Light foot traffic. • One printer/fax machine about 10 ft. from sampling area. • Individual fan in room – OFF. • Space is approximately 390 ft.^{2}
Room 8	• One long wall unit along wall entirely. • Three occupants in room during sampling. • Very light foot traffic. • Friedrich A/C unit in room. • Heat is on in boiler system. • Space is approximately 750 ft.^{2}
Room 1	• Labeled "computer lab" on floor plan. • Friedrich A/C unit (SL36L30A-C). • One long wall unit along south perimeter wall. • Emergency exit in room – outside access. • A/C unit is installed but not properly insulated – breach allowing outside air into space. • Filter is clean, but coils have trace dirt accumulation. • Space is approximately 720 ft.^{2}
Room A4	• Twenty-one occupants in area during sampling, about six feet from sampling area. • Water stain on ceiling tile indicative of previous leak in room. • Four air diffusers, one air return. • Air return 12x12 pleated filter with mild dirt load. • Space is approximately 820 ft.^{2}
Room 19	• Wall unit along wall perimeter. • Two window A/C units. • About seventeen occupants in room during sampling.

Sample Location	Observations
	• Bathroom within classroom. • Hot water non-operable (per teacher). • Water leaks from toilet base. • Dripping faucet. • Space is approximately 690 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 15, 2019, screening is summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 68.2 - 73.9°F, below and on the lower end of the ASHRAE summer comfort range.

Table 2: Temperature Measurements

Sample Location	May 15, 2019 °F			ASHRAE Standard °F
	Min	Max	Average	
Outside	58.0	58.0	58.0	N/A
Indoors				
Main Office	73.8	74.0	73.9	73 – 79
Room 8	70.1	70.1	70.1	73 – 79
Room 1	69.3	69.3	69.3	73 – 79
Room A4	71.7	71.9	71.8	73 – 79
Room 19	67.8	68.5	68.2	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 41.5 and 49.4%, below the ASHRAE maximum recommendation of 65% relative humidity.

Table 3: Relative Humidity Measurements

Sample Location	May 15, 2019 (%)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outside	33.0	35.1	34.05	N/A
Inside				
Main Office	41.3	41.7	41.5	< 65
Room 8	48.1	48.2	48.2	< 65
Room 1	46.0	46.8	46.4	< 65
Room A4	48.4	48.8	48.6	< 65
Room 19	48.8	49.9	49.4	< 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 400 ppm, which calculates to a maximum indoor concentration of 1,100 ppm (700 + 400). The carbon dioxide levels inside the school ranged from the average minimum detected, 935.5 ppm to 1,366 ppm, the average maximum detected, with two locations exceeding the maximum recommended concentration of 1,100 ppm.

Table 4: Carbon Dioxide Measurements

Sample Location	May 15, 2019 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outside	396	404	400	N/A
Inside				
Main Office	965	972	968.5	1,100
Room 8	1,365	1,367	1,366	1,100
Room 1	955	961	958	1,100
Room A4	1,204	1,228	1,216	1,100
Room 19	925	946	935.5	1,100

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 15, 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 8	0	0	0	< 9
Room 1	0	0	0	< 9
Room A4	0	0	0	< 9
Room 19	0	0	0	< 9

5. Total Fungal Air Sampling Results

Mold needs a food source, moisture, proper temperature and humidity, and at most times, a source of light, to grow in an environment. Air filtration through building entrances and exits, open windows and loading docks, and foot traffic into buildings, serve as primary pathways that bring mold indoors. Water leaks and humid conditions inside of buildings provide the moisture that fosters mold growth.

The May 15, 2019, mold screening sampled air using spore trap cassettes in randomly selected classrooms and other rooms. 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 dominating presence 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 15, 2019, is presented in Appendix A. The findings indicated that the indoor concentrations were favorable compared to the outdoor concentrations. Total concentrations detected in each tested space did not exceed the spore counts detected outdoors, 13,080 counts/m^3.

