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, December 10, 2018

Sam Stefanelli
Prince George's County Public Schools
13300 Old Marlboro Pike, Trailer #5
Upper MarlboroMD
sam.stefanelli@pgcps.org

Ref: Pointe Ridge Elementary School

Dear Sam,

The results of the inspection and testing performed at **Pointer Ridge Elementary School** are concluded and the findings are enclosed. I want to thank you for allowing me the opportunity to service your needs.

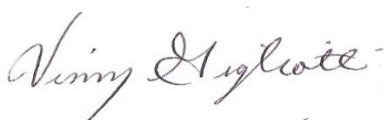
On 11/27/2018, Pointer Ridge Elementary School was inspected for water intrusion and microbial contamination. The enclosed report outlines my observations and recommendations based on my inspection and testing. The report includes personal protection recommendations, environmental controls, remediation recommendations, as well ESI's clearance requirements.

Next Steps:

1. Contact ESI with any questions you may have regarding our findings and recommendations.
2. Choose a remediation contractor and share this report with them. *Note:* A copy of this report was sent to Alex Baylor per your request.
3. Make sure the remediation contractor 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.
5. Do not breach the containment for any reason as this may affect the testing.

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.

ESI Environmental Solutions, Inc.
Consulting, Testing and Project Management

Ph: 410-867-6262 / Fax: 410-867-6333 / 6114 Drum Point Road, Deale, MD 20751
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Remediation Protocol Report

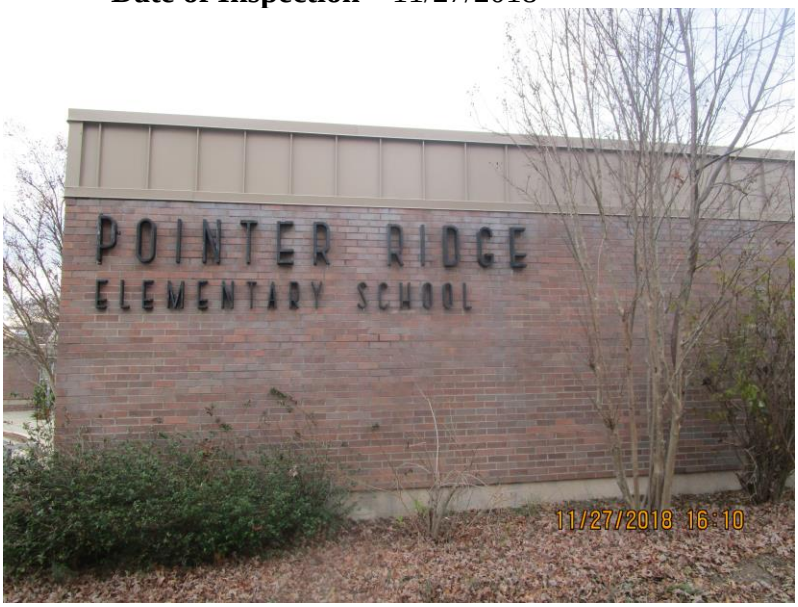
Project Contact Information

	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

Click or tap here to enter text.

Date of Inspection – 11/27/2018



Prepared By: Vinny Gigliotti

Certified Indoor Environmentalist (CIE)

Background Information

ESI was engaged to perform an inspection and testing within Pointer Ridge Elementary 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, ESI found surface mold in various areas of the classrooms and ceiling cavities.

The ceiling tiles throughout the classrooms and common hallways were in fair condition. Many of the horizontal surfaces were clean of dust and debris.

You will find our instrument readings for the specific locations 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 and Basidiospores, which are commonly found in indoor air sampling. The areas tested did NOT have any elevated levels of mold spores that would pose any health or environmental risk.

