Environmental Consultants and Engineers
1818 New York Avenue Suite 217
Washington, DC 20002
www.globalincusa.net

December 17, 2020

Prince Georges County
Environmental Safety Office
13306 Old Marlboro Pike
Upper Marlboro, MD 20772

Attention: Mr. Alex Baylor

RE: Indoor Air Quality Screening

Global Project Number: 20-064
School: Middletown Valley Elementary School

Dear Mr. Baylor,

On December 15, 2020, Global Inc.'s (GLOBAL) team of Industrial Hygienists under the supervision of Certified Industrial Hygienist, Dr. Channa Bambaradeniya, conducted an Indoor Air Quality Screening at Middletown Valley Elementary School located at 201 E Green St, Middletown, MD 21769.

Methodology

The IAQ evaluation included a visual assessment, sampling for non-viable mold spores in air, and measurement of comfort parameters (temperature, humidity, carbon dioxide, and carbon monoxide) in randomly selected representative locations within the building. GLOBAL's inspector conducted a walkthrough with Prince Georges County Public School (PGCPS) personnel present. Rooms were selected in a random manner throughout the building so as to prevent sampling bias.

During the visual assessment of representative locations, and when noted, GLOBAL documented those areas with suspected mold growth, water intrusions, and wet conditions that have the potential to lead to mold growth. GLOBAL also noted any unusual odors. At least one microbial air sample was collected for every 10,000 Square Feet (SF) of space in the building and the analytical results for the interior spaces were compared to an outdoor (ambient) sample collected on the same day.

Microbial samples (including a field blank for quality control) were delivered under strict chain-of-custody procedures were to Hayes Microbial Consulting - an AIHA EMPAT-certified laboratory in Midlothian, Virginia for analysis by microscopy. The sample chain-of-custody and laboratory report is attached.

Observations

The general observations in the five indoor locations inspected are summarized in Table 1 below:

Table 1: Observations

Location	Observations
Room 23	No issues
Room 14	No issues
Media Center	No issues
Room 11	No issues
Cafeteria	No issues

Comfort Parameter Measurements and Mold-in-Air Sample Results

The comfort parameter measurements and status of fungal ecology is summarized in Table 2.

Temperature

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) have published recommendations for year-round acceptable temperatures in Standard 55-2016 (*Thermal Environmental Conditions for Human Occupancy*). The winter comfort range is 68 to 75°F and the summer comfort range is 73 to 79°F. It is important to note that ASHRAE standards are intended as a suggested guideline as opposed to a regulation. All the indoor temperature readings were within the ASHRAE Standard.

Relative Humidity (RH)

Relative humidity is a key factor for mold growth. Mold has the potential of growing on suitable surfaces with humidity levels above 60%. ASHRAE standard 62.1-2013 (*Ventilation for Acceptable Indoor Air Quality*) recommends a maximum indoor relative humidity of 65% to preclude the likelihood of condensation on cool surfaces encouraging mold growth. All the indoor relative humidity readings were below the ASHRAE recommended level of 65%.

Carbon Monoxide

Carbon monoxide (CO) is a colorless and odorless gas that is produced by the incomplete combustion of carbon-containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are the major sources of CO. All registered CO concentrations were below the EPA National Ambient Air Quality Standard (NAAQS) of 9 ppm.

Carbon Dioxide

Under conditions of maximum occupancy, ASHRAE Standard 62.1-2013, Appendix C, infers that the acceptable carbon dioxide upper limit is the prevailing outdoor carbon dioxide concentration plus 700 parts per million (ppm). On December 15, 2020, the outdoor (ambient) carbon dioxide concentration was approximately 405 ppm so indoor concentrations should not exceed approximately 1105 ppm (700 + 405). All indoor carbon dioxide measurements were within the ASHRAE standards.

Mold-in-Air Samples

There are no definitive regulations or standardized guidelines for addressing airborne mold in an indoor setting. If building systems (ventilation, envelope) are functioning properly, the indoor fungal ecology profile should be consistent with what is encountered outdoors and the spore concentrations should be below the ambient levels. All indoor mold samples were found to have a normal fungal ecology. Laboratory analytical results are attached at the end of this report.

