ESI Environmental Solutions, Inc.
Consulting, Testing and Project Management
6114 Drum Point Rd., Deale, MD 20751 | info@esi4u.com | 410-867-6262 | www.esi4u.com

Monday, January 07, 2019

Prince Georges County Public Schools
14201 School Lane, Room 130
Upper MarlboroMD20770

Ref: Dora Kennedy French Immersion School.

Dear Sam,

The results of the inspection and testing performed at **Dora Kennedy French Immersion School,** are concluded and the findings are enclosed. On December 19, 2018, the school was inspected for microbial contamination.

I want to thank you and Mr. Alex Baylor for allowing ESI to assist you with this project. I believe the environmental team of PGCPS now have a good system in place to remediate mold from the schools, as well as taking a proactive approach to reduce and or restrict mold from aggressively colonizing as it did in 2018.

ESI inspected 12 classroom and common hallways, and the samples in this report indicate elevated levels of indoor microbial hazards for only three of the classrooms tested. I believe the spore count was elevated due to the custodial staff sweeping the floors prior to the indoor air quality sampling. However, once the environmental team cleans the rooms as described in the protocol, the indoor air quality should be at a normal fungal ecology.

The enclosed report outlines my observations and recommendations based on the inspection and testing. The report includes personal protection recommendations, environmental controls, remediation recommendations, as well ESI's clearance requirements.
Next Steps:

1. Contact ESI with any questions you may have regarding our findings and recommendations.
2. *Note:* A copy of this report was sent to Alex Baylor per your request.
3. Make sure the remediation team understands the "Clearance Requirements." If they have any questions they may call us directly.
4. Contact ESI when the job is complete, so that we can schedule a Post Remediation Inspection as required.

I hope you found our service beneficial. If you have any questions or concerns, we are only a phone call away.

Respectfully,

Vinny Gigliotti (CIE)
Environmental Solutions, Inc.

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Remediation Protocol Report

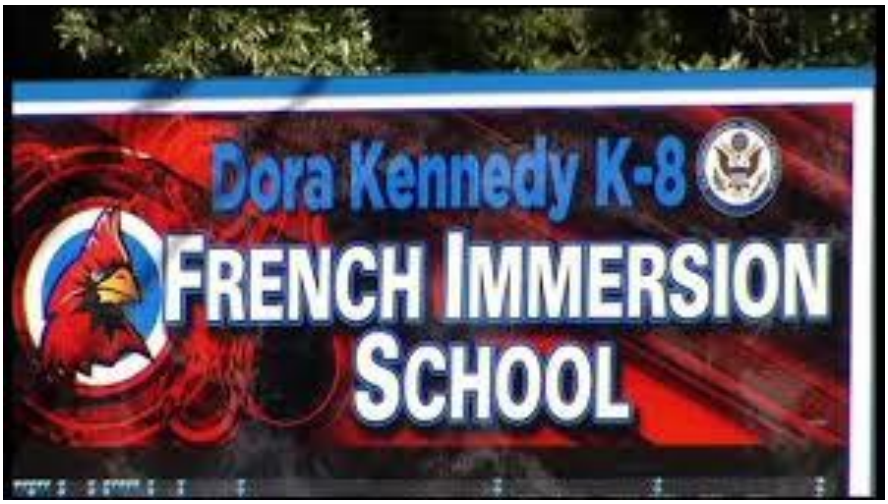
Project Contact Information

	Prince George's County Public Schools Sam Stefanelli 13300 Old Marlboro Pike, Trailer #5 Upper Marlboro, MD 20772 240-305-0795 sam.stefanelli@pgcps.org	

Property Location

Dora Kennedy French Immersion School 8950 Edmonston Road, Greenbelt, Md 20770

Date of Inspection – 12/19/2018



Prepared By: Vinny Gigliotti

Certified Indoor Environmentalist (CIE)

Background Information

ESI was engaged to perform an inspection and testing within Dora Kennedy French Immersion School. The purpose of this evaluation was to provide a visual assessment and microbial sampling to verify the presence or absence of mold growth. In addition, ESI will help determine the possible cause and effect of the suspected mold growth and or water intrusion.

Based on the observations and lab analysis, ESI has developed this Remediation Protocol outlining corrective action to alleviate possible health and environmental risks.