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	
Classroom 6 wing 1	2358316		20.9	65.1	495	000		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teacher's Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	NO	NO	NO	NO	YES	NO

Observation Notes

- The ceiling tiles are in good condition. Visible microbial growth was on the HVAC diffusers.
- The sheetrock wall to the right of the classroom had a 3% moisture content with no visible mold.
- No visible microbial growth was found on or under the tables, desks or cabinetry.
- The base cove is delaminating from the wall but there are no signs of visible microbial growth.
- The carpet, books, and contents appear to be clean of visible microbial growth.

Special Requirements

In addition to the general remediation requirements, the following is recommended.

- The ventilation systems should 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, as recommended in the remediation section of this protocol.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Classroom 3 wing 3	2358328		20.5	66.4	627	000		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teacher's Desk	Children's chairs	Tables	Cabinets Shelving	Books	HVAC	Window
NO	NO	NO	YES	YES	YES	NO	YES	

Observation Notes

- Visible microbial growth was found under the U-shape and round tables.
- Ceiling tiles appeared in good condition with no signs of visible microbial growth or water stains.
- Minimal amounts of dust and debris were found on the HVAC diffusers.
- The sheetrock walls had and average moisture content of 5.5% and were clean of any microbial growth.
- No visible microbial growth was found on the student's desks, but several of the chairs showed signs of visible microbial growth on the sides and bottoms.
- The average moisture content found in the cinder-block walls was 33%.
- The cabinetry in this room was free of any visible microbial growth, but the sink cabinet was water damaged.

Special Requirements

In addition to the general remediation requirements, the following is recommended.

- Clean and encapsulate sink cabinetry.
- The children's blue plastic chairs should be washed with soap and water to remove mold spores.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Classroom 5 wing 3	2358329	U-Shape desk	24.9	76.4	794	000		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teacher's Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
YES	YES	NO	NO	YES	NO	NO		

Observation Notes

- Evidence of a previous steam leak was found along the back and right side of the classroom on the ceiling tiles.
- The exterior cinder-block wall has paint that is blistering.
- The average moisture content of the wall was 19.5%.
- The ceiling tile grids are rusted. The majority of the 2 by 2 ceiling tiles are in good shape with no signs of visible microbial growth or water damage.
- The children's desks, teacher's desk, and surrounding cabinetry do not have any signs of visible microbial growth.
- The convector grate in the right-hand corner of the classroom showed light amounts of visible microbial growth.
- The green bulletin board is water damaged and has visible microbial growth on the back side; this board should be removed.
- The U-shape table had minimal amounts of suspected mold spores underneath it.

Special Requirements

In addition to the general remediation requirements, the following is recommended.

- Remove and discard water damage and contaminated green bulletin boards.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other
Classroom 2 wing 5	2358330		24	63.1	420	000	

Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teacher's Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
Tectum flaking	NO	YES	N/A	YES	NO	NO	NO	NO

Observation Notes

- The 2 x 4 tectum ceiling tiles are dropping white particulates on top of all the horizontal surfaces.
- The HVAC diffusers are dispersing carbon black onto the ceiling tiles.
- Underneath 7 of the 12 computer tables, there are signs of visible microbial growth.
- The blue plastic chairs have minimal amounts of visible microbial growth on the sides.
- The cabinetry and shelving appear to be clean of visible microbial growth.

Special Requirements

In addition to the general remediation requirements, the following is recommended.

- The children's blue plastic chairs should be washed with soap and water to remove mold spores.

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other
Classroom 4 wing 4	2358331		19	73.4	425	000	

Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teacher's Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
YES	NO	NO	NO	NO	NO	NO	YES	NO

Observation Notes

- The 2x2' ceiling tiles are in good condition, except for two ceiling tiles behind the teacher's desk. Both ceiling tiles are water damaged and have visible microbial growth. This water damage is preexisting due to the condensation from this summer's heat and humidity.
- The green bulletin board next to the rear exit door is water damaged and contaminated.
- The convector defused fins have an accumulation of dust and debris.
- All of the five-foot tables and U-shape table did not have any signs of visible microbial growth.
- The books, bookshelves, and cabinetry also did not appear to have any signs of visible microbial growth.
- The HVAC return register is rusted.

