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December 8, 2020

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

RE: Indoor Air Quality Assessment, Woodmore Elementary School
IFB: 022-19
ATI Project Number: 20-687

Dear Mr. Baylor:

Prince George's County Public Schools requested that ATI, Inc., conduct a proactive indoor air quality (IAQ) assessment at Woodmore Elementary School on November 30, 2020. The key findings are enclosed in the Executive Summary on page one, 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

Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Indoor Air Quality Assessment Report

Prince George's County Public Schools
Woodmore Elementary School
12500 Woodmore Road
Mitchellville, Maryland 20721

Prepared for:

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

December 8, 2020

Submitted by:



ATI Job # 20-687

Table of Contents

Table of Contents	1
1 Executive Summary	1
2 Assessment Methods	1
3 Visual Observations	2
4 Thermal Environmental Conditions for Human Occupancy	3
4.1 Temperature	3
4.2 Relative Humidity	3
4.3 Carbon Dioxide	4
4.4 Carbon Monoxide	5
5 Total Fungal Air Sampling Results	5
6 Summary of Findings	6

List of Tables

Table 1: Visual Observations and Sampling Locations	2
Table 2: Temperature Measurements	3
Table 3: Relative Humidity Measurements	4
Table 4: Carbon Dioxide Measurements	4
Table 5: Carbon Monoxide Measurements	5

Appendices

- Appendix A: Laboratory Report and Chain of Custody
- Appendix B: Instrument Calibration Records

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
CO₂	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/m³	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

ATI conducted a proactive Indoor Air Quality (IAQ) assessment on November 30, 2020, at Woodmore Elementary School, located at 12500 Woodmore Road, Mitchellville, MD 20721.

The assessment 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 assessment, ATI measured common IAQ comfort parameters using direct reading instruments, 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 assessment:

1. Two of the tested spaces were cooler than the ASHRAE recommended winter range of 68-75°F.
2. Relative humidity in three tested rooms were greater than the ASHRAE maximum relative humidity guidelines of 65%.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,078 parts per million (PPM) for the day of the assessment.
4. Carbon monoxide concentrations were less than the IAQ meter's detection limit throughout the tested spaces.
5. The fungal spore trap results do not suggest indoor spore amplification in the assessed spaces and are not considered unusual. While the concentration of basidiospores in Classroom 30 exceeded the ambient concentration, basidiospores are typically associated with outdoor origin.
6. There was an active water leak in the Library from a heavy rain event on the day of the assessment, and the staff was aware of the water leak. Any wet building materials should be dried completely within 48 hours of the initial water leak to prevent mold growth, or they should be cleaned or replaced if they remained wet longer than 48 hours.

2 Assessment Methods

Courtney McCall of ATI, Inc., conducted a visual assessment and air sampling on November 30, 2020. Sampled rooms were randomly selected and accounted for approximately 10% of classrooms or a minimum of five samples. Ms. McCall documented visual observations at the time she collected the air samples. 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 a typical breathing zone, and away from air-supply and return diffusers. Real-time direct readings for temperature, relative humidity, carbon dioxide (CO₂), and carbon monoxide (CO), were measured 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. EMSL Analytical, Inc. of Beltsville, MD analyzed the samples using direct microscopic examination per ASTM D7391-09, which counts both viable and non-viable mold spores and particulates, which combined yields *total fungal* results. EMSL participates in the National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for general laboratory performance and management, and the American Industrial Hygiene Association (AIHA) for Environmental Microbial Laboratory Accreditation Program (EMLAP). The EMSL laboratory reports are included in Appendix A.

3 Visual Observations

Table 1 lists the areas, conditions, observations, and other pertinent details related to this IAQ assessment. On the date of the sampling event, few occupants were present in the school because of the COVID-19 global pandemic. Many of the classrooms and multipurpose rooms had materials stored in boxes.

