Mystic Air Quality Consultants, Inc.

1204 North Road, Groton, Connecticut 06340

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January 5, 2019

Waterford Public Schools
15 Rope Ferry Road
Waterford, Connecticut 06385
Attn: Mr. Jay Miner, Director of Buildings and Grounds

Re: Waterford High School, Waterford, Connecticut,
Limited and Directed Indoor Air Quality Sampling
December 11, 2018

Encl: (1) Explanations and Recommendations, (2) Total Fungi Air Sample Results
(3) Ambient Air Sample Results

Dear Mr. Miner:

As requested, on December 11, 2018, Mystic Air Quality Consultants, Inc. conducted limited and directed ambient air sampling at the facility referenced above. Sampling was conducted as part of a general indoor air quality evaluation. Please refer to **Enclosure (1)** for Explanations and Recommendations.

Enclosure (2) contains the fungal spore count results. Results reflect conditions only at the time the samples were taken. Samples were analyzed by an American Industrial Hygiene Association accredited laboratory. **At the time of the sampling the interior total spore counts were comparable the outside air sample results. Additionally, no significant water indicator fungi were noted on the interior samples.**

Enclosure (3) contains the ambient gas, vapor, temperature and humidity air sample results. Results reflect the conditions only at the time the samples were taken. Sampling was conducted using direct reading instruments for hydrogen sulfide, carbon dioxide, carbon monoxide, combustible gases, oxygen, total hydrocarbons, respirable particulates and temperature/humidity. **At the time of the survey hydrogen sulfide, carbon monoxide, combustible gases, oxygen, total hydrocarbons, respirable particulates, and temperature levels were within applicable guidelines.**

If you have any questions or concerns please do not hesitate to contact me directly.

Sincerely,

David H. Goldstein, MS, CIH

Explanations and Recommendations

Explanation of Fungi Air Sampling and Microbial Recommendations

With the present science, the primary method to identify microbial reservoirs is to identify liquid water and/or moisture sources. This fungi screening was of an extremely limited nature and it is imperative not to rely on these results as the sole criteria for determining remediation or post-remediation issues. Statistically significant comparisons of different types of fungi based on relatively small interior and exterior sample sizes are unfounded. More importantly, no results shall be used as a health risk exposure assessment. Sample results are for environmental purposes only and are used to assist in the determination of potential microbial reservoirs or amplifiers. Comparatively low results shall not be used to confirm the absence of microbial contamination. Additional air sampling as well as source sampling may need to be conducted to assist in the evaluation of this limited data. Suspected contamination could be collected by source sampling to confirm fungal and/or bacterial matter. This approach identifies not only the source(s) of contamination but also facilitates eventual removal and control of fungal and bacterial growth. It is important to note, however, that susceptible individuals may respond not only to fungi but also to the various by-products produced by these organisms including enzymes, mycotoxins and other chemical by-products.

Because fungal bioaerosols may include a mixture of various fungal taxa, their composition varies widely depending on spatial and temporal changes. Hence, sampling during the different seasons as well as different periods during the day may produce varied results. There is also a lack of a dose response relationship, which makes defining standards and guidelines nearly impossible. A few proposed guidelines for fungi have been published, however, they should be used with care and only for screening purposes and not as a health standard.

Since there are no consensus health-based standards for bioaerosol levels, as recommended by the American Conference of Governmental Industrial Hygienists, (Bioaerosols, Assessments and Control, 1999) samples are interpreted in conjunction with a visual walkthrough of the facility that attempts to identify potential microbial sources and symptoms of building occupants that could potentially be linked to microbial growth. Note that the walkthrough is only attempting to identify accessible potential microbial sources. Inaccessible areas such as between walls, behind structural components, behind architectural components, above suspended ceilings and the interior of ventilation units are not included unless specifically referenced in this report.

Recommendations

The relative humidity levels in the areas tested were below the range of humidity recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) of 30%-60%. Please note that the levels in the facility are consistent with many buildings in New England during the winter months because of a combination of the low outside temperature and humidity combined with the interior heating of the facility. If building occupants experience dryness of their mucous membranes an increase in water intake is recommended. While the use of portable humidification systems can increase interior humidity levels, unless diligently maintained they can become a source for microbial amplification.

As required by the State of Connecticut's statutory requirement of the Act Concerning Indoor Air Quality in Schools, the school's entire ventilation system should be maintained and operated in accordance with the prevailing maintenance standards at the time of installation or renovation of the system.