Special Requirements

Location	IAQ Sample #	Swab	R/H	Temp	CO2	Co	Other	
Admin. office	2358314		19.6	72.1	472	000		
Visible Microbial Growth (VMG) Found								
Ceiling Tiles	Walls	Teachers Desk	Children's Desk	Tables	Cabinets Shelving	Books	HVAC	Window
Rusted	NO	NO	N/A	NO	NO	NO	Carbon Black	NO
Observation Notes								
• The ceiling tiles are in fair condition. The grid is sagging and rusted in areas. • Next to the cinder block column, there appears to be water damage and light mold growth. • The 3 desks did not appear to have any visible microbial growth. • The HVAC diffuser showed signs of previous condensation. They were likely stained yellow from the minerals in the water. • The copier room return and exhaust vents had a lot of carbon black on the fins. This is due to the toner from the copy machine.								
Special Requirements								

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 within the locations tested. The dominate genera detected in the breathable air space was Aspergillus / Penicillium at very low levels.

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: PGCPS
P.O. Number: VJG
Project Name: Pointer Ridge
Collected Date: 11/27/2018
Received Date: 11/29/2018 10:40:00 AM

SanAir ID Number
18055220
FINAL REPORT
11/30/2018 10:17:46 AM

Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18055220-001			18055220-002			18055220-003			18055220-004		
Analysis Using STL	107C			107C			107C			107C		
Sample Number	2358316			2358328			2358329			2358330		
Sample Identification	Classroom 6 - Wing 1			Classroom 3 - Wing 2			Classroom 5 - Wing 3			Classroom 2 - Wing 5		
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	1+			1+			1+			1+		
Other	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Dander	26	1040	n/a	23	920	n/a	8	320	n/a	6	240	n/a
Fibers	5	200	n/a	3	120	n/a	2	80	n/a	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	17	680	65	16	640	84				3	120	75
Basidiospores	7	280	27	3	120	16	1	40	50	1	40	25
Cladosporium species	2	80	8				1	40	50			
Epicoccum species												
Nigrospora species												
Smuts/Myxomycetes												
TOTAL	**26**	**1040**		**19**	**760**		**2**	**80**		**4**	**160**	

Signature: Date: 11/30/2018 Reviewed: Date: 11/30/2018

1551 Oakbridge Dr. Suite B, Powhatan, VA 23139 | 804.897.1177 | Fax: 804.897.0070 | www.SanAir.com | IAQ@SanAir.com

SanAir Technologies Laboratory

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Deale, MD 20751
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Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18055220-005			18055220-006			18055220-007		
Analysis Using STL	107C			107C			107C		
Sample Number	2358331			2358314			2358313		
Sample Identification	Classroom 4 - Wing 4			Administrative Office			Outside		
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5		
Volume	25 Liters			25 Liters			25 Liters		
Analytical Sensitivity	40 Count/M³			40 Count/M³			40 Count/M³		
Background Density	1+			1+			1+		
Other	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Dander	11	440	n/a	20	800	n/a	4	160	n/a
Fibers							1	40	n/a
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Ascospores							1	40	8
Aspergillus/Penicillium	1	40	50	7	280	64			
Basidiospores	1	40	50	2	80	18	6	240	50
Cladosporium species							4	160	33
Epicoccum species				1	40	9			
Nigrospora species							1	40	8
Smuts/Myxomycetes				1	40	9			
TOTAL	**2**	**80**		**11**	**440**		**12**	**480**	

Signature: Date: 11/30/2018 Reviewed: Date: 11/30/2018

1551 Oakbridge Dr. Suite B, Powhatan, VA 23139 | 804.897.1177 | Fax: 804.897.0070 | www.SanAir.com | IAQ@SanAir.com

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: Alternaria, Cladosporium and Smuts/Myxomycetes under the U-shape tables in class room #5.