Executive Summary

During the inspection and testing of selected classrooms and common areas of the school, there were minimal amounts of surface mold detected. The classrooms that were inspected are as follows: Classrooms # 14, 15,16,17,20,21,22,29,11,121,201 and 208. Four of the twelve classrooms had surface mold, which are classrooms # 20, 22, 121, 208. The surface mold discovered was less than 6" in diameter and can simply be cleaned off the surface with antimicrobial sponge.
The furniture inspected appears to be relatively new and made of synthetic materials, which are not a food source for mold spores to colonize.

The ceiling tiles throughout the classrooms and common hallways were in good condition. During the inspection, I noticed a water stain in classroom 22 and 29. The rest of the classrooms did not have any visible water stains during the time of the inspection.

You will find our instrument readings for the specific location inspected. Based upon the general condition of the school and our inspection and testing, we are developing room specific recommendations in addition to general remediation recommendations for other areas of the school.

Indoor air samples and an outdoor control sample of microbial and particulate matter were collected to be analyzed by an independent laboratory. The dominate species found in the indoor air quality test was Aspergillus / Penicillium. Three classrooms had elevated levels of mold spores: classroom # 20, 22 and 121. These three classrooms were swept and vacuumed shortly before I conducted the indoor air quality test and I believe that is why the spore count was elevated compared to the other classrooms.

The continuation of good housekeeping, preventative maintenance, and a seasonal microbial cleaning of this school, should reduce the ubiquitous mold spores from aggressively colonizing in the future.

Observations of Inspected Areas

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Room 14			18%	71	631	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Room 15			20%	71	618	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Room 16			22%	73	712	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Room 17			19%	71	601	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
20	2393608		34	64	621			
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	YES	NO	NO	NO	NO
Observation Notes								
• There were MINIMAL signs of mold growth under the tables. • The indoor air quality test indicated elevated levels of Aspergillus / Penicillium at 22,360 spores per cubic meter of air.								
Special Requirements								
• This classroom will need to have all the horizontal surfaces cleaned with an antimicrobial to remove any settled spores. • Engage two HEPA filtered air scrubbers that circulate 1,000 CMF for 24 hours.								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
21	2393628		27	63	457	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	YES	NO	NO	NO
Observation Notes								
• There were MINIMAL signs of mold growth on the side of the wooden cabinet								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
22	2393607		24%	70	491	000		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
YES	NO	YES	NO	NO	NO	NO	NO	NO
Observation Notes								
• One water stained ceiling tile approximately 12" in diameter above a light fixture • Visible microbial growth under the teacher's desk • The CMU walls are retaining moisture between 75-99% moisture content. This is due to vapor diffusion through CMU walls. • The indoor air quality test indicated elevated levels of Aspergillus / Penicillium at 16,120 spores per cubic meter of air.								
Special Requirements								
• This classroom will need to have all the horizontal surfaces cleaned with an antimicrobial to remove any settled spores. • Engage two HEPA filtered air scrubbers that circulate 1,000 CMF for 24 hours.								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
29	2393617		21%	70	567	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
YES	NO	NO	NO	NO	NO	NO	YES	NO
Observation Notes								
• There was one small water stain approximately 3" in diameter • The HVAC fins on the convector had microbial growth on them.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
117	2393620		26%	68	678	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
121	2393630		27%	68	502	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	YES	NO	NO	NO	NO
Observation Notes								
• The desks in this classroom were relatively new and constructed out of synthetic material that would not harbor mold growth. • There was one black desk with a minimal amount of microbial growth underneath of it. This minimal amount of microbial growth can simply be wiped off with an antimicrobial sponge.								
Special Requirements								
NONE								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
201	2393619		28%	70	1104	001		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	NO	NO
Observation Notes								
• This room did not show any signs of water intrusion or mold growth. It was clean and neat, with little to no dust and debris that would harbor mold spores. • The Carbon Dioxide level in the classroom was leveled at 1104 ppm. Carbon Dioxide levels between 1,000-2,000 ppm, may cause drowsiness.								
Special Requirements								
NONE. There is nothing you can do to reduce the carbon dioxide, except reduce and or eliminate emission from entering this classroom.								

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
208	2393629		22%	80	900	002		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	YES	NO
Observation Notes								
• The desks in this classroom were relatively new and constructed out of synthetic material that would not harbor mold growth. • The window A/C unit had visible microbial growth on the fins, which can simply be wiped clean with an antimicrobial sponge.								
Special Requirements								
NONE								

Non-Viable Air Sampling/Results

Air samples are collected via Micro-5 or Air-o-Cell bio-aerosol cassettes. After five-minute sampling periods, the impacted samples are sealed and void of all ambient light. The samples are sealed, labeled and delivered to the laboratory within twenty-four hours. The third-party laboratory lab analysis provides qualitative and quantitative results for airborne mold spores.