The laboratory report indicates that Basidiospores are the highest concentration within the samples. Basidiospores are common outdoor fungi with the potential to enter building spaces though main entrances, opened windows, or via building envelopes. They may pose allergy-like symptoms but are not a fungi to be associated with water damaged building materials. Basidiospores detected indoors did not exceed the quantity detected outdoors. Also, Ascospores and Cladosporium, spores commonly found indoors and known to cause allergies, were detected in most tested rooms. Aspergillus/Penicillium, which are known to cause allergies also, were detected in four of the six tested spaces, while it was not detected outdoors.

6. Summary of Findings

ASHRAE comfort parameters including relative humidity and carbon monoxide were within recommended ranges in all tested areas. The indoor temperatures fell below and on the lower end of the ASHRAE recommended summer comfort range. Carbon dioxide levels in two locations exceeded the ASHRAE maximum for the day of the screening.

Total spore concentrations detected in each tested space did not exceed the spore counts detected outdoors, 13,080 counts/m^3. Most spore types were detected at levels below the outdoor level. Cladosporium and Aspergillus/Penicillium, spores that may cause allergies, were detected in some tested areas at levels higher than outdoors.

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

Best regards,
ATI, INC.

Courtney E. McCall
Project Manager

Sarath Seneviratne
CIH, CSP, CHMM

Appendix A:
Laboratory Report and Chain of Custody

EMSL Analytical, Inc.

2500 Gateway Centre Blvd., Suite 600 Morrisville, NC 27560

Tel/Fax: (919) 465-3900 / (919) 465-3950

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

EMSL Order: 291905208
Customer ID: ATII25A
Customer PO:
Project ID:

Attn: Brian Chapman
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 19-663 - PGCPS - McHenry ES

Phone: (202) 368-1376
Fax:
Collected: 05/15/2019
Received: 05/15/2019
Analyzed: 05/20/2019

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

Lab Sample Number:	291905208-0001			291905208-0002			291905208-0003		
Client Sample ID:	19-663-01			19-663-02			19-663-03		
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)	-	-	-	-	-	-	-	-	-
Ascospores	67	2800	21.4	-	-	-	7	300	21.4
Aspergillus/Penicillium	-	-	-	-	-	-	15	630	45
Basidiospores	241	10200	78	-	-	-	7	300	21.4
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	2	80	0.6	-	-	-	3	100	7.1
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	4*	50*	3.6
Pithomyces++	-	-	-	-	-	-	1*	10*	0.7
Rust	-	-	-	-	-	-	1*	10*	0.7
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**310**	**13080**	**100**	**-**	**No Trace**	**-**	**38**	**1400**	**100**
Hyphal Fragment	-	-	-	-	-	-	1	40	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1	40	-	-	-	-	3	100	-
Analyt. Sensitivity 600x	-	42	-	-	0	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	0*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	-	-	-	3	-
Fibrous Particulate (1-4)	-	-	-	-	-	-	-	1	-
Background (1-5)	-	1	-	-	-	-	-	4	-

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

Alan Goldstein

Alan Goldstein, Ph.D., 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. Morrisville, NC AIHA-LAP, LLC--EMLAP Lab 173741

Initial report from: 05/21/2019 08:12:10

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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Project: 19-663 - PGCPS - McHenry ES

Phone: (202) 368-1376
Fax:
Collected: 05/15/2019
Received: 05/15/2019
Analyzed: 05/20/2019

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

Lab Sample Number:	291905208-0004			291905208-0005			291905208-0006		
Client Sample ID:	19-663-04			19-663-05			19-663-06		
Volume (L):	75			75			75		
Sample Location	Room 8			Computer Lab Room 1			Room A4		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	12	510	28	56	2400	52.7	5	200	31.3
Aspergillus/Penicillium	7	300	16.5	1	40	0.9	-	-	-
Basidiospores	11	460	25.3	37	1600	35.2	4	200	31.3
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	12	510	28	12	510	11.2	4	200	31.3
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	1	40	6.3
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1	40	2.2	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Total Fungi	**43**	**1820**	**100**	**106**	**4550**	**100**	**14**	**640**	**100**
Hyphal Fragment	9	400	-	1*	10*	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1*	10*	-	-	-	-	2*	30*	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	2	-	-	3	-	-	3	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-	-	2	-

