INDOOR AIR QUALITY SURVEY

SAMPLING LOCATION:
West Creek Elementary School
400 Erford Road
Camp Hill, Pennsylvania

SAMPLING DATE:
August 3, 2017

PREPARED FOR:
Mr. Chad Reigle
East Pennsboro Area School District
890 Valley Street
Enola, Pennsylvania 17025

CALI PROJECT NUMBER:
17-1081-010

REPORT DATE:
August 7, 2017

Survey Performed By:

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Project Manager

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Executive Summary:

In August 2017, Cumberland Analytical Laboratories, Inc. (CALI) was contracted by the East Pennsboro Area School District to perform an Indoor Air Quality Survey at the West Creek Elementary School. This survey consisted of the collection of air samples for airborne fungal contaminants on August 3, 2017, by Richard E. Roush, CIAQM, Project Manager of Cumberland Analytical Laboratories, Inc.

Unusual Mold Expiations:

The results table listed below showed that **unusual mold conditions exist** in **3 of the samples**. Please refer to the individual sample results (Page 4, Page 5 and Page 6) for more detailed information regarding these individual samples.

Sample No.	Sample Location	Sample Type	Unusual Mold Conditions Exist
01	Hallway Outside Room 1	Mold Air	No
02	Room 01	Mold Air	No
03	Room 04	Mold Air	No
04	Hallway Outside Room 6	Mold Air	No
05	Room 06	Mold Air	No
06	**Room 010**	**Mold Air**	**Yes**
07	Outside Room 14	Mold Air	No
08	Room 26	Mold Air	No
09	Room 25	Mold Air	No
010	**Speech / Language**	**Mold Air**	**Yes**
011	**ELS English 2nd Floor**	**Mold Air**	**Yes**
012	Outside	Mold Air	N/A

Methods and Analysis – Air Sampling:

Particle air sampling techniques were used. Air samples were collected using a calibrated high volume-sampling pump and Allergenco D Cassettes. Sample analysis provided by Environmental Hazard Services, located in Richmond, Virginia.

The samples were packaged for proper shipment and delivered to EHS Laboratories an American Industrial Hygiene Association (AIHA) accredited laboratory located out of Richmond, Virginia. *While the results and information of this analysis are considered to be reliable, CALI assumes no responsibility for the accuracy of these results.*

Standards – Bacterial/Mold:

There are no current Permissible Exposure Levels or Safe Levels established by OSHA or NIOSH.

EPA has guidelines on mold remediation in schools yet no clearance levels have been established. Molds are a major source of indoor allergens. Molds can also trigger asthma. Even when dead or unable to grow, mold can cause health effects such as allergic reactions. The types and severity of health effects associated with exposure to mold depend, in part, on the type of mold present and the extent of the occupants' exposure and existing sensitivities or allergies. Prompt and effective remediation of moisture problems is essential to minimize potential mold exposures and their potential health effects.

Statistically, total spore counts are always significantly correlated with counts conducted on Agar Plate samples. On average, total mold spore to culturable mold ratios are in the range of 10:1. A concentration dominated by one genus such as Penicillium or Aspergillus even at 10,000 Particles/m^3 is unacceptable. Total levels should not exceed 2,000 Particles/m^3, and each individual count should not exceed 650 Particles/m^3. For remediation, a reduction of airborne spores based upon Pre and Post sampling, compared to exterior sample results, and *no evidence of mold* growth present is the goal.

Survey Results:

The result of the Non-Viable Spore Trap Sample collected on 08/03/2017, **showed that unusual mold condition exists in 3 of the samples (Sample #06, Sample #010 and Sample #011)**. Please refer to the individual sample results as listed on Page 4, Page 5 and Page 6 of this report, for more detailed information regarding this individual sample.

Recommendations:

It is recommended that to lower the total spore counts in this area, good housekeeping practices should be intensified while including the use of a bio-cide cleaning solution and HEPA vacuuming. Housekeeping is an effective measure to maintain Indoor Air Quality within a structure, as well as minimize the release of harmful materials into the structure that will negatively affect Indoor Air Quality. Cleaning and sterilizing activities also will decrease the risk of exposure to biological growth and contamination. Also, an air scrubber containing a HEPA filter should be used during and after the cleanup for a minimum of 24-36 hours at which time the areas should be retested to ensure that airborne fungal populations have been lowered to acceptable levels.

Non-Viable Mold Spore Trap Sample Results Table #1:

Lab No. **Client Sample ID:** **Date Collected:** **Collection Location:** **Sampling Media:** **Analytical Sensitivity spores/m3:** **Volume (L):**	17-08-00651-012 012 08/03/2017 OUTSIDE Air-O-Cell 13.3 75		17-08-00651-001 01 08/03/2017 Hallway Outside Room 1 Air-O-Cell 13.3 75		17-08-00651-002 02 08/03/2017 Room 01 Air-O-Cell 13.3 75		17-08-00651-003 03 08/03/2017 Room 04 Air-O-Cell 13.3 75		17-08-00651-004 04 08/03/2017 Hallway Outside Room 6 Air-O-Cell 13.3 75	
Spore ID	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**
Cladosporium Spores	60	800	9	120	19	250	4	53	5	67
Peronospora/Oidium Spores	1	13	0	0	0	0	0	0	0	0
Penicillium/Aspergillus Group Spores	17	230	1	13	4	53	4	53	2	27
Alternaria Spores	3	40	0	0	0	0	0	0	0	0
Aureobasidium Spores	0	0	1	13	0	0	2	27	0	0
Drechslera/Bipolaris Group Spores	0	0	2	27	0	0	0	0	0	0
Pyricularia Spores	3	40	0	0	0	0	0	0	0	0
Stachybotrys Spores	0	0	1	13	0	0	0	0	0	0
Torula Spores	2	27	0	0	0	0	0	0	0	0
Pithomyces Spores	0	0	1	13	1	13	0	0	0	0
Epicoccum Spores	1	13	0	0	0	0	0	0	0	0
Cercospora Spores	4	53	0	0	0	0	0	0	0	0
Nigrospora Spores	1	13	0	0	0	0	0	0	0	0
Fusarium Spores	1	13	0	0	0	0	0	0	0	0
Smuts, Periconia, Myxomycetes	12	160	0	0	0	0	1	13		
Total Spores (Spores/m3)	----	**1400**	----	**200**	----	**320**	----	**150**	----	**93**