Table 1: Visual Observations and Sampling Locations

Sample Location	Observations
Library	<ul style="list-style-type: none"> • An active leak was occurring from the flat roof and downspout along the room’s windows. Water was entering from the metal windows near the downspout and wetting the carpet near the windows. The ceiling was dripping near a column by the windows. Of the nine windows in the room, the leak was near the far right or 9th window. The principal and staff were aware of the leak. • Wall ventilator supplies the heat and was operating. • No occupants were present. • Closets and an office adjoin the room. • No visual microbial growth observed. • Room is approximately 1,600 square feet with some carpeting over concrete slab (and possibly tile).
Room 30	<ul style="list-style-type: none"> • Room 30 is at the end of the hall and is noticeably cooler than the hallway and library. • Friedrich A/C unit in room was not on during sampling. • A bathroom adjoins the space and an emergency exit door to the outside is present. • Wall ventilator supplies the heat and was operating. • Black slate windowsills had some water after the rainfall but an exact entry point could not be determined. No active leak was visible. • Minor water staining on a ceiling tile near the windows. Water staining is not too visible. • No occupants were present. • Space is approximately 1,225 square feet and has a tile floor.
Room 11	<ul style="list-style-type: none"> • Metal ceiling grid near the windows had minor rust present. • Black slate windowsills have some water drops present. No active leak is observed. • Rain and thunder are occurring during sampling. • Wall ventilator supplies the heat and was operating. • No occupants were present. • Space is approximately 870 square feet and has a tile floor.
Room 2	<ul style="list-style-type: none"> • Kids’ toys and materials are stored on desks and shelves around the perimeter of the room. • A bathroom adjoins the space and an emergency exit door to the outside is present. • Minor staining on ceiling tile is present. Windows in this room appear to be newer. No water intrusion is observed on concrete windowsills. • Space is approximately 1,056 square feet with half of the room carpeted and the other half with tile.
Main Office	<ul style="list-style-type: none"> • Two plants were in the space, along with one occupant. The door to the hallway was propped open during the sampling event. The building entrance was about 15 feet from the sampling pump. • Wall ventilator supplies the heat and was operating. • A water-stained ceiling tile was near the window. • Few papers or other items were stored in the room. Housekeeping was very good.

Sample Location	Observations
	<ul style="list-style-type: none"> Space is about 575 square feet.
Outdoors	<ul style="list-style-type: none"> Region was experiencing very heavy rainfall during sampling event. At the time of the outdoor sample, the rain had subsided and many puddles surrounded the sampling pump. From parking lot, can observe water pouring down onto ground where downspouts are full.

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 80% of 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 temperatures measured during the November 30, 2020, assessment are summarized in Table 2. As indicated by the data in the table, temperatures in the school averaged between 66°F and 72°F, with two locations slightly cooler than the ASHRAE recommended winter range.

Table 2: Temperature Measurements

Sample Location	11/30/2020 °F			ASHRAE Standard °F
	Min	Max	Average	
Outdoors	65	68	67	N/A
Indoors				
Library	70	70	70	68-75°F
Room 30	65	66	66	68-75°F
Room 11	66	66	66	68-75°F
Room 2	69	71	70	68-75°F
Main Office	72	72	72	68-75°F

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 occupants' mucous membranes and skin. Relative humidity measurements are summarized in Table 3. As indicated by the data in the table, average

relative humidity ranged between 54 and 70% with three locations exceeding the ASHRAE maximum recommendation of 65% relative humidity.

Table 3: Relative Humidity Measurements

Sample Location	11/30/2020 (% RH)			ASHRAE Standard (% RH)
	Min	Max	Average	
Outdoors	73	78	76	N/A
Indoors				
Library	67	68	68	< 65
Room 30	65	66	66	< 65
Room 11	70	70	70	< 65
Room 2	52	55	54	< 65
Main Office	60	63	62	< 65

4.3 Carbon Dioxide

Carbon dioxide concentrations 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 can maintain indoor carbon dioxide concentrations less than 700 parts per million (ppm) greater than the outdoor air concentration. Typically, outdoor carbon dioxide concentrations range from 300 ppm to 450 ppm, with the higher range typically found in urban areas during peak rush hour.