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

Alan Goldstein

Alan Goldstein, Ph.D., Laboratory Manager
or other approved signatory

Samples analyzed by EMSL Analytical, Inc. Morrisville, NC AIHA-LAP, LLC--EMLAP Lab 173741

Initial report from: 05/21/2019 08:12:10

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Project: 19-663 - PGCPS - McHenry ES

Phone: (202) 368-1376
Fax:
Collected: 05/15/2019
Received: 05/15/2019
Analyzed: 05/20/2019

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

Lab Sample Number:	**291905208-0007**								
Client Sample ID:	**19-663-07**								
Volume (L):	**75**								
Sample Location	**Room 19**								
Spore Types	**Raw Count**	**Count/m³**	**% of Total**						
Alternaria (Ulocladium)	-	-	-						
Ascospores	27	1100	42.6						
Aspergillus/Penicillium	1	40	1.6						
Basidiospores	25	1100	42.6						
Bipolaris++	-	-	-						
Chaetomium	-	-	-						
Cladosporium	3	100	3.9						
Curvularia	-	-	-						
Epicoccum	4	200	7.8						
Fusarium	-	-	-						
Ganoderma	-	-	-						
Myxomycetes++	1	40	1.6						
Pithomyces++	-	-	-						
Rust	-	-	-						
Scopulariopsis/Microascus	-	-	-						
Stachybotrys/Memnoniella	-	-	-						
Unidentifiable Spores	-	-	-						
Zygomycetes	-	-	-						
Total Fungi	**61**	**2580**	**100**						
Hyphal Fragment	1	40	-						
Insect Fragment	-	-	-						
Pollen	1*	10*	-						
Analyt. Sensitivity 600x	-	42	-						
Analyt. Sensitivity 300x	-	13*	-						
Skin Fragments (1-4)	-	3	-						
Fibrous Particulate (1-4)	-	1	-						
Background (1-5)	-	2	-						

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

Alan Goldstein

Alan Goldstein, Ph.D., Laboratory Manager
or other approved signatory

Samples analyzed by EMSL Analytical, Inc. Morrisville, NC AIHA-LAP, LLC--EMLAP Lab 173741

Initial report from: 05/21/2019 08:12:10

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

Client: ATI | Test: M001 Air-O-Cell | #Samples: 7
Order: 291905208 | Project: 19-663 - PGCPS - McHenry ES
Disposition: ***Discard after 7/14/2019***

EMSL ...
LABORATORY•PRODUCTS•TRAINING
...L, INC.
...NORTH
...08077
...-3675
...-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): Brian Chapman / Mikal Frater	Telephone #: 202-558-7489
Email Address: Brian@atiin.com & Mikal@atiinc.com	Fax #: / Purchase Order:
Project Name/Number: 19-663- PGCPS - McHenry 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
M174 MoldSnap
M030 Micro 5
M032 Allergenco-D
M041 Fungal Direct Examination
M169 *Pollen ID & Enumeration*
M280 Dust Characterization Level-1
M281 Dust Characterization Level-2
M005 Viable Fungi- Air Samples (Genus ID & Count)
M006 Viable Fungi- Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M007 Culturable fungi - Surface Samples (Genus ID & Count)
M008 Culturable fungi - Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)
M009 Bacteria Culture Gram Stain & Count
M010 Bacteria Count & ID - 3 Most Prominent
M011 Bacteria Count & ID - 5 Most Prominent

M012 *Pseudomonas aeruginosa* (P/A***)
M024 *Pseudomonas aeruginosa* (MFT*)
M015 Heterotrophic Plate Count
M017 Total Coliform & *E. coli* (Colilert P/A***)
M018 Total Coliform & *E. coli* (MFT*)
M114 Total Coliform & *E. coli* Enumeration (Colilert MPN**)
M019 Fecal Coliform (MFT*)
M020 Fecal *Streptococcus* (MFT*)
M029 *Enterococci* (MFT*)
M129 *Enterococci* (Enterolert P/A***)
M180 Real Time qPCR-ERMI 36 Panel
M025 Sewage Screen –Water (MFT*)

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

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

Name of Sampler: Brian Chapman & Mikal Frater | **Signature of Sampler:** [signature]

