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

May 15, 2019

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: 19-015
School: Tulip Grove Elementary School

Dear Mr. Baylor,

On May 7, 2019, Global Inc.'s (Global) Certified Industrial Hygienist, Ms. Lauren Kesslak, conducted an Indoor Air Quality Screening at Tulip Grove Elementary School located at 2909 Trainor Ln, Bowie, MD 20715.

## Methodology

The IAQ evaluation included a visual assessment as well as sampling for non-viable mold spores in air, temperature, humidity, carbon dioxide, and carbon monoxide in randomly selected representative locations within the building.

Microbial samples were delivered to Hayes Microbial of Midlothian, Virginia for analysis by microscopy. The sample chain-of-custody and laboratory report is attached.

## Observations and Results

The inspector conducted a walkthrough with Price Georges County Public School (PGCPS) personnel present. Rooms were selected at random to cover a representation of the overall building.

### *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 mimic what is encountered outdoors and the concentrations should be below the ambient levels. One mold sample was collected for every 10,000 Square Feet (SF) of

space in the building and compared to an outdoor (ambient) sample. Laboratory analytical results are attached at the end of this report.

***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 20 to 24°C (68 to 75°F) and 23 to 26°C (73 to 79°F) is the summer comfort range. It is important to note that ASHRAE standards are intended as a suggested guideline as opposed to a regulation.

***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.

***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 May 7, 2019, the outdoor (ambient) carbon dioxide concentration was approximately 499 ppm so indoor concentrations should not exceed approximately 1199 ppm (700 + 499). All indoor carbon dioxide measurements were within the ASHRAE standards.

Observations are presented in Table 1 and testing results are presented in Table 2.

**Table 1: Observations**

| Location | Observations |
|---|---|
| Ambient | No issues found |
| 126 | No issues found |
| 128 | No issues found |
| 134 | No issues found |
| 159 | No issues found |
| 179 | No issues found |
| Cafeteria | No issues found |
| Library | No issues found |
| Teacher's Lounge | No issues found |

**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 1119** | |
| Ambient | 71.7 | 60.15 | 0 | 499 | N/A |
| 126 | 76 | 54.3 | 0 | 601.5 | Yes |
| 128 | 72.05 | 59.7 | 0 | 538 | Yes |
| 134 | 71.4 | 62.85 | 0 | 716 | Yes |
| 159 | 71.6 | 59.6 | 0 | 671.5 | Yes |
| 179 | 70.8 | 59.35 | 0 | 508 | Yes |
| Cafeteria | 70 | 55.1 | 0 | 553.5 | Yes |
| Library | 71 | 60.5 | 0 | 849.5 | Yes |
| Teacher's Lounge | 70.65 | 62.4 | 0 | 584 | Yes |

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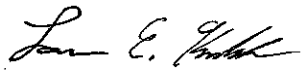
**Conclusions**

No indoor air quality issues related to mold were found during the screening performed on May 7, 2019, and all mold samples were found to have a normal ecology for an indoor environment.

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

Regards,



Lauren E. Kesslak, MS, CIH, CSP
Certified Industrial Hygienist

# HAYES MICROBIAL CONSULTING

**#19018573**

Analysis Report prepared for

## Global, Inc.

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

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

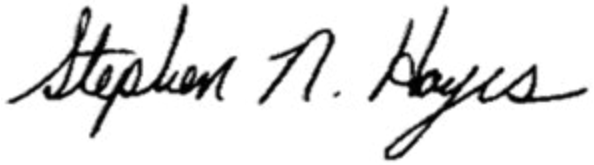
**19-015**
Tulip Grove ES

Collected: **May 7, 2019**
Received: **May 9, 2019**
Reported: **May 9, 2019**

We would like to thank you for trusting Hayes Microbial for your analytical needs!
We received 6 samples by FedEx in good condition for this project on May 9th, 2019.

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

NVLAP Lab Code: 500096-0

DPH License: #PH-0198

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**19-015**
Tulip Grove ES

**#19018573**

**Spore Trap**
SOP - HMC#101

| Sample Number | 1 | TGES/5719-01 | | 2 | TGES/5719-02 | | 3 | TGES/5719-03 | | 4 | TGES/5719-04 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Name | **Ambient** | | | **Room 126** | | | **Room 128** | | | **Room 134** | | |
| Sample Volume | 75.00 liter | | | 75.00 liter | | | 75.00 liter | | | 75.00 liter | | |
| Reporting Limit | 13 spores/$m^3$ | | | 13 spores/$m^3$ | | | 13 spores/$m^3$ | | | 13 spores/$m^3$ | | |
| Background | 2 | | | 2 | | | 2 | | | 2 | | |
| Fragments | ND | | | ND | | | ND | | | ND | | |
| **Organism** | **Raw Count** | **Count / $m^3$** | **% of Total** | **Raw Count** | **Count / $m^3$** | **% of Total** | **Raw Count** | **Count / $m^3$** | **% of Total** | **Raw Count** | **Count / $m^3$** | **% of Total** |
| Alternaria | | | | | | | | | | | | |
| Ascospores | 84 | 1120 | 23.5% | 3 | 40 | 75.0% | | | | 1 | 13 | 33.3% |
| Aspergillus\|Penicillium | | | | | | | | | | 2 | 27 | 66.7% |
| Basidiospores | 252 | 3360 | 70.6% | | | | 2 | 27 | 100.0% | | | |
| Bipolaris\|Drechslera | | | | | | | | | | | | |
| Chaetomium | | | | | | | | | | | | |
| Cladosporium | 19 | 253 | 5.3% | | | | | | | | | |
| Curvularia | | | | | | | | | | | | |
| Epicoccum | 2 | 27 | <1% | | | | | | | | | |
| Fusarium | | | | | | | | | | | | |
| Memnoniella | | | | | | | | | | | | |
| Myxomycetes | | | | 1 | 13 | 25.0% | | | | | | |
| Pithomyces | | | | | | | | | | | | |
| Stachybotrys | | | | | | | | | | | | |
| Stemphylium | | | | | | | | | | | | |
| Torula | | | | | | | | | | | | |
| Ulocladium | | | | | | | | | | | | |
| Total | 357 | 4760 | 100% | 4 | 53 | 100% | 2 | 27 | 100% | 3 | 40 | 100% |