SanAir Technologies Laboratory

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Analyst: Shepperson, Josh

Direct Identification Analysis

SanAir ID: 18055220-008 Sample #:Swab Room 5 U Shape Table

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
Alternaria species	Rare
Cladosporium species	Light
Smuts/Myxomycetes	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

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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.

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.

Alternaria species - This genus compromises a large number of saprobes and plant pathogens. It is one of the predominate airborne fungal spores indoor and outdoor. Outdoors it may be isolated from samples of soil, seeds, and plants. It is one of the more common fungi found in nature, extremely widespread and ubiquitous. Conidia are easily carried by the wind, with peak concentrations in the summer and early fall. It is commonly found in outdoor samples. It is often found in indoor environments, on drywall, ceiling tiles, in house dust, carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames.
Health Effects: In humans, it is recognized to cause type I and III allergic responses. Because of the large size of the spores, it can be deposited in the nose, mouth and upper respiratory tract, causing nasal septum infections. It has been known to cause Baker's asthma, farmer's lung, and hay fever. It has been associated with hypersensitivity pneumoniti, sinusitis, deratomycosis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
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.

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.

Nigrospora species - Has been isolated from air and soil samples. Usually found in plant material as a saprobe.
Health Effects: It has been associated with type I allergic responses. No reported cases of infection.
References: St-Germain, Guy and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Company., 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.

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

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-shape" 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 the exterior 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 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's 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 breaths 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)

Clearance Checklist

This checklist is designed for the remediation supervisor to cross check the items related to this job and ensure they are completed prior to scheduling a clearance test. If items are not completed, and the clearance test is scheduled and can/should not be performed, a site visit fee will be invoiced to the client and possibly back charged to the remediation contractor.

	Client Name:		**Contractor:**		
Site Observation					
□ **Visual Pass** □ **Visual Fail** □ **Clear to Close**		Yes	No	**COMMENTS:**	
1.	Was the moisture problem fixed?	☐	☐		
2.	Are SDS posted on site?	☐	☐		
3.	Is there any visible microbial growth present in the remediated areas?	☐	☐		
4.	Is the overall jobsite clean and free of any visible dust and debris?	☐	☐		
5.	Is there a presence of MVOC's or other odors?	☐	☐		
6.	Has all furniture and other contents been effective cleaned and sanitized?	☐	☐		
7.	Have all water damaged acoustic ceiling tiles been removed to their approximate measurements as recommended within the remediation protocol?	☐	☐		
8	Was all equipment turned off and all the equipment filters covered/sealed?	☐	☐		
9.	Were HEPA filter air scrubbers on site?	☐	☐		
10.	HVAC: Were all return & supply registers cleaned and sanitized with an anti-microbial solution?	☐	☐		
11.	HVAC: Were the filter(s) replace?	☐	☐		

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.

SanAir Technologies Laboratory

The Identification Specialists

Analysis Report prepared for Environmental Solutions, Inc

Report Date: 11/30/2018

Project Name: Pointer Ridge

Project #: PGCPS

SanAir ID#: 18055220

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SanAir Technologies Laboratory

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

Project Number: PGCPS
P.O. Number: VJG
Project Name: Pointer Ridge
Collected Date: 11/27/2018
Received Date: 11/29/2018 10:40:00 AM