Finally, as a general note, medical personnel should play a key role in identifying any potential building related illness. It is always recommended that medical expertise be sought in any situation where the probability exists for a potential building related illness. Additionally, please note that certain individuals may exhibit hypersensitive or allergic reactions in environments where there are contaminants below set standards or detectable limits.

SanAir Technologies Laboratory

Name: Mystic Air Quality Consultants
Address: 1204 North Road
Groton, CT 06340
Phone: 860-449-8903

Project Number:
P.O. Number:
Project Name: W H S
Collected Date: 12/11/2018
Received Date: 12/13/2018 10:50:00 AM

SanAir ID Number
18057552
FINAL REPORT
12/17/2018 11:22:44 AM

Analyst: Pulliam, Tashema

Air Cassette Analysis

ND = None Detected. Blank spaces indicate no spores detected.

SanAir ID Number	18057552-001			18057552-002			18057552-003			18057552-004		
Analysis Using STL	105C			105C			105C			105C		
Sample Number	2842026			2842024			2842016			2842021		
Sample Identification	Outside			Nurses Office			Media Center			Cafe		
Sample Type	Air Cassette - Allergenco-D			Air Cassette - Allergenco-D			Air Cassette - Allergenco-D			Air Cassette - Allergenco-D		
Volume	75 Liters			75 Liters			75 Liters			75 Liters		
Analytical Sensitivity	13 Count/M^3			13 Count/M^3			13 Count/M^3			13 Count/M^3		
Background Density	2			1			1			1		
Fungal Identification	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Ascospores	1	13	6									
Aspergillus/Penicillium	8	107	44				1	13	>99			
Basidiospores	2	27	11									
Cladosporium species	1	13	6									
Smuts/Myxomycetes	6	80	33									
TOTAL	**18**	**240**					**1**	**13**				

Signature: Tashema Pulliam Date: 12/17/2018 Reviewed: Johnathan Wilson Date: 12/17/2018

ENCLOSURE 2 PAGE 1 OF 4

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18057552
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12/17/2018 11:22:44 AM

Analyst: Pulliam, Tashema

Air Cassette Analysis

ND = None Detected. Blank spaces indicate no spores detected.

SanAir ID Number	18057552-005			18057552-006			18057552-007			18057552-008		
Analysis Using STL	105C			105C			105C			105C		
Sample Number	2842014			2842019			2842015			2842020		
Sample Identification	200 2nd Fl Main Office			Hall Outside 216			Hall Outside 321A			Hall 3rd Fl Stair 1		
Sample Type	Air Cassette - Allergenco-D			Air Cassette - Allergenco-D			Air Cassette - Allergenco-D			Air Cassette - Allergenco-D		
Volume	75 Liters			75 Liters			75 Liters			75 Liters		
Analytical Sensitivity	13 Count/M³			13 Count/M³			13 Count/M³			13 Count/M³		
Background Density	1+			1			1			1		
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Ascospores												
Aspergillus/Penicillium	1	13	>99	1	13	>99						
Basidiospores							1	13	>99	1	13	>99
Cladosporium species												
Smuts/Myxomycetes												
TOTAL	**1**	**13**		**1**	**13**		**1**	**13**		**1**	**13**	

Signature: Tashema Pulliam Date: 12/17/2018 Reviewed: Johnathan Wilson Date: 12/17/2018

ENCLOSURE 2 PAGE 2 OF 11

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18057552
FINAL REPORT
12/17/2018 11:22:44 AM

Analyst: Pulliam, Tashema

Air Cassette Analysis

ND = None Detected. Blank spaces indicate no spores detected.

SanAir ID Number	18057552-009			18057552-010		
Analysis Using STL	105C			105C		
Sample Number	2842010			2842009		
Sample Identification	Old Gym			Field House Foyer		
Sample Type	Air Cassette - Allergenco-D			Air Cassette - Allergenco-D		
Volume	75 Liters			75 Liters		
Analytical Sensitivity	13 Count/M^3			13 Count/M^3		
Background Density	1			1+		
Fungal Identification	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Ascospores						
Aspergillus/Penicillium				1	13	50
Basidiospores				1	13	50
Cladosporium species						
Smuts/Myxomycetes						
TOTAL				**2**	**27**	

Signature: Tashema Pulliam Date: 12/17/2018 Reviewed: Johnathan Wilson Date: 12/17/2018

ENCLOSURE 2 PAGE 3 OF 4

SanAir Technologies Laboratory
1551 Oakbridge Dr. STE B
Powhatan, VA 23139
804.897.1177 / 888.895.1177
Fax 804.897.0070
sanair.com