Table 2: Air Quality Results

Sample Location	Temp ^{0}F	RH%	CO ppm	CO2 ppm	Normal Fungal Ecology?
Standards	**ASHRAE 68 to 75°F**	**ASHRAE <65%**	**NAAQS <9**	**ASHRAE 1105**	
Ambient	48.6	35	0	405	-
Room 23	71.5	29	0	414	Yes
Room 14	68.8	28	0	396	Yes
Media Center	73.1	29	0	411	Yes
Room 11	69.1	27	0	414	Yes
Cafeteria	69.4	26	0	399	Yes

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Conclusions and Recommendations

The comfort parameters measured were within the applicable Standards for indoor comfort. No indoor air quality issues related to mold were found during the screening performed on December 15, 2020, and all mold samples were found to have a normal ecology for an indoor environment.

It has been our pleasure to conduct these IAQ Screening services for the Prince Georges County Public School system. If you have any questions, please feel free to contact us.

Regards,

Channa Bambaradeniya, Ph.D., CIH, CSP, CHMM
Certified Industrial Hygienist
Global, Inc.
Mobile: 443-691-0455

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ATTACHMENT I

Air Sample Analytical Results and Chain-Of-Custody Form

HAYES MICROBIAL CONSULTING

#20046843

Analysis Report prepared for

Global, Inc.

1818 New York Ave.
Suite 217
Washington, DC, 20002

Phone: **(443) 691-0455**

BB203
PGCPS Indoor Air Quality
Middletown Valley Elementary School

Collected: **December 15, 2020**
Received: **December 16, 2020**
Reported: **December 16, 2020**

We would like to thank you for trusting Hayes Microbial for your analytical needs!
We received 7 samples by FedEx in good condition for this project on December 16th, 2020.

The results in this analysis pertain only to this job, collected on the stated date, and should not be used in the interpretation of any other job. This report may not be duplicated, except in full, without the written consent of Hayes Microbial Consulting, LLC..

This laboratory bears no responsibility for sample collection activities, analytical method limitations, or your use of the test results. Interpretation and use of test results are your responsibility. Any reference to health effects or interpretation of mold levels is strictly the opinion of Hayes Microbial. In no event, shall Hayes Microbial or any of its employees be liable for lost profits or any special, incidental or consequential damages arising out of the use of these test results.

Steve Hayes, BSMT(ASCP)
Laboratory Director
Hayes Microbial Consulting, LLC.

EPA Laboratory ID: VA01419

Lab ID: #188863

DPH License: #PH-0198

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BB203
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Middletown Valley Elementary School

#20046843

Spore Trap, Spore Trap Blank
SOP - HMC#101

Sample Number	1	MVES-1215-01		2	MVES-1215-02		3	MVES-1215-03		4	MVES-1215-04	
Sample Name	**Ambient**			**Room 23**			**Room 14**			**Media Center**		
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter		
Reporting Limit	13 spores/m³			13 spores/m³			13 spores/m³			13 spores/m³		
Background	2			2			2			2		
Fragments	ND			ND			ND			13/m³		
Organism	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**
Alternaria												
Ascospores	6	80	66.7%	2	27	66.7%	1	13	20.0%	2	27	100.0%
Aspergillus|Penicillium							2	27	40.0%			
Basidiospores	2	27	22.2%	1	13	33.3%						
Bipolaris|Drechslera												
Chaetomium												
Cladosporium							1	13	20.0%			
Curvularia												
Epicoccum	1	13	11.1%									
Fusarium												
Memnoniella												
Myxomycetes												
Pithomyces							1	13	20.0%			
Stachybotrys												
Stemphylium												
Torula												
Ulocladium												
Total	9	120	100%	3	40	100%	5	66	100%	2	27	100%

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Dec 15, 2020** Received: **Dec 16, 2020** Reported: **Dec 16, 2020**

Project Analyst: Ramesh Poluri, PhD P. Ramesh Date: **12 - 16 - 2020**

Reviewed By: Steve Hayes, BSMT Stephen N. Hayes Date: **12 - 16 - 2020**

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Spore Trap, Spore Trap Blank
SOP - HMC#101

