COMMITMENT & INTEGRITY
DRIVE RESULTS

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Via Electronic Mail

January 17, 2019

Thomas Cullen
Director of Operation
Fairfield Public Schools
P.O. Box 320189
501 Kings Highway East, Suite 210
Fairfield, CT 06825

Re: Bioaerosol Sampling and Limited Environmental Assessment, Tomlinson Middle School
200 Unquowa Road, Fairfield, Connecticut

Dear Mr. Cullen:

As requested, Woodard & Curran performed bioaerosol sampling for total fungal spores and a limited environmental assessment in select areas of the Tomlinson Middle School facility located at 200 Unquowa Road in Fairfield, Connecticut. The purpose of the assessment was to determine if there was evidence of fungal growth in certain classrooms at the Tomlinson Middle School.

On January 9, 2019, bioaerosol samples for airborne fungal spores were collected at the request of The Fairfield School Department in areas identified by school representatives where concerns had been raised. Woodard & Curran also performed a visual inspection, direct reading-measurements of temperature and relative humidity, and a moisture survey of building materials in classrooms 101, 107, 109, 015, 013, 020, and 031.

It was reported by Fairfield Public School Operations that school employees observed suspected fungal growth on concrete masonry unit block walls in classrooms 107 and 109. Minor water infiltration was also reported in classrooms 020 and 031 during a heavy rainstorm.

BACKGROUND

Fungus thrives in damp organic matter and fungal growth media can vary widely. Examples of media that can support fungal growth include stagnant water, damp wood, backing on carpet and carpet pads, cellulose ceiling tiles, and paper facing on gypsum board. Interior finishes such as vinyl cove base and vinyl wall covering may hold moisture against gypsum board or wood, thus enhancing the conditions for fungal growth.

METHODS

Visual Inspection

Woodard & Curran conducted a visual inspection in classrooms 101, 107, 109, 015, 013, 020, and 031 to determine if obvious sources of suspect fungal growth were present. This visual inspection did not include a comprehensive inspection above suspended ceiling, rooftop or in the heating, ventilation and air conditioning system. Woodard & Curran did not make any penetrations into wall cavities.

Moisture Survey

The moisture content of building materials was evaluated using a Dual Moisture Meter Pro moisture meter, manufactured by Extech Instruments, which has two operating modes: search and measure. In search mode, the instrument uses a non-invasive radio frequency emission technique to locate moisture and can penetrate most wall and floor coverings, including ceramic tiles, to a depth of approximately ¾ inch. It displays a semi-quantitative result on a scale of colored lights. In measure mode, the instrument uses the electrical conductivity of a damp porous building material to indicate its level of free water. Two electrode pins are inserted into the material and the moisture level is displayed on a digital numeric display in units of wood moisture equivalent (WME). WME is the water content that wood would have if it were in contact with the material being tested for sufficient time to reach moisture equilibrium. It is the ratio of the weight of the water in the wood to the dry weight of the wood, expressed as a percentage. Prior to use, the calibration of the instrument was checked using a calibration device.

Bioaerosol Sampling for Total Fungal Spores

Bioaerosol samples for total fungal spores were collected using a calibrated Zefon Biopump. Air was drawn through Air-O-Cell cassettes prepared by EMSL Analytical, Inc. at a flow rate of 15 liters per minute. Samples were collected at seven indoor locations and three samples were collected outdoors for reference. Each Sample was collected for a period of five minutes. Samples along with a field blank, for quality control purposes, were sent via overnight mail to EMLab P& K in Marlton, New Jersey. Analysis includes identification to genus or group of all fungi present, living, dead, or dormant.

Temperature and Relative Humidity

Indoor temperature levels for occupied areas should be maintained within the thermal comfort envelope suggested by the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE). ASHRAE specifies conditions in which 80% or more of building occupants should find the thermal environment acceptable. ASHRAE suggests temperatures of 68 to 75 degrees Fahrenheit (°F), during winter months, for people in typical seasonal clothing during light sedentary activity. For summer, the temperature should be in the range of 73 to 79 °F.

RESULTS

Visual Inspection

No visible suspect mold growth was observed in any of the classrooms. The white painted brick walls in classrooms 101, 107 and 109 appeared clean. Water staining was visible on a section, less than 10 square feet, of sound proof wall material in Classroom 031 (Band Room).

Moisture Survey

Woodard & Curran conducted a moisture survey in accessible areas with porous wall materials (gypsum board walls, sound proofing wall materials) in classroom 020 and 031. The moisture survey indicated that the moisture content was less than 15%, indicating dry conditions, in the porous wall materials evaluated in these classrooms.

Bioaerosol Samples for Total Fungal Spores

There are no published or regulatory standards to compare bioaerosol sample results in order to assess potential health risks. As such, a reference or background level, typically outdoor ambient air, is used to compare the results.