The attached Spore Trap Analysis indicate the presence or absence of mold spore with the locations tested. The dominate genera detected in the breathable air space was Aspergillus / Penicillium.

Below you will notice Organisms, which is the genera detected both indoors and/or outdoors (control sample). The Raw Count is the actual number of spores counted on the slide and the Count/M^3 are the spores per cubic meter of air. The % of Total is calculated by the percentage of total spores on the slide to more easily differentiate the dominant genera in the breathable air space.

Name: Environmental Solutions, Inc
Address: 534-A Deale Road
Deale, MD 20751
Phone: 410-867-6262

Project Number: 8950
P.O. Number: VJA
Project Name: Dora Kennedy
Collected Date: 12/19/2018
Received Date: 12/21/2018 11:25:00 AM

SanAir ID Number
18058794
FINAL REPORT
12/21/2018 5:38:06 PM

Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18058794-001			18058794-002			18058794-003			18058794-004		
Analysis Using STL	107C			107C			107C			107C		
Sample Number	2393609			2393628			2393607			2393617		
Sample Identification	Room 20			Room 21			Room 22			Room 29		
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5		
Volume	25 Liters			25 Liters			25 Liters			25 Liters		
Analytical Sensitivity	40 Count/M³			40 Count/M³			40 Count/M³			40 Count/M³		
Background Density	2			2			2			2		
Other												
Aspergillus Conidiophore												
Dander	20	800	n/a	17	680	n/a	21	840	n/a	30	1200	n/a
Fibers				1	40	n/a	2	80	n/a			
Mycelial Fragments										1	40	n/a
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Ascospores												
Aspergillus/Penicillium	559	22360	99	7	280	41	403	16120	>99	5	200	28
Basidiospores	4	160	< 1	10	400	59	2	80	< 1	13	520	72
Cladosporium species	3	120	< 1				1	40	< 1			
Epicoccum species												
Pithomyces species												
Smuts/Myxomycetes							1	40	< 1			
Stachybotrys species												
TOTAL	**566**	**22640**		**17**	**680**		**407**	**16280**		**18**	**720**	

Signature: Date: 12/21/2018 Reviewed: Date: 12/21/2018

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12/21/2018 5:38:06 PM

Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18058794-005			18058794-006			18058794-007			18058794-008		
Analysis Using STL	107C			107C			107C			107C		
Sample Number	2393620			2393630			2393619			2393629		
Sample Identification	Room 117			Room 121			Room 201			Room 208		
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5		
Volume	25 Liters			25 Liters			25 Liters			25 Liters		
Analytical Sensitivity	40 Count/M³			40 Count/M³			40 Count/M³			40 Count/M³		
Background Density	2			3			2			2		
Other										**Raw Count**	**Count/M³**	**%**
Aspergillus Conidiophore										1	40	n/a
Dander	41	1640	n/a	43	1720	n/a	28	1120	n/a	25	1000	n/a
Fibers	4	160	n/a	4	160	n/a	1	40	n/a			
Mycelial Fragments												
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Ascospores							1	40	11			
Aspergillus/Penicillium	11	440	22	107	4280	91	2	80	22	7	280	32
Basidiospores	25	1000	51	5	200	4	5	200	56	12	480	55
Cladosporium species	8	320	16	2	80	2	1	40	11	3	120	14
Epicoccum species	1	40	2	1	40	< 1						
Pithomyces species				1	40	< 1						
Smuts/Myxomycetes	4	160	8	1	40	< 1						
Stachybotrys species				1	40	< 1						
TOTAL	**49**	**1960**		**118**	**4720**		**9**	**360**		**22**	**880**	

Signature: Date: 12/21/2018 Reviewed: Date: 12/21/2018

SanAir Technologies Laboratory

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Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18058794-009		
Analysis Using STL	107C		
Sample Number	2393645		
Sample Identification	Control Sample VJG		
Sample Type	Air Cassette - Micro-5		
Volume	25 Liters		
Analytical Sensitivity	40 Count/M^3		
Background Density	2		
Other			
Aspergillus Conidiophore			
Dander	55	2200	n/a
Fibers	4	160	n/a
Mycelial Fragments	1	40	n/a
Fungal Identification	**Raw Count**	**Count/M^3**	**%**
Ascospores			
Aspergillus/Penicillium	5	200	45
Basidiospores	3	120	27
Cladosporium species	1	40	9
Epicoccum species			
Pithomyces species			
Smuts/Myxomycetes			
Stachybotrys species	2	80	18
TOTAL	**11**	**440**	

Signature: Date: 12/21/2018 Reviewed: Date: 12/21/2018

Direct Identification Lab Results

Results for the direct identification analysis describe the amount of evidence indicating possible fungal growth. The presence of associated mycelial fragments and conidiophores help the analyst to determine which description to use: rare, light, moderate, or heavy. Please refer to the following table for interpretation of direct identification results.

