



Environmental Consultants and Engineers

1818 New York Avenue Suite 217  
Washington, DC 20002

[www.globalincusa.net](http://www.globalincusa.net)

December 7, 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: Arrowhead Elementary School

Dear Mr. Baylor,

On December 3, 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 Arrowhead Elementary School located at 2300 Sansbury Road Upper Marlboro, MD.

### **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.



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## Observations

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

**Table 1: Observations**

Location	Observations
Room 108	No issues
Music Room	No issues
Media Center	No issues
Room 209	No issues
Multi-purpose Room	No issues
Room 301	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 lower than 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.



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### *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 3, 2020, the outdoor (ambient) carbon dioxide concentration was approximately 394 ppm so indoor concentrations should not exceed approximately 1094 ppm (700 + 394). 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. The total mold spore concentrations in all indoor samples were less than the outdoor sample. Laboratory analytical results are attached at the end of this report.

**Table 2: Air Quality Results**

Sample Location	Temp °F	RH%	CO ppm	CO2 ppm	Normal Fungal Ecology?
Standards	ASHRAE 68 to 75°F	ASHRAE <65%	NAAQS <9	ASHRAE 1094	
Ambient	59.8	20.4	0	394	-
Room 108	60.6	28.8	0	418	Yes
Music Room	65.2	24.2	0	415	Yes
Media Center	64.2	26.4	0	411	Yes
Room 209	61.8	23.3	0	416	Yes
Multi-purpose Room	57.2	27.8	0	408	Yes
Room 301	64.9	24.1	0	425	Yes



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## Conclusions and Recommendations

Among the comfort parameters measured, the indoor temperature readings were lower than the ASHRAE recommended range for winter. No indoor air quality issues related to mold were found during the screening performed on December 3, 2020, and all mold samples were found to have a normal ecology for an indoor environment.

Based on the observations and results of air quality parameters screened in representative locations at Arrowhead Elementary School, GLOBAL recommends the following corrective measures:

- Regulate the indoor temperature at the ASHRAE recommended range for winter (68 to 75°F) for general comfort.

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,

A handwritten signature in blue ink, appearing to read "Channa Bambaradeniya".

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**

Analysis Report prepared for

## Global, Inc.

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

Phone: (443) 691-0455

**BB203**  
Indoor Air Quality  
Arrowhead Elementary School

Collected: **December 3, 2020**  
Received: **December 4, 2020**  
Reported: **December 4, 2020**

We would like to thank you for trusting Hayes Microbial for your analytical needs!  
We received 8 samples by FedEx in good condition for this project on December 4th, 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

Sample Number	1	AES-1203-01			2	AES-1203-02			3	AES-1203-03			4	AES-1203-04		
Sample Name	<b>Ambient</b>			<b>Room 108</b>			<b>Music Room</b>			<b>Media Center</b>						
Sample Volume	75.00 liter			75.00 liter			75.00 liter			75.00 liter						
Reporting Limit	13 spores/m <sup>3</sup>			13 spores/m <sup>3</sup>			13 spores/m <sup>3</sup>			13 spores/m <sup>3</sup>						
Background	2			2			2			2						
Fragments	13/m <sup>3</sup>			ND			ND			ND						
Organism	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total				
Alternaria										1	13	33.3%				
Ascospores	5	67	45.5%	3	40	75.0%	1	13	14.3%	2	27	66.7%				
Aspergillus Penicillium							5	67	71.4%							
Basidiospores	4	53	36.4%	1	13	25.0%										
Bipolaris Drechslera																
Chaetomium																
Cladosporium	2	27	18.2%													
Curvularia																
Epicoccum																
Fusarium																
Memnoniella																
Myxomycetes							1	13	14.3%							
Pithomyces																
Stachybotrys																
Stemphylium																
Torula																
Ulocladium																
<b>Total</b>	<b>11</b>	<b>147</b>	<b>100%</b>	<b>4</b>	<b>53</b>	<b>100%</b>	<b>7</b>	<b>93</b>	<b>100%</b>	<b>3</b>	<b>40</b>	<b>100%</b>				

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



Collected: Dec 3, 2020

Received: Dec 4, 2020

Reported: Dec 4, 2020

Project Analyst:  
 Ramesh Poluri, PhD *P. Ramesh*

Date:  
**12 - 04 - 2020**

Reviewed By:  
 Steve Hayes, BSMT *Stephen N. Hayes*

Date:  
**12 - 04 - 2020**

Sample Number	5	AES-1203-05			6	AES-1203-06			7	AES-1203-07			8	Field Blank		
Sample Name	<b>Room 209</b>			<b>Multipurpose</b>			<b>Room 301</b>			<b>Field Blank</b>						
Sample Volume	75.00 liter			75.00 liter			75.00 liter			0.00 liter						
Reporting Limit	13 spores/m <sup>3</sup>			13 spores/m <sup>3</sup>			13 spores/m <sup>3</sup>			1 spore/m <sup>3</sup>						
Background	2			2			2			NBD						
Fragments	ND			ND			ND			ND						
Organism	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total	Raw Count	Count / m <sup>3</sup>	% of Total				
Alternaria																
Ascospores	1	13	50.0%	3	40	75.0%	2	27	100.0%							
Aspergillus Penicillium																
Basidiospores				1	13	25.0%										
Bipolaris Drechslera																
Chaetomium																
Cladosporium	1	13	50.0%													
Curvularia																
Epicoccum																
Fusarium																
Memnoniella																
Myxomycetes																
Pithomyces																
Stachybotrys																
Stemphylium																
Torula																
Ulocladium																
Total	2	26	100%	4	53	100%	2	27	100%	ND	ND					