Sample Number	5	MVES-1215-05		6	MVES-1215-06		7	Field Blank	
Sample Name	**Room 11**			**Cafeteria**			**Field Blank**		
Sample Volume	75.00 liter			75.00 liter			0.00 liter		
Reporting Limit	13 spores/m³			13 spores/m³			1 spore/m³		
Background	2			2			NBD		
Fragments	ND			ND			ND		
Organism	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**	**Raw Count**	**Count / m³**	**% of Total**
Alternaria									
Ascospores	1	13	33.3%	2	27	50.0%			
Aspergillus|Penicillium				1	13	25.0%			
Basidiospores									
Bipolaris|Drechslera									
Chaetomium									
Cladosporium	2	27	66.7%	1	13	25.0%			
Curvularia									
Epicoccum									
Fusarium									
Memnoniella									
Myxomycetes									
Pithomyces									
Stachybotrys									
Stemphylium									
Torula									
Ulocladium									
Total	3	40	100%	4	53	100%	ND	ND	

Water Damage Indicator | Common Allergen | Slightly Higher than Baseline | Significantly Higher than Baseline | Ratio Abnormality

Collected: **Dec 15, 2020** Received: **Dec 16, 2020** Reported: **Dec 16, 2020**

Project Analyst: Ramesh Poluri, PhD P. Ramesh Date: **12 - 16 - 2020**

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Spore Trap Information

Reporting Limit	The Reporting Limit is the lowest number of spores that can be detected based on the total volume of the sample collected and the percentage of the slide that is counted. At Hayes Microbial, 100% of the slide is read so the LOD is based solely on the total volume. Raw spore counts that exceed 500 spores will be estimated.
Blanks	Results have not been corrected for field or laboratory blanks.
Background	The Background is the amount of debris that is present in the sample. This debris consists of skin cells, dirt, dust, pollen, drywall dust and other organic and non-organic matter. As the background density increases, the likelihood of spores, especially small spores such as those of Aspergillus and Penicillium may be obscured. The background is rated on a scale of 1 to 5 and each level is determined as follows: **NBD:** No background detected due to possible pump or cassette malfunction. Recollect sample. (Field Blanks will display NBD) **1 :** <5% of field occluded. No spores will be uncountable. **2 :** 5-25% of field occluded. **3 :** 25-75% of field occluded. **4 :** 75-90% of field occluded. **5 :** >90% of field occluded. Suggested recollection of sample.
Fragments	Fragments are small pieces of fungal mycelium or spores. They are not identifiable as to type and when present in very large numbers, may indicate the presence of mold amplification.
Control Comparisons	There are no national standards for the numbers of fungal spores that may be present in the indoor environment. As a general rule and guideline that is widely accepted in the indoor air quality field, the numbers and types of spores that are present in the indoor environment should not exceed those that are present outdoors at any given time. There will always be some mold spores present in "normal" indoor environments. The purpose of sampling and counting spores is to help determine whether an abnormal condition exists within the indoor environment and if it does, to help pinpoint the area of contamination. Spore counts should not be used as the sole determining factor of mold contamination. There are many factors that can cause anomalies in the comparison of indoor and outdoor samples due to the dynamic nature of both of those environments.
Water Damage Indicator Common Allergen Slightly Higher than Baseline Significantly Higher than Baseline Ratio Abnormality	**Blue:** These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem. **Green:** Although all molds are potential allergens, these are the most common allergens that may be found indoors. **Orange:** The spore count is slightly higher than the outside count and may or may not indicate a source of contamination. **Red:** The spore count is significantly higher than the baseline count and probably indicates a source of contamination. **Violet:** The types of spores found indoors should be similar to the ones that were identified in the baseline sample. Significant increases (more than 25%) in the ratio of a particular spore type may indicate the presence of abnormal levels of mold, even if the total number of spores of that type is lower in the indoor environment than it was outdoors.
Color Coding	Fungi that are present in indoor samples at levels lower than 200 per cubic meter are not color coded on the report, unless they are one of the water damage indicators.