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

Collected: **May 7, 2019** Received: **May 9, 2019** Reported: **May 9, 2019**

Project Analyst: Connor Gailliot,

Date: **05 - 09 - 2019**

Reviewed By: Steve Hayes, BSMT

Date: **05 - 09 - 2019**

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**19-015**
Tulip Grove ES

**#19018573**

**Spore Trap**
SOP - HMC#101

| Sample Number | 5 | TGES/5719-05 | | 6 | TGES/5719-06 | |
|---|---|---|---|---|---|---|
| Sample Name | **Room 159** | | | **Room 179** | | |
| Sample Volume | 75.00 liter | | | 75.00 liter | | |
| Reporting Limit | 13 spores/m³ | | | 13 spores/m³ | | |
| Background | 2 | | | 1 | | |
| Fragments | ND | | | ND | | |
| **Organism** | **Raw Count** | **Count / m³** | **% of Total** | **Raw Count** | **Count / m³** | **% of Total** |
| Alternaria | | | | | | |
| Ascospores | | | | | | |
| Aspergillus\|Penicillium | | | | | | |
| Basidiospores | | | | 2 | 27 | 100.0% |
| Bipolaris\|Drechslera | | | | | | |
| Chaetomium | | | | | | |
| Cladosporium | 1 | 13 | 33.3% | | | |
| Curvularia | | | | | | |
| Epicoccum | 1 | 13 | 33.3% | | | |
| Fusarium | | | | | | |
| Memnoniella | | | | | | |
| Myxomycetes | 1 | 13 | 33.3% | | | |
| Pithomyces | | | | | | |
| Stachybotrys | | | | | | |
| Stemphylium | | | | | | |
| Torula | | | | | | |
| Ulocladium | | | | | | |
| Total | 3 | 39 | 100% | 2 | 27 | 100% |

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

Collected: **May 7, 2019** Received: **May 9, 2019** Reported: **May 9, 2019**

Project Analyst: Connor Gailliot, Date: **05 - 09 - 2019**

Reviewed By: Steve Hayes, BSMT Date: **05 - 09 - 2019**

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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:<br><br>**NBD:** No background detected due to possible pump or cassette malfunction. Recollect sample. (Field Blanks will display NBD)<br>**1 :** <5% of field occluded. No spores will be uncountable.<br>**2 :** 5-25% of field occluded.<br>**3 :** 25-75% of field occluded.<br>**4 :** 75-90% of field occluded.<br>**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<br>Common Allergen<br>Slightly Higher than Baseline<br>Significantly Higher than Baseline<br>Ratio Abnormality | **Blue:** These molds are commonly seen in conditions of prolonged water intrusion and usually indicate a problem.<br><br>**Green:** Although all molds are potential allergens, these are the most common allergens that may be found indoors.<br><br>**Orange:** The spore count is slightly higher than the outside count and may or may not indicate a source of contamination.<br><br>**Red:** The spore count is significantly higher than the baseline count and probably indicates a source of contamination.<br><br>**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.

**Myxomycetes**

**Habitat:** Found on decaying plant material and as a plant pathogen.

**Effects:** Some allergenic properties reported, but generally pose no health concerns to humans.

HAYES MICROBIAL CONSULTING

Company: Global Inc.
Address: 1818 New York Ave. NE
Washington, DC 20002

N

SHIP: FEDEX - PAK SO
DATE: 05-09-2019

7751 6830 0851

MOLD
19018573

| | |
|---|---|
| Job Number: 19-015 | Job Name: Tulip Grove ES |
| Collector: Lauren Kesslak | Mobile: 814-241-9105 Email: LaurenK@globalincusa.net |
| Date Collected: ~~5-8-19~~ 5-7-19 | Note: |

| 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 | TGES/5~~8~~19-01 | Ambient | 5 | 75L | |
| 2 | 02 | Room 126 | | | |
| 3 | 03 | " 128 | | | |
| 4 | 04 | " 134 | | | |
| 5 | 05 | " 159 | | | |
| 6 | 06 | " 179 | | | |
| 7 | | | | | |
| 8 | | | | | |
| 9 | | | | | |
| 10 | | | | | |
| 11 | | | | | |
| 12 | | | | | |
| 13 | | | | | |
| 14 | | | | | |
| 15 | | | | | |
| 16 | | | | | |

| | | | |
|---|---|---|---|
| Released by: | Date: 5-8-19 | Received By: IB 5/9/19 | Date: |