Carbon dioxide concentrations are summarized in Table 4. On the day of the assessment, the average outdoor carbon dioxide concentration was 378 ppm, which calculates to a maximum indoor concentration of 1,078 ppm (700 + 378). All tested locations indoors were less than the recommended maximum for the day of the assessment.

Table 4: Carbon Dioxide Measurements

Sample Location	11/30/2020 Concentration (parts per million)			ASHRAE Standard (ppm) NTE
	Min	Max	Average	
Outdoors	371	384	378	N/A
Indoors				
Library	405	427	416	1,078
Room 30	394	401	398	1,078
Room 11	404	414	409	1,078
Room 2	395	412	404	1,078
Main Office	449	462	456	1,078

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 over an eight-hour time-weighted average. ATI measured carbon monoxide concentrations using a TSI Q-Trak model number 7575-X with an attached IAQ probe (model number 982). The instrument’s carbon monoxide sensor has an error range of ± 3% of the reading or three (3) ppm, whichever is greater. As indicated by the data in Table 5, carbon monoxide concentrations were less than the Q-Trak’s detection limit throughout the school.

Table 5: Carbon Monoxide Measurements

Sample Location	11/30/2020 Concentration (parts per million)			ASHRAE Standard (ppm)
	Min	Max	Average	
Outdoors	<3	<3	<3	N/A
Inside				
Library	<3	<3	<3	< 9
Room 30	<3	<3	<3	< 9
Room 11	<3	<3	<3	< 9
Room 2	<3	<3	<3	< 9
Main Office	<3	<3	<3	< 9

5 Total Fungal Air Sampling Results

Mold can be carried indoors through building entrances, open windows, loading docks, foot traffic into buildings, and the HVAC system. To thrive indoors, mold requires a food source, proper temperature and humidity or water to foster its growth. The November 30, 2020 mold assessment 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 indoor concentrations were generally favorable compared to the outdoor concentrations. The total ambient spore count was 4,780 counts/m³, and one tested room, Classroom 30, had a total spore concentration of 6,730 counts/m³, which was greater than the outdoor ambient concentration. The basidiospores concentration in Classroom 30 was 6,290 counts/m³, compared with the ambient sample of 2,600 counts/m³. Basidiospores are commonly detected indoors, are known to cause allergies, yet are not associated with water damaged materials in buildings. The rainfall occurring at the time of the outdoor ambient sample was collected likely reduced the amount of airborne basidiospore concentration outdoors. It is not unusual to observe outdoor basidiospore concentrations in the tens of thousands of spores per cubic meter during autumn months. Basidiospores are commonly associated with outdoor origin, so any basidiospores detected indoors were likely introduced into the space via unfiltered outdoor air. Also, Classroom 30 had an emergency exit door to the outdoors, which is a potential and easy pathway for this mold to enter. Some standing water was present on windowsills from a rain event that was actively occurring at the time of sampling.

The *Aspergillus/Penicillium* concentration in Classroom 30 was 400 counts/m³, which was greater than the outdoor ambient sample; however, this is not considered unusual indoors. *Aspergillus/Penicillium* is known to cause allergic reactions in certain people, albeit in higher concentrations.

The Library had an active water leak at the time of sampling. Any building materials that become significantly wet from a water leak or water intrusion should be dried within 48-hour to prevent mold growth. Airborne mold spore amplification may not be observed until 30 days after the building materials first become wet, although not all water leaks lead to active mold growth issues.

Other tested rooms had low concentrations of spores that were not detected in the ambient sample, such as *Myxomycetes* and *Cladosporium*. Low concentrations of *Aspergillus/Penicillium* that did not exceed 400 counts/m³, were detected in other spaces. The low concentrations of these spores indoors do not suggest noteworthy amplification. The spore concentrations in all indoor sampled rooms are not considered unusual for an occupied space like a school, but total spore concentrations greater than 1,000 counts/m³ may suggest unfiltered outdoor air is entering the space, such as through opened windows or doors, or fresh air is bypassing the filtration units of the HVAC systems. Insufficient housekeeping may also allow unusual outdoor fungal spores to accumulate in indoor spaces.