Estimated Amount	Indication of Growth	Evidence of Mycelial Fragments / Conidiophores
Rare	Not Likely	None
Light	Possible	Some, 10 to 25% of Covered
Moderate	Probable	Abundant, 25 to 50% of Covered
Heavy	Significant	Throughout, 50 to 100% of Covered

The Direct Identification Analysis indicates the presence of: Aspergillus / Penicillium.

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Collected Date: 12/19/2018
Received Date: 12/21/2018 11:25:00 AM

Analyst: Shepperson, Josh

Direct Identification Analysis

SanAir ID: 18058794-010 Sample #:1 Room 20 Under Desk

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
No Fungi Detected	

SanAir ID: 18058794-011 Sample #:2 Room 22 Under Table

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
No Fungi Detected	

SanAir ID: 18058794-012 Sample #:3 Room 121 Under Table

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
Aspergillus/Penicillium	Rare

Estimated Amount	Indication of Growth	Evidence of Mycelial Fragments/Conidiophores
Rare	Not Likely	None
Light	Possible	Some, 10 to 25% of Tape Covered
Moderate	Probable	Abundant, 25 to 50% of Tape Covered
Heavy	Significant	Throughout, 50 to 100% of Tape Covered

*Refer to additional information page for further details

Signature: Joshua Shepperson
Date: 12/21/2018

Reviewed: Johnathan Wilson
Date: 12/21/2018

SanAir Technologies Laboratory

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Organism Descriptions

The descriptions of the organisms presented are derived from various reference materials. The laboratory report is based on the data derived from the samples submitted and no interpretation of the data, as to potential, or actual, health effects resulting from exposure to the numbers of organisms found, can be made by laboratory personnel. Any interpretation of the potential health effects of the presence of this organism must be made by qualified professional personnel with first hand knowledge of the sample site, and the problems associated with that site.

Aspergillus Conidiophore - The conidiophore is the reproductive structure on which conidia (or spores) develop.

Dander - Comprised of human and/or animal skin cells. Counts may be higher in carpeted rooms and in rooms with more traffic.
Health Effects: May cause allergies.

Fibers - This category can include clothing, carpet, and insulation fibers.

Mycelial Fragments - A mycelium (plural = mycelia) is the "body" of a fungus. It is a collective term for hyphae (singular = hypha), which are the tubular units of the mycelium usually composed of chitin. The terms hyphae and mycelial fragments are used interchangeably. [This information was referenced from the mycology text "The Fifth Kingdom"]In some cases a fungal identification cannot be obtained due to lack of sporulation. Only the mycelial fragments are present, and cannot be identified without the distinguishing characteristics of the spores or the structures they grow from.
Health Effects: Allergic reactions may occur in the presence of spores (conidia) or mycelial/hyphal fragments.

Ascospores - From the fungal Subphylum Ascomycotina. Ascospores are ubiquitous in nature and are commonly found in the outdoor environment. This class contains the "sac fungi" and yeasts. Some ascospores can be identified by spore morphology, however; some care should be excercised with regard to specific identification. They are identified on tape lifts and non-viable analysis by the fact that they have no attachment scars and are sometimes enclosed in sheaths with or without sacs. Ascomycetes may develop both sexual and asexual stages. Rain and high humidity may help asci to release, and dispurse ascospores, which is why during these weather conditions there is a great increase in counts.
Health Effects: This group contains possible allergens.

Aspergillus/Penicillium - These spores are easily aerosolized. Only through the visualization of reproductive structures can the genera be distinguished. Also included in this group are the spores of the genera Acremonium, Phialophora, Verticillium, Paecilomyces, etc. Small, round spores of this group lack the necessary distinguishing characteristics when seen on non-viable examination.
Health Effects: Can cause a variety of symptoms including allergic reactions. Most symptoms occur if the individual is immunocompromised in some way (HIV, cancer, etc). Both Penicillium and Aspergillus spores share similar morphology on non-viable analysis and therefore are lumped together into the same group.