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	
19-663-01	Outside Parking Lot	Air	☐ P ☐ NP	M001	75L	05-15-19 - 9:13	
19-663-02	Field Blank	Air	☐ P ☐ NP	M001	75L	05-15-19 -	
19-663-03	Main Office	Air	☐ P ☐ NP	M001	75L	05-15-19 - 9:28	
19-663-04	Room 8	Air	☐ P ☐ NP	M001	75L	05-15-19 - 9:38	
19-663-05	"Computer Lab" Room 1	Air	☐ P ☐ NP	M001	75L	05-15-19 - 9:48	

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

Relinquished (Client): MIKAL FRATER	Date: 5-15-19	Time: 3:55
Received (Lab): [signature]	Date: 5/15/19	Time: 3:55pm

Comments/Special Instructions:

Page 1 of 2

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

Microbiology Chain of Custody

EMSL ANALYTICAL, INC.
: 130 NORTH
ON, NJ 08077
0) 220-3675
) 786-0262

ATI
19-663 - PGCPS - McHenry ES
5/15/2019 15:55 TAT: 1 Week
M001 Air-O-Cell Air

Order ID: 291905208
No Samples: 7
Due: 05/22 3:55 PM
Fax:

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)
19-663-06	Room A4	Air	☐ P ☐ NP	M001	75L	05-15-19 - 10:00	
19-663-07	Room 19	Air	☐ P ☐ NP	M001	75L	05-15-19-10:09	
			☐ P ☐ NP				
			☐ P ☐ NP				
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			☐ P ☐ NP				
			☐ P ☐ NP				

Comments/Special Instructions:

Page 2 of 2

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this chain of custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

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.

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.3 (24.1)	°F (°C)
RELATIVE HUMIDITY	46	%RH
BAROMETRIC PRESSURE	28.84 (976.6)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☐ AS LEFT
☒ AS FOUND
☒ IN TOLERANCE
☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

THERMO COUPLE — SYSTEM PRESSURE01-02 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	71.5 (21.9)	71.1 (21.7)	69.5~73.5 (20.8~23.1)				

BAROMETRIC PRESSURE — SYSTEM PRESSURE01-02 — *Unit: inHg (hPa)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	28.89 (978.3)	28.80 (975.3)	28.31~29.47 (958.7~998.0)				

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E002827	03-14-18	03-31-19
Pressure	E003982	02-07-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Pressure	E005254	10-06-17	10-31-18
DC Voltage	E003493	09-21-17	09-30-18

K. Davey
VERIFIED

May 25, 2018
DATE

Doc ID: CERT_GEN_WCC

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.2 (24.0)	°F (°C)
RELATIVE HUMIDITY	45	%RH
BAROMETRIC PRESSURE	28.81 (975.6)	inHg (hPa)

MODEL	7575-X
SERIAL NUMBER	7575X1711004

☒ AS LEFT ☐ AS FOUND

☒ IN TOLERANCE ☐ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

THERMO COUPLE — SYSTEM PRESSURE01-02 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	71.6 (22.0)	71.6 (22.0)	69.6~73.6 (20.9~23.1)				

BAROMETRIC PRESSURE — SYSTEM PRESSURE01-02 — *Unit: inHg (hPa)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	28.89 (978.3)	28.91 (979.0)	28.31~29.47 (958.7~998.0)				

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E002827	03-14-18	03-31-19
Pressure	E003982	02-07-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Pressure	E005254	10-06-17	10-31-18
DC Voltage	E003493	09-21-17	09-30-18

Ken Davey
CALIBRATED

May 25, 2018
DATE

Doc. ID: CERT_GEN_WCC

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

ENVIRONMENT CONDITIONS		
TEMPERATURE	75.0 (23.9)	°F (°C)
RELATIVE HUMIDITY	45	%RH
BAROMETRIC PRESSURE	28.83 (976.3)	inHg (hPa)

MODEL	982
SERIAL NUMBER	P17100006

☐ AS LEFT ☐ IN TOLERANCE
☒ AS FOUND ☒ OUT OF TOLERANCE

– CALIBRATION VERIFICATION RESULTS –

GAS CO_2 AS FOUND — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	0	0	0~50	4	3033.5	* 2860.4	2942.5~3124.5
2	523.8	* 470.7	473.8~573.8	5	5060	* 4739.5	4908.2~5211.8
3	1025	* 960.5	975~1075				