The total spores detected indoors were less than concurrent outdoor samples. The average of the outdoor sample results (average of all detected concentrations) was 1,036 spores/m^3 (spores per cubic meter of air),

whereas the average of the indoor sample results was 61 spores/m^3. The range of detected concentrations in the outdoor samples was 210 to 1,900 spores/m^3, whereas the range of detected concentrations in the indoor samples was less than 13 to 160 spores/m^3.

In addition, the individual spore types were similar between the indoor and outdoor samples. The detected concentrations of airborne fungal spores would not be expected to cause a health issue in healthy individuals. No common species indicative of a chronic moisture issue, i.e., Chaetomium or Stachybotrys were detected on any sample. These species commonly grow on indoor building materials that have been subjected to long periods of excess moisture. These results are not indicative of an ongoing indoor source of fungal growth and wouldn't be expected to negatively affect the indoor environment.

A table of the results is included as Attachment A and analytical laboratory report is included as Attachment B.

Temperature and Relative Humidity

On the day of the survey, temperature and relative humidity readings throughout the facility were made with a TSI Q-Trak (Model 7575-X) direct-reading instrument. The temperature readings in occupied classrooms areas intended for occupancy ranged between 69 and 72°F meaning all of the office area readings were within the guideline of 68 to 75 °F recommended by ASHRAE for thermal comfort for winter months. The indoor relative humidity readings in occupied portions of the building, also measured with the TSI Q-Trak, ranged from 23.6 to 28.9%. All of the of relative humidity readings were within the guideline of less than 65% recommended by ASHRAE for occupant comfort and for the prevention of microbial growth. It should be noted that these recommended ranges are guidelines and can vary depending on building occupancy, heating system, and seasonal temperature differential.

RECOMMENDATIONS

Based on industry guidelines and best management practices, it is recommended that the following steps be taken:

- Continue to monitor school areas for water damage and excess moisture in building materials. Remove the water stained wall material in Classroom 031 (Band Room). Note that the School's Asbestos Hazard Emergency Response Act (AHERA) records should be reviewed prior to disturbing any building materials.
- If there is any large water intrusion or interior water release effecting porous building materials an experienced environmental assessment firm should be consulted for recommendations.

Woodard & Curran appreciates the opportunity to assist you on this project. If you have any questions or require further information, please feel free to email me at whenderson@woodardcurran.com or call me at (781) 251-0489.

Sincerely,

WOODARD & CURRAN INC.

William Henderson, CIH, CSP
Project Scientist

Ray Cowan, CIH
Senior Project Manager

Attachment A: Table of Laboratory Results
Attachment B: EMLab P&K Analytic Laboratory Results

ATTACHMENT A: TABLE OF BIOAREOSOL SAMPLING RESULTS

WOODARD &CURRAN

Summary of Bioaerosol Sampling Results for Total Fungal Spores

Tomlinson Middle School
200 Unquowa Road, Fairfield, Connecticut
January 9, 2019

Spores/m³								
Spore Type	**Outdoor Range**	**Classroom 101**	**Classroom 107**	**Classroom 109**	**Classroom 015**	**Classroom 013**	**Classroom 020**	**Classroom 031**
Ascospores	< 13 to 110	< 13	< 13	< 13	< 13	< 13	< 13	< 13
Basidiospores	160 to 1,700	53	< 13	< 13	< 13	< 13	< 13	< 13
Cladosporium	53 to 110	53	110	< 13	< 13	< 13	< 13	160
Penicillium/Aspergillus	<13	53	< 13	< 13	< 13	< 13	< 13	< 13
Background Debris	1+	1 +	1 +	1 +	1 +	1 +	1 +	1+
Total Spores/m³	210 to 1,900	160	110	< 13	< 13	< 13	< 13	160

ATTACHMENT B: EMLAB P&K ANALYTICAL LABORATORY RESULTS

EMLab P&K
A TestAmerica Company

Report for:

Will Henderson
Woodard & Curran
980 Washington Street
Suite 325
Dedham, MA 02026

Regarding: Project: Tomlinson Middle School; Environmental Assessment
EML ID: 2074054

Approved by:

Technical Manager
Ariunaa Jalsrai

Dates of Analysis:
Spore trap analysis: 01-10-2019

Service SOPs: Spore trap analysis (EM-MY-S-1038)
AIHA-LAP, LLC accredited service, Lab ID #103005

EMLab P&K
3000 Lincoln Drive East, Suite A, Marlton, NJ 08053
(866) 871-1984 Fax (856) 334-1040 www.emlab.com

Client: Woodard & Curran
C/O: Will Henderson
Re: Tomlinson Middle School; Environmental Assessment

Date of Sampling: 01-09-2019
Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-01: Outdoors West			F-02: Classroom 101		
Comments (see below)	None			None		
Lab ID-Version‡:	9797900-1			9797901-1		
Analysis Date:	01/10/2019			01/10/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores	2	25	110			
Basidiospores	31	25	1,700	1	25	53
Chaetomium						
Cladosporium	2	25	110	1	25	53
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†				1	25	53
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	1+			1+		
Hyphal fragments/m3	13			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	1+			1+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			1,900			160

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
††Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m^3 divided by the raw count, expressed in spores/m^3. The limit of detection is the analytical sensitivity (in spores/m^3) multiplied by the sample volume (in liters) divided by 1000 liters.