Basidiospores - From the Subphylum Basidiomycotina which contains the mushrooms, shelf fungi, and a variety of other macrofungi. They are saprophytes, ectomycorrhizal fungi or agents of wood rot, which may destroy the structure wood of buildings. It is extremely difficult to identify a specific genera of mushrooms by using standard culture plate techniques. Some basidiomycete spores can be identified by spore morphology; however, some care should be exercised with regard to specific identification. The release of basidiospores is dependant upon moisture, and they are dispersed by wind.
Health Effects: Many have the potential to produce a variety of toxins. Members of this group may trigger Type I and III fungal hypersensitivity reactions. Rarely reported as opportunistic pathogens.

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Cladosporium species - The most commonly identified outdoor fungus. The outdoor numbers are reduced in the winter and are often high in the summer. Often found indoors in numbers less than outdoor numbers. It is commonly found on the surface of fiberglass duct liner in the interior of supply ducts. A wide variety of plants are food sources for this fungus. It is found on dead plants, woody plants, food, straw, soil, paint and textiles. Often found in dirty refrigerators and especially in reservoirs where condensation is collected, on moist window frames it can easily be seen covering the whole painted area with a velvety olive green layer.
Health Effects: It is a common allergen. It can cause mycosis. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema. Illnesses caused by this genus can include phaeohyphomycosis, chromoblastomycosis, hay fever and common allergies.
References: Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

Epicoccum species - It is found in plants, soil, grains, textiles, and paper products. Frequently isolated from air and occasionally occurs in house dust. Is a saprophyte and considered a weakly parasitic secondary invader of plants, moldy paper and textiles. Epicoccum is usually isolated with either Cladosporium species or Aureobasidium species.
Health Effects: A common allergen. It also has the potential to produce type I fungal hypersensitivity reactions.
References: Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

Pithomyces species - Grows on dead grass in pastures and decaying plant material.
Health Effects: Causes facial eczema in ruminants.
References: St-Germain, Guy, and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Co., 1996.

Smuts/Myxomycetes - Smuts and Myxomycetes are parasitic plant pathogens. They are typically grouped together due to their association with plants, the outdoors and because they share similar microscopic morphology.
Health Effects: Can produce type I fungal hypersensitivity reactions.
References: Martin, G.W., C.J. Alexopoulos, and M.L. Farr. The Genera of Myxomycetes. Iowa City, Iowa: University of Iowa Press, 1983.

Stachybotrys species - This organism is rarely found in outdoor samples. It is usually difficult to find in indoor air samples unless it is physically disturbed because the spores are in a gelatinous mass. Grows well on wet media, preferably containing cellulose. It proliferates in the indoor environment with long term water damage, growing on wallpaper, gypsum board, and textiles. As a general rule, air cultures for Stachybotrys yields unpredictable results, mainly due to the fact that this fungus is usually accompanied by other fungi such as Aspergillus and Penicillium that normally are better aerosolized than Stachybotrys. This is a slow growing fungus on media. It does not compete well with other rapidly growing fungi. The black fungi grow on building material with high cellulose content and low nitrogen content. Appropriate media for the growth of this organism will have high cellulose content and low nitrogen content.
Health Effects: It has worldwide distribution and has been reported to cause dermatitis, cough, rhinitis, and headache, although no definitive reports of human infections have been verified. It has the ability to cause type I hypersensitivity. It is a documented mycotoxin producer.
References: Flannigan, Brian, Robert A. Samson, and J. David Miller, eds. Microorganisms in Home and Indoor Work Environments: Diversity, Health Impacts, Investigation, and Control. London and New York: Taylor & Francis, 2001.

Carbon Monoxide Thresholds

Carbon monoxide sampling is performed using a Pyle PCM005 Carbon Monoxide Meter. Carbon monoxide (CO) is a colorless, odorless, tasteless, and toxic air pollutant, which is produced in the incomplete combustion of carbon-containing fuels, such as gasoline, natural gas, oil, coal, and wood. Please refer to the outline below for exposure to carbon monoxide.

9 ppm	CO Max prolonged exposure (ASHRAE standard)
35 ppm	CO Max exposure for 8-hour work day (OSHA)
800 ppm	CO Death within 2 to 3 hours
12,800 ppm	CO Death within 1 to 3 minutes

Carbon Dioxide Thresholds

Carbon dioxide sampling is performed using an AZ-7755 Carbon Dioxide Detector. Carbon dioxide (CO2) is a heavy colorless gas CO_2 that does not support combustion, dissolves in water to form carbonic acid, is formed especially in animal respiration and in the decay or combustion of animal and vegetable matter, is absorbed from the air by plants in photosynthesis, and is used in the carbonation of beverages. Please refer to the outline below for exposure to carbon dioxide.