The official laboratory report with spore trap samples collected on November 30, 2020, is presented in Appendix A.

6 Summary of Findings

1. Two of the tested spaces were cooler than the ASHRAE recommended winter range of 68-75°F.
2. Relative humidity in three tested rooms were greater than the ASHRAE maximum relative humidity guidelines of 65%.
3. Carbon dioxide concentrations in all tested spaces were less than the ASHRAE limit for carbon dioxide, which was 1,078 parts per million (PPM) for the day of the assessment.
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6. There was an active water leak in the Library from a heavy rain event on the day of the assessment and the staff was aware of the water leak. Any wet building materials should be dried completely within 48 hours of the initial water leak to prevent mold growth, or they should be cleaned or replaced if they remained wet longer than 48 hours.

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,
ATI, INC.



Courtney E. McCall
Project Manager



Nate Burgei, CIH, CSP
Certified Industrial Hygienist

Appendix A: Laboratory Report and Chain of Custody



EMSL Analytical, Inc.

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Tel/Fax: (610) 828-3102 / (610) 828-3122
<http://www.EMSL.com> / plymouthmeetinglab@emsl.com

EMSL Order: 182003866
Customer ID: ATII25A
Customer PO:
Project ID:

Attention: Courtney McCall
ATI
4221 Forbes Blvd
Suite 250
Lanham, MD 20706
Project: 20-687 Woodmore ES

Phone: (202) 832-1433
Fax:
Collected Date: 11/30/2020
Received Date: 12/01/2020 03:00 PM
Analyzed Date: 12/07/2020

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

Lab Sample Number:	182003866-0001			182003866-0002			182003866-0003		
Client Sample ID:	31462000			31461982			31462172		
Volume (L):	75			75			75		
Sample Location:	Library			Classroom 30			Classroom 11		
Spore Types	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total	Raw Count	Count/M ³	% of Total
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-
Ascospores	4	200	7.9	1	40	0.6	-	-	-
Aspergillus/Penicillium	-	-	-	9	400	5.9	6	300	25.4
Basidiospores	51	2200	87.3	149	6290	93.5	16	680	57.6
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	2	80	3.2	-	-	-	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1	40	1.6	-	-	-	5	200	16.9
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Tripospermum	-	-	-	-	-	-	-	-	-
Total Fungi	58	2520	100	159	6730	100	27	1180	100
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. 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. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. 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.
Samples analyzed by EMSL Analytical, Inc. Plymouth Meeting, PA AIHA-LAP, LLC-EMLAP Accredited #178659

Initial report from: 12/07/2020 10:12 AM

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



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

Lab Sample Number: Client Sample ID: Volume (L): Sample Location:	182003866-0004 31461942 75 Classroom 2			182003866-0005 31461967 75 Office			182003866-0006 31461895 75 Ambient			
	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	7.1	2	80	13.8	50	2100	43.9	
Aspergillus/Penicillium	2	80	14.3	3	100	17.2	-	-	-	
Basidiospores	9	400	71.4	6	300	51.7	61	2600	54.4	
Bipolaris++	-	-	-	-	-	-	-	-	-	
Chaetomium	-	-	-	-	-	-	-	-	-	
Cladosporium	-	-	-	-	-	-	1	40	0.8	
Curvularia	-	-	-	-	-	-	-	-	-	
Epicoccum	-	-	-	-	-	-	-	-	-	
Fusarium	-	-	-	-	-	-	-	-	-	
Ganoderma	-	-	-	-	-	-	-	-	-	
Myxomycetes++	1	40	7.1	3	100	17.2	-	-	-	
Pithomyces++	-	-	-	-	-	-	-	-	-	
Rust	-	-	-	-	-	-	-	-	-	
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-	
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-	
Unidentifiable Spores	-	-	-	-	-	-	-	-	-	
Zygomycetes	-	-	-	-	-	-	-	-	-	
Tripospermum	-	-	-	-	-	-	1	40	0.8	
Total Fungi	13	560	100	14	580	100	113	4780	100	
Hyphal Fragment	-	-	-	-	-	-	-	-	-	
Insect Fragment	-	-	-	1	40	-	-	-	-	
Pollen	-	-	-	-	-	-	-	-	-	
Analyt. Sensitivity 600x	-	42	-	-	42	-	-	42	-	
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-	
Skin Fragments (1-4)	-	2	-	-	2	-	-	1	-	
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