Microbiology
Chain of Custody
Form 68. Revision 7. 5/18/18

SanAir ID Number
18057552

Company: Mystic Air Quality	Project Number:	Phone #: 860-449-8905
Address: 1204 North Rd	Project Name: WHS	Phone #: 860-235-5501
City, State, Zip: Sprague, CT 06340	Date Collected: 12/11/18	Fax #:
Samples Collected By: David Goldstein	P.O. Number:	Email: Simbaabu@aol.com
Account #:		Email:

Sample Types		Analysis Types	Turn Around Time
AC	Air Cassette	A1 - Identification and Enumeration of Fungal spores, plus total dander, fiber, and pollen count	3/6/24/48 Hour
		A2 - Identification and Enumeration of Fungal spores only	3/6/24/48 Hour
T B S	Tape Bulk Swab	D1 - Direct Identification of Fungi	3/6/24/48 Hour
		D2 - Direct Identification of Mites, Insects, Pollen, etc.	3/6/24/48 Hour
		D3 – Direct Identification and Enumeration of Fungi	3/6/24/48 Hour
AP B S	Air Plate Bulk Swab	C1 - Culture Identification and Enumeration of Fungi only	5-10 Days
		C2 - Culture Identification and Enumeration of Bacteria only	2-4 Days
		C3 - Culture Identification and Enumeration of Fungi and Bacteria	5-10 Days
		C4 - Culture Identification and Enumeration of Thermophilic Bacteria with C2 or C3 analysis	2-4 or 5-10 Days
D	Dust	DA1 – Dust Mite Allergen Test	3/6/24/48 Hour

SanAir offers *Legionella* testing and other specialized culture analyses. Please call for details, COC and pricing.

Sample #	Sample Identification	Sample Type	Analysis Type(s)	Turn Around Time	Flow Rate (Liters/min)	Total Volume (L) or Area (in^2)	Time Start	Time Stop
2842026	Outside	AC	A2	5TO	15	75L	–	–
2842024	Nurses Office							
2842016	Media Center							
2842021	CAFE							
2842014	200 2nd Fl Main Office							
2842019	Home Outside 216							
2842015	Home Outside 321A							
2842020	Home 3rd Fl Stairs							
2842010	OLO GYM							
2842009	Field House Foyer							

Special Instructions

Relinquished by	Date	Time	Received by	Date	Time
David Goldstein	12/11/18	1230	[signature]	DEC 13 2018	1050

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST will be logged in the next business day. Weekend or holiday work must be scheduled ahead of time and is charged at 150% of the 3hr TAT or a minimum charge of $150. A courier charge will be applied for same day and one-day turnaround times for offsite work. SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.

Mystic Air Quality Consultants, Inc.

1204 North Road, Groton, Connecticut 06340 (860) 449-8903

AMBIENT AIR SAMPLE RESULTS

LOCATION: Waterford High School
Waterford, Connecticut

DATE: December 11, 2018

Typical Occupancy at the Time of Testing

SAMPLE LOCATION	H2S hydrogen sulfide ppm	CO2 carbon dioxide ppm Ave.	CO carbon monoxide ppm	O2 oxygen %	Total hydro-carbons ppm	Temperature F	Humidity %	Respirable Particulates mg/m3	% LEL Combustible Gases	Other
Nurses Office	<1	755	<1	20.9	<1	69	26	0.006	<1	-
Media Center	<1	890	<1	20.9	<1	69	26	0.010	<1	-
Cafe	<1	845	<1	20.9	<1	70	26	0.011	<1	-
2nd Floor Main Office	<1	750	<1	20.9	<1	68	26	0.009	<1	-
Room 321 A Hall	<1	710	<1	20.9	<1	70	27	0.009	<1	-
Room 216 Hall	<1	700	<1	20.9	<1	70	26	0.009	<1	-
3rd Fl. Stair 1 Hall	<1	680	<1	20.9	<1	70	26	0.009	<1	-
Old Gym	<1	645	<1	20.9	<1	68	26	0.009	<1	-
FH Foyer	<1	705	<1	20.9	<1	70	26	0.009	<1	-
Outside	-	410	-	-	-	-	-	-	-	
Standards	10 ppm OSHA	1110 ASH-RAE	50 ppm OSHA	19.5-23.5% OSHA	Various	68-75 Winter 73-84 Summer ASHRAE	30-60% ASH-RAE	5.0 mg/m3 OSHA	10% OSHA	-

Sampling Instrumentation: BWI Combustible Gas Meter and EVM Monitor

Industrial Hygienist: David Goldstein, MS, CIH