250-350 ppm	Normal background concentration in outdoor ambient air
350-1,000 ppm	Concentrations typical of occupied indoor spaces with good air exchange
1,000-2,000 ppm	Complaints of drowsiness and poor air.
2,000-5,000 ppm	Headaches, sleepiness and stagnant, stale, stuffy air. Poor concentration, loss of attention, increased heart rate and slight nausea may also be present.
5,000 ppm	Workplace exposure limit (as 8-hour TWA) in most jurisdictions.
> 40,000 ppm	Exposure may lead to serious oxygen deprivation resulting in permanent brain damage, coma, even death.

Recommended Personal Protection Equipment (PPE)

The following procedures are recommended:

When it is time to begin mold remediation, require that all occupants leave the remediation area, *this means the contained areas and egress areas,* during the actual work performance. The occupants are not to return until the mold remediation is completed. The reason for this precaution is that the very removal of contaminated building materials puts an even greater number of mold spores into the breathable air space, causing potential health harm to the occupants of that space if they were present during mold remediation.

Personnel responsible for remediation should have received training on the proper clean-up methods, personal protection, and potential health hazards for microbiological organisms.

Respiratory protection should be in accordance with the Occupational Safety and Health Association (OSHA) Respiratory Protection Standard (29 CFR 1910.134). In addition, gloves and eye protection should also be used.

All mold remediation workers need to be protected by personal protective gear always when working inside the impacted areas. Personal protective gear should include ALL the following:

1. One-piece facemask to protect worker's eyes from mold spores and to filter out mold spores from being breathed in through nose and mouth with air respirator utilizing air filter cartridges with a minimum NIOSH rating of N-95.
2. Tyvek or comparable one-piece body suit with head cover (hood).
3. Tyvek or comparable booties to cover shoes, sock, and feet.
4. Rubber gloves.
5. Ear plugs.

No food or drink can be present in, or consumed inside, the contained remediation areas. Mold spores can be ingested into the body by food and drink being contaminated by airborne mold spores.

Even though protected by the personal protective gear detailed above, any workers with open wounds or sores should have such wound/sores totally covered with plastic coated bandages/dressing. Mold spores can enter the body through open wounds and sores.

Remediation Recommendations

Remediation recommendations for Dora Kennedy French immersion School are as follows:

Due to the health concerns, before any antimicrobials, detergents or chemicals are introduced into this environment, an SDS detailing such agents must be provided to the client and posted near the entrance of each Classroom and Common Area in which microbial cleaning is being performed.

Contractors and the workforce conducting the services below should **READ AND FOLLOW THE ENTIRE PROTOCOL** to assist them in a successful remediation effort. Owners or authorized personnel must grant ESI permission to discuss the contents of this protocol with anyone other than employed service providers.

Negative Air Pressure Differential:

PLEASE NOTE: It is the responsibility of the remediation contractor to monitor and maintain the negative air pressure. Negative air pressure can be measured using a manometer.

1. Engage a HEPA filtered Air Filtration Device (AFD) in the Classrooms and Common Areas in which microbial cleaning is being performed. The exhaust tube should vent outside through the nearest window or door to create a minimum of 5 Pascals of negative air pressure.

Content Instructions:

All contents and/or furnishings with microbial growth and/or accumulations of dust should be cleaned and sanitized. General microbial cleaning includes the following:

1. When HEPA vacuuming microbial growth and/or accumulations of dust, use a bristle brush attachment.
2. When damp-wiping surfaces, use a soft cloth dampened with an EPA registered botanical solution such as Benefect or equivalent. Allow treated surface to dry. Use a new cloth for each piece of furniture and/or item. Do not reuse cloths, which will inevitably spread mold spores.
3. Re-HEPA vacuum surfaces with a clean bristle brush.