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Samples analyzed by EMSL Analytical, Inc. Plymouth Meeting, PA AIHA-LAP, LLC-EMLAP Accredited #178659

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

Lab Sample Number:	182003866-0007		
Client Sample ID:	31461922		
Volume (L):			
Sample Location:	Field Blank		
Spore Types	Raw Count	Count/M³	% of Total
Alternaria (Ullocladium)	-	-	-
Ascospores	-	-	-
Aspergillus/Penicillium	-	-	-
Basidiospores	-	-	-
Bipolaris++	-	-	-
Chaetomium	-	-	-
Cladosporium	-	-	-
Curvularia	-	-	-
Epicoccum	-	-	-
Fusarium	-	-	-
Ganoderma	-	-	-
Myxomycetes++	-	-	-
Pithomyces++	-	-	-
Rust	-	-	-
Scopulariopsis/Microascus	-	-	-
Stachybotrys/Memnoniella	-	-	-
Unidentifiable Spores	-	-	-
Zygomycetes	-	-	-
Tripospermum	-	-	-
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.

Kevin Ream, Laboratory Manager
or other Approved Signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. 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. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. 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.
Samples analyzed by EMSL Analytical, Inc. Plymouth Meeting, PA AIHA-LAP, LLC-EMLAP Accredited #178659

Initial report from: 12/07/2020 10:12 AM

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



EMSL ANALYTICAL, INC.
LABORATORY PRODUCTS TRAINING

Microbiology Chain of Custody

EMSL Order Number (Lab Use Only):