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



Collected: Dec 3, 2020

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Project Analyst:  
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Reviewed By:  
 Steve Hayes, BSMT *Stephen N. Hayes*

Date:  
**12 - 04 - 2020**



**Spore Trap Information**

<b>Reporting Limit</b>	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.										
<b>Blanks</b>	Results have not been corrected for field or laboratory blanks.										
<b>Background</b>	<p>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 <i>Aspergillus</i> and <i>Penicillium</i> may be obscured. The background is rated on a scale of 1 to 5 and each level is determined as follows:</p> <p><b>NBD:</b> No background detected due to possible pump or cassette malfunction. Recollect sample. (Field Blanks will display NBD)</p> <p><b>1 :</b> &lt;5% of field occluded. No spores will be uncountable.</p> <p><b>2 :</b> 5-25% of field occluded.</p> <p><b>3 :</b> 25-75% of field occluded.</p> <p><b>4 :</b> 75-90% of field occluded.</p> <p><b>5 :</b> &gt;90% of field occluded. Suggested recollection of sample.</p>										
<b>Fragments</b>	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.										
<b>Control Comparisons</b>	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.										
<table border="1"> <tr> <td style="background-color: #ADD8E6;">Water Damage Indicator</td> <td><b>Blue:</b> These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.</td> </tr> <tr> <td style="background-color: #90EE90;">Common Allergen</td> <td><b>Green:</b> Although all molds are potential allergens, these are the most common allergens that may be found indoors.</td> </tr> <tr> <td style="background-color: #FFDAB9;">Slightly Higher than Baseline</td> <td><b>Orange:</b> The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.</td> </tr> <tr> <td style="background-color: #FFB6C1;">Significantly Higher than Baseline</td> <td><b>Red:</b> The spore count is significantly higher than the baseline count and probably indicates a source of contamination.</td> </tr> <tr> <td style="background-color: #DDA0DD;">Ratio Abnormality</td> <td><b>Violet:</b> 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.</td> </tr> </table>	Water Damage Indicator	<b>Blue:</b> These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.	Common Allergen	<b>Green:</b> Although all molds are potential allergens, these are the most common allergens that may be found indoors.	Slightly Higher than Baseline	<b>Orange:</b> The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.	Significantly Higher than Baseline	<b>Red:</b> The spore count is significantly higher than the baseline count and probably indicates a source of contamination.	Ratio Abnormality	<b>Violet:</b> 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.	
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<b>Color Coding</b>	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.										

**Organism Descriptions**

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<b>Alternaria</b>	<b>Habitat:</b> Commonly found outdoors in soil and decaying plants. Indoors, it is commonly found on window sills and other horizontal surfaces. <b>Effects:</b> A common allergen and has been associated with hypersensitivity pneumonitis. Alternaria is capable of producing toxic metabolites which may be associated with disease in humans or animals. Occasionally an agent of onychomycosis, ulcerated cutaneous infection and chronic sinusitis, principally in the immunocompromised patient.
<b>Ascospores</b>	<b>Habitat:</b> 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. <b>Effects:</b> Health affects are poorly studied, but many are likely to be allergenic.
<b>Aspergillus Penicillium</b>	<b>Habitat:</b> 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. <b>Effects:</b> 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.
<b>Basidiospores</b>	<b>Habitat:</b> 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. <b>Effects:</b> Common allergens and are also associated with hypersensitivity pneumonitis.
<b>Cladosporium</b>	<b>Habitat:</b> 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. <b>Effects:</b> A common allergen, producing more than 10 allergenic antigens and a common cause of hypersensitivity pneumonitis.
<b>Myxomycetes</b>	<b>Habitat:</b> Found on decaying plant material and as a plant pathogen. <b>Effects:</b> Some allergenic properties reported, but generally pose no health concerns to humans.

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Company: Global, Inc  
 Address: 1918 New York Avenue, -  
Suite 217 Washington, DC 20002

SHIP: FEDEX - PAK 50  
 DATE: 12-04-2020  
 8160 4411 5521

MOLD  
  
 20045365

Job Number: BB203	Job Name: Indoor Air Quality	Mobile: 443-691-0455	Email: channab@globalincusa.net
Collector: Kenna Leonzo	Arrowhead Elementary School	Note:	
Date Collected: 12/03/2020			

Analysis Type	Analysis Description	Turnaround	Accepted Media Types
Spore Trap	S	24 Hour	Air Cassettes, Impact Slides
	S+	24 Hour	Air Cassettes, Impact Slides
Direct ID	D	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
	D+	24 Hour	Bio-Tape, Tape, Swab, Bulk, Agar Plate
Culture	C1	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C2	4 Day	Air Plate, Agar Plate, Swab, Bulk
	C3	7 Day	Air Plate, Agar Plate, Swab, Bulk
	C5	2 Day	Agar Plate, Swab, Bulk
Particle	TPA	24 Hour	Air Cassettes, Impact Slides, Bio-Tape

#	Number	Sample	Analysis	Volume	Notes
1	AES-1203-01	Ambient	S	75 L	
2	AES-1203-02	Room 108	↓	↓	
3	AES-1203-03	Music Room			
4	AES-1203-04	Media Center			
5	AES-1203-05	Room 209			
6	AES-1203-06	Multipurpose			
7	AES-1203-07	Room 301			
8	Field blank	-			S
9					
10					
11					
12					
13					
14					
15					
16					

Released by: <u>Kenna Leonzo</u>	Date: <u>12/03/20</u>	Received By: <u>[Signature]</u>	Date: <u>12-4-20</u>
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