GAS CO AS FOUND — SYSTEM G-101 — *Unit: ppm*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	36	* 0	33~39	2	101.3	* 0	98.2~104.3

TEMPERATURE AS FOUND — SYSTEM T-101 — *Unit: °F (°C)*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	32.0 (0.0)	32.4 (0.2)	31.0~33.0 (−0.6~0.6)	2	140.0 (60.0)	140.8 (60.4)	139.0~141.0 (59.4~60.6)

HUMIDITY AS FOUND — SYSTEM H-102 — *Unit: %RH*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	10.0	9.8	7.0~13.0	4	70.0	72.5	67.0~73.0
2	30.0	30.6	27.0~33.0	5	90.02	* 93.27	87.02~93.02
3	49.9	51.6	46.9~52.9				

**Indicates Out-of-Tolerance Condition*

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
5000 CO_2	T-0926	02-15-18	12-18-20
N2	t78516	04-17-18	04-03-23
Flow	E003298	10-25-17	10-31-18
Flow	E003980	03-28-18	03-31-19
2000 C4H8	EB0053919	10-20-17	10-20-21
Temperature	E003986	02-14-18	08-31-18
Humidity	E003539	02-22-18	08-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
200 CO	CC506122	01-24-18	01-25-26
Air	108551y	04-23-18	03-09-20
Flow	E004631	10-25-17	10-31-18
Flow	E003525	01-10-18	01-31-19
100 C4H8	EB0078607	09-28-16	09-28-20
Temperature	E003987	02-14-18	08-31-18

Ken Davey
VERIFIED

May 25, 2018
DATE

Doc ID: CERT_GEN_WCC

TSI P/N 2300157

TSI P/N 2300157

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	75.9 (24.4)	°F (°C)
Relative Humidity	46	%RH
Barometric Pressure	28.81 (975.6)	inHg (hPa)

Model	982
Serial Number	P17100006

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

– Calibration Verification Results –

Temperature Verification — System T-101 — *Unit: °F (°C)*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	32.0 (0.0)	32.4 (0.2)	31.0~33.0 (−0.6~0.6)	2	140.0 (60.0)	140.8 (60.4)	139.0~141.0 (59.4~60.6)

Humidity Verification — System H-102 — *Unit: %RH*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	10.0	9.6	7.8~12.2	4	70.0	69.7	67.8~72.2
2	30.0	29.7	27.8~32.2	5	90.0	89.3	87.8~92.2
3	50.0	49.9	47.8~52.2				

CO_2 Gas Verification — System G-101 — *Unit: ppm*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	0	0	0~50	4	3031	3043	2940~3122
2	518	510	468~568	5	5000	4988	4850~5150
3	1020	1030	970~1070				

CO Gas Verification — System G-101 — *Unit: ppm*

#	Standard	Measured	Allowable Range	#	Standard	Measured	Allowable Range
1	36	36	33~39	2	101	100	98~104

TSI does hereby certify that the above described instrument conforms to the original manufacturer's specification (not applicable to As Found data) and has been calibrated using standards whose accuracies are traceable to the United States National Institute of Standards and Technology (NIST) or has been verified with respect to instrumentation whose accuracy is traceable to NIST, or is derived from accepted values of physical constants. TSI's calibration system is registered to ISO-9001:2015.

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003986	02-14-18	08-31-18
Humidity	E003539	02-22-18	08-31-18
200 CO	CC506122	01-24-18	01-25-26
Air	108551y	04-23-18	03-09-20
Flow	E004631	10-25-17	10-31-18
Flow	E003525	01-10-18	01-31-19
100 C4H8	EB0078607	09-28-16	09-28-20

Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E003987	02-14-18	08-31-18
5000 CO_2	c5732043	04-16-18	10-04-20
N_2	t78516	04-17-18	04-03-23
Flow	E003298	10-25-17	10-31-18
Flow	E003980	03-28-18	03-31-19
2000 C4H8	EB0053919	10-20-17	10-20-21

Calibrated

May 29, 2018
Date

Doc. ID: CERT_GEN_WCC