182007966

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: <input checked="" type="checkbox"/> Same <input type="checkbox"/> Different if Bill to is Different note instructions in Comments				
Street: 4221 Forbes Blvd 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			Telephone #: 703 399 5423				
Email Address: courtney@atiinc.com			Fax #:		Purchase Order:		
Project Name/Number: 20-687 Woodmore ES			Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email				
U.S. State Samples Taken: MD		Project Zip Code: 20721		Connecticut Samples: <input type="checkbox"/> Commercial <input type="checkbox"/> Residential			
Sterile, Sodium Thiosulfate Preserved Bottle Used: <input type="checkbox"/> Biocide Used in Source (specify): <input type="checkbox"/>							
Public Water Supply Samples: <input type="checkbox"/> Note: All results may automatically be reported to DOH if required by state.							
Turnaround Time (TAT) Options - Please Check							
<input type="checkbox"/> 3 Hour	<input type="checkbox"/> 6 Hour	<input type="checkbox"/> 24 Hour	<input type="checkbox"/> 48 Hour	<input type="checkbox"/> 72 Hour	<input type="checkbox"/> 96 Hour	<input checked="" type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week	
Microbiology Test Codes							
M001 Air-O-Cell	M174 MoldSnap	M012 <i>Pseudomonas aeruginosa</i> (P/A***)	M115 Sewage Screen - Water (P/A***)				
M030 Micro 5	M032 Allergenco-D	M024 <i>Pseudomonas aeruginosa</i> (MFT*)	M116 Sewage Screen - Water (MPN**)				
M041 Fungal Direct Examination		M015 Heterotrophic Plate Count	M117 Sewage Screen - Swab (P/A***)				
M169 Pollen ID & Enumeration		M017 Total Coliform & <i>E. coli</i> (Colilert P/A***)	M013 Sewage Screen - Swab (MFT*)				
M280 Dust Characterization Level-1		M018 Total Coliform & <i>E. coli</i> (MFT*)	M133 Methicillin-resistant <i>Staph. aureus</i> (MRSA)				
M281 Dust Characterization Level-2		M114 Total Coliform & <i>E. coli</i> Enumeration (Colilert MPN**)	M031 Rapid-growing non-TB <i>Mycobacteria</i> Detection & Enumeration				
M005 Viable Fungi- Air Samples (Genus ID & Count)		M019 Fecal Coliform (MFT*)	M014 Endotoxin Analysis				
M006 Viable Fungi- Air Samples (Includes <i>Penicillium</i> , <i>Aspergillus</i> , <i>Cladosporium</i> , <i>Stachybotrys</i> Species ID & Count)		M020 Fecal <i>Streptococcus</i> (MFT*)	M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)				
M007 Culturable fungi - Surface Samples (Genus ID & Count)		M029 <i>Enterococci</i> (MFT*)	Other See Analytical Price Guide				
M008 Culturable fungi - Surface Samples (Includes <i>Penicillium</i> , <i>Aspergillus</i> , <i>Cladosporium</i> , <i>Stachybotrys</i> Species ID & Count)		M129 <i>Enterococci</i> (Enterolert P/A***)	Legionella Analysis Please use EMSL <i>Legionella</i> COC				
M009 Bacteria Culture Gram Stain & Count		M180 Real Time qPCR-ERMI 36 Panel					
M010 Bacteria Count & ID - 3 Most Prominent		M025 Sewage Screen -Water (MFT*)					
M011 Bacteria Count & ID - 5 Most Prominent							
			*MFT= Membrane Filtration Technique **MPN= Most Probable Number ***P/A= Presence/Absence				
Name of Sampler: Courtney E McCall			Signature of Sampler: <i>Courtney E McCall</i>				
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	<input checked="" type="checkbox"/> P <input type="checkbox"/> NP	M017	100 mL	9/1/13 4:00 PM	
3146 2000	Library	Air	<input type="checkbox"/> P <input type="checkbox"/> NP	M001	75 L	11/30/20 1:10 pm	
3146 1982	Classroom 30	Air	<input type="checkbox"/> P <input type="checkbox"/> NP	M001	75L	11/30/20 1:23 pm	
3146 2172	Classroom 11	Air	<input type="checkbox"/> P <input type="checkbox"/> NP	M001	75L	11/30/20 1:38 pm	
3146 1942	Classroom 2	Air	<input type="checkbox"/> P <input type="checkbox"/> NP	M001	75L	11/30/20 1:49 pm	
3146 1967	Office	Air	<input type="checkbox"/> P <input type="checkbox"/> NP	M001	75L	11/30/20 2:00 pm	
Client Sample # (s):		Total # of Samples: 7		Samples Received Chilled? Yes / No (Lab Use Only)			
Relinquished (Client): <i>Courtney E McCall</i>		Date: 12/1/20		Time: 2:50 pm			
Received (Lab): <i>J. Smith Prop Box</i>		Date:		Time:			
Comments/Special Instructions:							

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

RECEIVED
 EMSL ANALYTICAL, INC.
 BELTSVILLE, MD
 2020 DEC 1 10 3:00



182003866

EMSL Analytical, Inc.

Sample Transfer Form

Receiving Lab:	EMSL- BELTSVILLE	Phone Number:	3019375700	
		Fax Number:	3019375701	
Relinquished to:	EMSL- <i>Plymouth Mtg.</i>	Phone Number:	8002203675	
		Fax Number:	8567860262	
Does new lab hold equivalent or additional accreditation? *			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
EMSL Customer ID # (if known):	ATII25A			
Client Name:	ATI INC			
Client Project:	20-687 - WOODMORE ES			
Tests to be Performed:	M001			
Date Received:	12/1/20			
Date Relinquished:	12/2/20			
Date Due:	1 WEEK - 12/8/20 @ 3 PM			
Special Instructions: (e.g. Work Order # , required qualifications, project specific procedures/modifications)				
Relinquished by (Signature): <i>J. Yonert</i>	Date: 12/2/20	Received by (Signature): <i>[Signature]</i>	Date: 12-3-20	
Relinquished by (Signature):	Date:	Received by (Signature):	Date:	
Customer Agreement- Please sign form and send to the receiving laboratory. By signing below, you agree to permit the above named receiving lab to transfer samples to a separate EMSL lab with equivalent qualifications* for analysis. The final report will be issued from the analyzing laboratory. Ensure any requirements are listed in special instructions.				
Name (please print):	Signature:	Agent of:	Date:	
<i>If this is a recurring project or sample type that may require samples to be relinquished on a regular basis, a Standing Agreement form must be completed.</i>				