For more information regarding analytical sensitivity, please contact QA by calling the laboratory.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total Spores/m3 has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 01-09-2019
Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-03: Classroom 107			F-04: Classroom 109		
Comments (see below)	None			A		
Lab ID-Version‡:	9797902-1			9797903-1		
Analysis Date:	01/10/2019			01/10/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores						
Basidiospores						
Chaetomium						
Cladosporium	2	25	110			
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†						
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	1+			1+		
Hyphal fragments/m3	< 13			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	1+			1+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			110			< 13

Comments: A) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
† The spores of *Aspergillus* and *Penicillium* (and others such as *Acremonium, Paecilomyces*) are small and round with very few distinguishing characteristics. They cannot be differentiated by non-viable sampling methods. Also, some species with very small spores are easily missed, and may be undercounted.
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Re: Tomlinson Middle School; Environmental Assessment

Date of Sampling: 01-09-2019
Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-05: Classroom 015			F-06: Classroom 013		
Comments (see below)	A			A		
Lab ID-Version‡:	9797904-1			9797905-1		
Analysis Date:	01/10/2019			01/10/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores						
Basidiospores						
Chaetomium						
Cladosporium						
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†						
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	1+			1+		
Hyphal fragments/m3	< 13			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	1+			1+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			< 13			< 13

Comments: A) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
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Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-07: Outdoors East			F-08: Room 020		
Comments (see below)	None			A		
Lab ID-Version‡:	9797906-1			9797907-1		
Analysis Date:	01/10/2019			01/10/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores						
Basidiospores	3	25	160			
Chaetomium						
Cladosporium	1	25	53			
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†						
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	1+			1+		
Hyphal fragments/m3	13			< 13		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	1+			1+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			210			< 13

Comments: A) No spores detected.

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
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Re: Tomlinson Middle School; Environmental Assessment

Date of Sampling: 01-09-2019
Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-09: Room 031			F-10: Outdoors West		
Comments (see below)	None			None		
Lab ID-Version‡:	9797908-1			9797909-1		
Analysis Date:	01/10/2019			01/10/2019		
	raw ct.	% read	spores/m3	raw ct.	% read	spores/m3
Ascospores				1	25	53
Basidiospores				17	25	910
Chaetomium						
Cladosporium	3	25	160	1	25	53
Curvularia						
Epicoccum						
Fusarium						
Myrothecium						
Nigrospora						
Other colorless						
Penicillium/Aspergillus types†						
Pithomyces						
Rusts						
Smuts, Periconia, Myxomycetes						
Stachybotrys						
Stemphylium						
Torula						
Ulocladium						
Zygomycetes						
Background debris (1-4+)††	1+			1+		
Hyphal fragments/m3	< 13			27		
Pollen/m3	< 13			< 13		
Skin cells (1-4+)	1+			< 1+		
Sample volume (liters)	75			75		
§ TOTAL SPORES/m3			160			1,000

Comments:

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Re: Tomlinson Middle School; Environmental Assessment

Date of Sampling: 01-09-2019
Date of Receipt: 01-10-2019
Date of Report: 01-11-2019

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Location:	F-11: Field Blank		
Comments (see below)	None		
Lab ID-Version‡:	9797910-1		
Analysis Date:	01/10/2019		
	raw ct.	% read	spores/m3
Ascospores			
Basidiospores			
Chaetomium			
Cladosporium			
Curvularia			
Epicoccum			
Fusarium			
Myrothecium			
Nigrospora			
Other colorless			
Penicillium/Aspergillus types†			
Pithomyces			
Rusts			
Smuts, Periconia, Myxomycetes			
Stachybotrys			
Stemphylium			
Torula			
Ulocladium			
Zygomycetes			
Background debris (1-4+)††	None		
Hyphal fragments/m3	N/A		
Pollen/m3	N/A		
Skin cells (1-4+)	None		
Sample volume (liters)	0		
§ TOTAL SPORES/m3			N/A

Comments:

Spore types listed without a count or data entry were not detected during the course of the analysis for the respective sample, indicating a raw count of <1 spore.
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