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Organism Descriptions

Ascospores

Habitat: A large group consisting of more than 3000 species of fungi. Common plant pathogens and outdoor numbers become very high following rain. Most of the genera are indistinguishable by spore trap analysis and are combined on the report.

Effects: Health affects are poorly studied, but many are likely to be allergenic.

Aspergillus|Penicillium

Habitat: The most common fungi isolated from the environment. Very common in soil and on decaying plant material. Are able to grow well indoors on a wide variety of substrates.

Effects: This group contains common allergens and many can cause hypersensitivity pneumonitis. They may cause extrinsic asthma, and many are opportunistic pathogens. Many species produce mycotoxins which may be associated with disease in humans and other animals. Toxin production is dependent on the species, the food source, competition with other organisms, and other environmental conditions.

Basidiospores

Habitat: A common group of Fungi that includes the mushrooms and bracket fungi. They are saprophytes and plant pathogens. In wet conditions they can cause structural damage to buildings.

Effects: Common allergens and are also associated with hypersensitivity pneumonitis.

Cladosporium

Habitat: One of the most common genera worldwide. Found in soil and plant debris and on the leaf surfaces of living plants. The outdoor numbers are lower in the winter and often relatively high in the summer, especially in high humidity. The outdoor numbers often spike in the late afternoon and evening. Indoors, it can be found growing on textiles, wood, sheetrock, moist window sills and in HVAC supply ducts.

Effects: A common allergen, producing more than 10 allergenic antigens and a common cause of hypersensitivity pneumonitis.

Epicoccum

Habitat: It is found in soil and plant litter and is a plant pathogen. It can grow indoors on a variety of substrates, including paper and textiles and is commonly found on wet drywall.

Effects: It is a common allergen. No cases of infection have been reported in humans.

Pithomyces

Habitat: Common fungus isolated from soil, decaying plant material. Rarely found indoors.

Effects: Allergenic properties are poorly studied. No cases of infection in humans.

HAYES MICROBIAL CONSULTING

Company: Global Inc.
Address: 1818 New York Avenue
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N

SHIP: FEDEX - PAK 50
DATE: 12-16-2020

8160 4410 5440

MOLD

20046843

Job Number: BB203	Job Name: PGCPS Indoor Air Quality- Middletown Valley Elementary School
Collector: Kenna Leonzo	
Date Collected: 12/15/20	

Mobile: 2404358771 Email: kennal@globalincusa.net

Note: Send also to channab@globalincusa.net

Analysis Type		Analysis Description	Turnaround	Accepted Media Types
Spore Trap	S	Identification & Enumeration of Fungal Spores	24 Hour	Air Cassettes, Impact Slides
	S+	Spore Trap Analysis with Dander, Fiber, and Pollen counts	24 Hour	Air Cassettes, Impact Slides
Direct ID	D	ID & Semi-Quantative Enumeration of spores and mycelium	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
	D+	Direct Analysis with Fully Quantitative spore count	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
Culture	C1	Identification & Enumeration of Mold only	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C2	Identification & Enumeration of Bacteria only	4 Day	Air Plate, Agar Plate, Swab, Bulk
	C3	Identification & Enumeration of Mold and Bacteria	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C5	Coliform Screen for Sewage Bacteria	2 Day	Agar Plate, Swab, Bulk
Particle	TPA	Total Particulate Analysis, ID & Count (Does Not Include Mold)	24 Hour	Air Cassettes, Impact Slides, Bio-Tape

#	Number	Sample	Analysis	Volume	Notes
1	MVES-1215-01	Ambient	S	75 L	
2	MVES-1215-02	Room 23	S	75 L	
3	MVES-1215-03	Room 14	S	75 L	
4	MVES-1215-04	Media Center	S	75 L	
5	MVES-1215-05	Room 11	S	75 L	
6	MVES-1215-06	Cafeteria	S	75 L	
7	Field Blank	Field Blank	S		
8					
9					
10					
11					
12					
13					
14					
15					
16					

Released by: Kenna Leonzo Date: 12/15/20 Received By: Date: 12.16.20