FURNITURE	
Item(s)	Suggested Cleaning Procedures
Upholstered teacher's chairs Seat cushions Seat covers	If the furniture has removable cushions, remove each cushion and HEPA vacuum all sides, as well as all surfaces of the furniture. If the cushions are not removable, HEPA vacuum all surfaces, paying careful attention to the frame/mechanisms and all crevices between the cushions and frame. Damp-wipe all surfaces with Benefect or equivalent. Re-HEPA vacuum surfaces with a clean bristle brush.
Wood "U-shaped" tables Steel/wood round tables Steel/wood rectangular tables Wood rocking chairs Steel/wood student desks Steel/high-density polyethylene student chairs Bookshelves and metal shelving Cabinets Push-carts	Remove contents to ensure cleaning of all surfaces. HEPA vacuum all surfaces. Pay careful attention to the underside of the tables, desks, and chairs. Damp-wipe all surfaces with Benefect or equivalent. Re-HEPA vacuum surfaces with a clean bristle brush.
ELECTRONICS, ETC.	
Item(s)	Suggested Cleaning Procedures
Televisions Computer monitors Projectors	Unplug. HEPA vacuum the exterior of all electronics. Damp-wipe housing with Benefect or equivalent. Re-HEPA vacuum exterior surfaces with clean bristle brush.
Pull down projector screens Pull down maps	HEPA vacuum surfaces of spring holder and screen/map holder. Damp wipe with Benefect or equivalent.
Loud speakers	Speaker covers should be HEPA vacuumed then removed to allow access to the speaker itself. Speaker cabinet should be HEPA vacuumed, damp-wiped, then re-HEPA vacuumed. Carefully wet-wipe the speaker itself.
VCR DVD	Unplug. HEPA vacuum, damp-wipe, then re-HEPA vacuum the exterior surfaces.

Ceiling Tile Instructions:

The water damaged acoustic ceiling tiles should be removed and discarded. ESI recommends placing the ceiling tiles into black contractor bags upon removal.

Any additional water damaged ceiling tiles should be removed as needed. Once the acoustic ceiling tiles are removed and the ceiling cavities are exposed, remove any contaminated or water damaged cellulosic materials not noted or detected during the initial inspection. In addition, seal the insulation joints on the plumbing lines to prevent condensation within the ceiling cavities.

Central Air Duct System and HVAC Convector Units - Cleaning and Sanitizing Process:

ESI recommends the ventilation systems be cleaned to remove accumulations of dust and debris. The systems can also be sanitized with an EPA registered botanical solution such as Benefect, or equivalent. This includes the central air duct systems and HVAC convector units.

Air Scrubbing:

***PLEASE NOTE*:** All negative air filtration should be disengaged and air filtration devices (AFDs) should be engaged in circulation mode.

1. Engage a minimum 1,000 CFM HEPA filtered AFD in each Classroom and/or Common Area in which microbial cleaning is being performed to accomplish a minimum of 8-12 air changes per hour.

Final Cleaning of Remediated and Impacted Areas:

1. Prior to final clearance test, cover and seal airtight all the equipment filters and/or remove them from the project no less than four and no more than 72 hours prior to clearance inspection.
2. Fogging of each Classroom and/or Common Area is recommended with an EPA registered botanical solution such as Benefect, or equivalent.
3. Wait approximately 2-3 hours after the fogging for particulates to settle, then damp wipe and towel dry all non-porous horizontal surfaces. This also includes wet-mopping the floor tiles.

Any contractor applying chemicals should follow manufactures dilution instruction and a SDS must be posted. This includes products such as: FOSTERS 40-20, Fiberlock/IAQ products, Benefect, LYSOL, MICROBAN, as well as other disinfectants and deodorizers.

ESI has included further instruction in the Clearance Requirements and Clearance Checklist below, to assist you in a successful remediation attempt, and to reduce the risk of any cross contamination of microbial hazards.

Post Remediation Clearance Requirements

ESI clearance verification requirements are based on experience from hundreds of projects annually and sources, including the AIHA, EPA, NYG, ACGIH and IICRC S500/S520 and on professional judgment on a case by case basis. The following requirements include the remediation and possible affected areas.

Scheduled clearance testing should be coordinated by the contractor or responsible party of the remediation project within 72 hours of completion. The HEPA filtered air scrubbers should be disengaged and sealed at least four hours prior to inspection, preferably not to exceed 72 hours prior. Ensure that the air has been changed at least 8-12 times before scheduling air sampling.

The ventilation systems should be operating properly during the IAQ testing.