* Receiving and analyzing labs shall be aware of required qualifications of project prior to transfer of samples.

Note: If customer has been notified and approved this transfer verbally or by e-mail, the receiving lab must sign for the customer above. EMSL employee filling out form on behalf of customer shall print name of person to whom they spoke, date agreement was received, and then sign under Signature.

Appendix B: Instrument Calibration Records

Certificate of Calibration

- (✓) Buck™ BioAire Pump Calibration Rotameter
() Buck™ BioSlide Pump Calibration Rotameter

Serial number: R14535

Date Calibrated: 12/27/19

Calibration Due Date: 12/27/20

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 $\pm 5\%$ of the actual flow rate.

AMBIENT CONDITIONS: Temperature $74\pm 3^{\circ}$ F Relative Humidity $50\pm 10\%$

Description	MFR.	Model	Serial #
Primary Calibrator	A.P. Buck Inc.	M30B	<input type="checkbox"/> A40020 <input checked="" type="checkbox"/> A40021

QA Approval By: Moroni Went

Information contained in this document should not be reproduced in any form without the written consent of A.P. Buck, Inc. It is for reference only and cannot be used as a form of endorsement by any private or governmental regulatory body.

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			MODEL	982
TEMPERATURE	71.33 (21.9)	°F (°C)	SERIAL NUMBER	P17100006
RELATIVE HUMIDITY	53.9	%RH		
BAROMETRIC PRESSURE	28.81 (975.6)	inHg (hPa)		

<input checked="" type="checkbox"/> AS LEFT	<input checked="" type="checkbox"/> IN TOLERANCE
<input type="checkbox"/> AS FOUND	<input type="checkbox"/> 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)	32.6 (0.3)	31.0-33.0 (-0.5-0.6)	2	139.8 (59.9)	140.6 (60.3)	138.8-140.8 (59.4-60.5)	

HUMIDITY VERIFICATION				SYSTEM H-102				Unit: %RH
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	10.0	10.5	7.0-13.0	4	70.0	69.6	67.0-73.0	
2	30.0	30.4	27.0-33.0	5	90.0	88.9	87.0-93.0	
3	50.0	50.4	47.0-53.0					

CO2 GAS VERIFICATION				SYSTEM G-101				Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	0	0	0-50	4	3020	3025	2929-3110	
2	504	501	454-554	5	5037	5026	4886-5188	
3	1008	1027	958-1058					

CO GAS VERIFICATION				SYSTEM G-101				Unit: ppm
#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE	
1	35	36	32-38	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	Measurement Variable	System ID	Last Cal.	Cal. Due
Temperature	E010657	02-14-20	02-28-21	Temperature	E010658	02-14-20	02-28-21
Temperature	E010655	01-21-20	01-31-21	Humidity	E003539	08-21-20	02-28-21
5000 CO2	T-0660	07-15-20	07-15-28	200 CO	149848	03-24-20	03-24-28
N2	CT308798	06-28-20	06-28-28	Air	T608955	06-17-20	06-17-28
Flow	E003341	09-03-19	09-30-20	Flow	E003980	04-22-20	04-30-21
Flow	E003525	01-06-20	01-31-21	Flow	E003342	09-03-19	09-30-20
2000 C4H8	EB0054467	08-13-19	08-12-22	100 C4H8	CC507339	03-24-20	03-24-28

Baw yany

CALIBRATED

August 31, 2020

DATE

Doc. ID. CERT_GEN_WCC