SanAir ID Number
18055220
FINAL REPORT
11/30/2018 10:17:46 AM

Analyst: Shepperson, Josh

Air Cassette Analysis

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

SanAir ID Number	18055220-001			18055220-002			18055220-003			18055220-004		
Analysis Using STL	107C			107C			107C			107C		
Sample Number	2358316			2358328			2358329			2358330		
Sample Identification	Classroom 6 - Wing 1			Classroom 3 - Wing 2			Classroom 5 - Wing 3			Classroom 2 - Wing 5		
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/M^3			40 Count/M^3			40 Count/M^3			40 Count/M^3		
Background Density	1+			1+			1+			1+		
Other	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Dander	26	1040	n/a	23	920	n/a	8	320	n/a	6	240	n/a
Fibers	5	200	n/a	3	120	n/a	2	80	n/a	1	40	n/a
Fungal Identification	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**	**Raw Count**	**Count/M^3**	**%**
Ascospores												
Aspergillus/Penicillium	17	680	65	16	640	84				3	120	75
Basidiospores	7	280	27	3	120	16	1	40	50	1	40	25
Cladosporium species	2	80	8				1	40	50			
Epicoccum species												
Nigrospora species												
Smuts/Myxomycetes												
TOTAL	**26**	**1040**		**19**	**760**		**2**	**80**		**4**	**160**	

Signature: Date: 11/30/2018 Reviewed: Date: 11/30/2018

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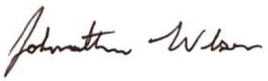
SanAir ID Number	18055220-005			18055220-006			18055220-007		
Analysis Using STL	107C			107C			107C		
Sample Number	2358331			2358314			2358313		
Sample Identification	Classroom 4 - Wing 4			Administrative Office			Outside		
Sample Type	Air Cassette - Micro-5			Air Cassette - Micro-5			Air Cassette - Micro-5		
Volume	25 Liters			25 Liters			25 Liters		
Analytical Sensitivity	40 Count/M³			40 Count/M³			40 Count/M³		
Background Density	1+			1+			1+		
Other	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Dander	11	440	n/a	20	800	n/a	4	160	n/a
Fibers							1	40	n/a
Fungal Identification	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**	**Raw Count**	**Count/M³**	**%**
Ascospores							1	40	8
Aspergillus/Penicillium	1	40	50	7	280	64			
Basidiospores	1	40	50	2	80	18	6	240	50
Cladosporium species							4	160	33
Epicoccum species				1	40	9			
Nigrospora species							1	40	8
Smuts/Myxomycetes				1	40	9			
TOTAL	**2**	**80**		**11**	**440**		**12**	**480**	

Signature:  Date: 11/30/2018

Reviewed:  Date: 11/30/2018

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Analyst: Shepperson, Josh

Direct Identification Analysis

SanAir ID: 18055220-008 Sample #:Swab Room 5 U Shape Table

D1 - Direct Identification Analysis on Surface Swab using STL 104

Direct ID of Mold

Fungi	Estimated Amount
Alternaria species	Rare
Cladosporium species	Light
Smuts/Myxomycetes	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

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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.

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.

Alternaria species - This genus compromises a large number of saprobes and plant pathogens. It is one of the predominate airborne fungal spores indoor and outdoor. Outdoors it may be isolated from samples of soil, seeds, and plants. It is one of the more common fungi found in nature, extremely widespread and ubiquitous. Conidia are easily carried by the wind, with peak concentrations in the summer and early fall. It is commonly found in outdoor samples. It is often found in indoor environments, on drywall, ceiling tiles, in house dust, carpets, textiles, and on horizontal surfaces in building interiors. Often found on window frames.
Health Effects: In humans, it is recognized to cause type I and III allergic responses. Because of the large size of the spores, it can be deposited in the nose, mouth and upper respiratory tract, causing nasal septum infections. It has been known to cause Baker's asthma, farmer's lung, and hay fever. It has been associated with hypersensitivity pneumoniti, sinusitis, deratomycosis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Common cause of extrinsic asthma (immediate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.
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.

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.

Nigrospora species - Has been isolated from air and soil samples. Usually found in plant material as a saprobe.
Health Effects: It has been associated with type I allergic responses. No reported cases of infection.
References: St-Germain, Guy and Richard Summerbell. Identifying Filamentous Fungi: A Clinical Laboratory Handbook. California: Star Publishing Company., 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.