Visual Inspection

1. No visible microbial growth shall be evident. (Effective Source Removal)
2. No significant visible dust shall be evident. (Effective HEPA vacuum)
3. No significant odors shall be evident. (MVOCs and VOCs)

Air Sampling

Typical Indoor Mold Spore Concentration - According to the EAA (Environmental Analysis Associates)

Description	Spores/Cubic Meter	Predominant Types
"Clean" building	less than 2,000	Total for all spore types
	less than 1,000	Penicillium, Aspergillus
Possible Indoor Amplification	1,000 - 5,000	Penicillium, Aspergillus, Cladosporium
Indoor Amplification likely	5,000 - 10,000	Penicillium, Aspergillus, Cladosporium
Chronic Indoor Amplification	10,000 - 500,000	Penicillium, Aspergillus, Cladosporium
Inadequate flood cleanup or indoor demolition of surfaces	50,000 - 10,000,000	Penicillium, Aspergillus, Stachybotrys, Cladosporium, Chaetomium, Basiomycetes Tricoderma, Ulocladium, etc.

Everyone breathes in thousands of mold spores daily in all environments. ESI uses the air quality of the outside as a baseline sample to support or test hypotheses of contamination and remediation issues. Above all, the visual and olfactory observations of an indoor environmental professional are paramount and may supersede any questionable sampling results.

“The ultimate criteria for the adequacy of abatement efforts for treating microbial and/or biological contaminations, is the ability of people to occupy or re-occupy the space without health complaints or physical discomfort". (ACGIH 15-5 Judging Remediation Effectiveness)

Industry References

Since the 1993 New York City Department of Health (NYCDOH) document (Assessment and remediation of *Stachybotrys Atra* in Indoor Environments) was produced, several other guidance documents have been written. This report was developed in accordance with and including:

- *Fungal Contamination in Buildings: A Guide to Recognition and Management* (Health Canada, 1995).
- *Control of Moisture Problems Affecting Biological Indoor Air Quality* (Flannigan and Morey, 1996).
- *Bioaerosols: Assessment and Control* (American Conference of Government Industrial Hygienists [ACGIH], 1999).
- *Guidelines on Assessment and Remediation of Fungi in Indoor Environments* (NYCDOH, 2000). [external link]
- *Mold Remediation in Schools and Commercial Buildings* (U.S. EPA, 2001).
- *Report of the Microbial Growth Task Force* (The American Industrial Hygiene Association, 2001).
- *Fungal Contamination: A manual for investigation, remediation and control (BECi) 2005*.
- *29 CFR 1910, Occupational Safety and Health Standards for General Industry, U.S. Department of Labor*
- Institute of Inspection, Cleaning and Restoration Certification Standard IICRC S520 *29 CFR 1926, Occupational Safety and Health Standards for the Construction Industry*, U.S. Department of Labor
- *40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP), U.S. Environmental Protection Agency*
- *ACR 2006, Assessment, Cleaning and Restoration of HVAC Systems, National Air Duct Cleaners Association, 2006**
- *ASHRAE Standards 62.1 or 62.2*
- *ASTM D-1653, Standard Test Methods for Water Vapor Transmission of Organic Coating Films*
- *Bioaerosols: Assessment and Control*, American Conference of Governmental Industrial Hygienists, 1999
- *Field Guide for Determination of Biological Contaminants in Environmental Samples, American Industrial Hygiene Association, 2005*
- *A Guide for Mold Remediation in Schools and Commercial Buildings, US Environmental Protection Agency, 2001 Protecting the Built Environment: Cleaning for Health, Michael A. Berry Ph.D., 1993*
- *IICRC S100 Standard and Reference Guide for Professional Carpet Cleaning, Fourth Edition, Institute of Inspection, Cleaning and Restoration Certification, (S100)**
- *IICRC S300 Standard and Reference Guide for Professional Upholstery Cleaning, First Edition, Institute of Inspection, Cleaning and Restoration Certification, (S300)**
- *ANSI/IICRC S500 Standard and Reference Guide for Professional Water Damage Restoration, Third Edition, Institute of Inspection, Cleaning and Restoration Certification, (S500)**

Limitations and Exclusions

All the professional opinions presented in this report are based solely on the scope of work conducted and sources referred to in our report. The data presented by ESI in this report was collected and analyzed using generally accepted industry methods and practices at the time the report was generated. This report represents the conditions, locations and material that were observed at the time the fieldwork was conducted. The scope of work for this project did not include an assessment of other environmental conditions which might exist on the property. No inferences regarding other conditions, locations or materials at a later or earlier time may be made based on the contact of this report. No warranty is made. ESI liability and that of its contractors and subcontractors, arising from any services rendered hereunder, shall not exceed the total fee paid by the client to ESI. This report was prepared for the sole use of our client. The use of this report by anyone other than our client or ESI is strictly prohibited without the expressed written consent of ESI. Portions of this report may not be used independently of the entire report.