Non-Viable Mold Spore Trap Sample Results Table #2:

Lab No. **Client Sample ID:** **Date Collected:** **Collection Location:** **Sampling Media:** **Analytical Sensitivity spores/m3:** **Volume (L):**	17-08-00651-012 012 08/03/2017 OUTSIDE Air-O-Cell 13.3 75		17-08-00651-005 05 08/03/2017 Room 06 Air-O-Cell 13.3 75		**17-08-00651-006** **06** **08/03/2017** **Room 010** **Air-O-Cell** **13.3** **75**		17-08-00651-007 07 08/03/2017 Outside Room 14 Air-O-Cell 13.3 75		17-08-00651-008 08 08/03/2017 Room 26 Air-O-Cell 13.3 75	
Spore ID	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**
Cladosporium Spores	60	800	3	40	61	810	1	13	13	170
Peronospora/Oidium Spores	1	13	0	0	0	0	0	0	0	0
Penicillium/Aspergillus Group Spores	17	230	0	0	69	920	6	80	7	93
Alternaria Spores	3	40	0	0	0	0	0	0	0	0
Aureobasidium Spores	0	0	1	13	1	13	1	13	0	0
Drechslera/Bipolaris Group Spores	0	0	0	0	1	13	0	0	0	0
Pyricularia Spores	3	40	0	0	0	0	0	0	0	0
Curvularia Spores	0	0	0	0	2	27	0	0	0	0
Stachybotrys Spores	0	0	0	0	2	27	0	0	0	0
Torula Spores	2	27	0	0	1	13	0	0	0	0
Pithomyces Spores	0	0	0	0	1	13	0	0	0	0
Epicoccum Spores	1	13	0	0	2	27	0	0	0	0
Cercospora Spores	4	53	0	0	0	0	1	13	0	0
Nigrospora Spores	1	13	0	0	0	0	0	0	0	0
Fusarium Spores	1	13	0	0	0	0	0	0	0	0
Smuts, Periconia, Myxomycetes	12	160	0	0	14	190	1	13	0	0
Total Spores (Spores/m3)	**----**	**1400**	**----**	**53**	**----**	**2100**	**----**	**130**	**----**	**270**

Non-Viable Mold Spore Trap Sample Results Table #3:

Lab No. **Client Sample ID:** **Date Collected:** **Collection Location:** **Sampling Media:** **Analytical Sensitivity spores/m3:** **Volume (L):**	17-08-00651-012 012 08/03/2017 OUTSIDE Air-O-Cell 13.3 75		17-08-00651-009 09 08/03/2017 Room 25 Air-O-Cell 13.3 75		**17-08-00651-010** **010** **08/03/2017** **Speech/Langue Room** **Air-O-Cell** **13.3** **75**		**17-08-00651-011** **011** **08/03/2017** **ELS English 2nd Floor** **Air-O-Cell** **13.3** **75**	
Spore ID	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**	**Raw Count**	**Results (Spores/m3)**
Cladosporium Spores	60	800	6	80	6	80	3	40
Peronospora/Oidium Spores	1	13	0	0	0	0	0	0
Penicillium/Aspergillus Group Spores	17	230	2	27	107	1400	109	1500
Alternaria Spores	3	40	0	0	0	0	0	0
Aureobasidium Spores	0	0	1	13	0	0	0	0
Pyricularia Spores	3	40	0	0	0	0	0	0
Torula Spores	2	27	0	0	0	0	0	0
Pithomyces Spores	0	0	0	0	0	0	1	13
Epicoccum Spores	1	13	0	0	0	0	0	0
Cercospora Spores	4	53	0	0	0	0	0	0
Nigrospora Spores	1	13	0	0	0	0	0	0
Fusarium Spores	1	13	0	0	0	0	0	0
Smuts, Periconia, Myxomycetes	12	160	0	0	1	13	2	27
Total Spores (Spores/m3)	- - - -	**1400**	- - - -	**120**	- - - -	**1500**	- - - -	**1500**

Mold Definitions:

Spore Name	Description
Cladosporium Spores	Reported to be allergenic. Most commonly identified spore in outdoor samples. Highly seasonal. Indoor species may differ from outdoor species. Typically found inside supply ducts.
Peronospora/Oidium Spores	No information regarding the health effects of this genus is available at this time. All mold should be treated as potential allergens.
Penicillium/Aspergillus Group Spores	Reported to be allergenic. Many species have been documented to produce mycotoxins, which may be associated with pulmonary disease in humans and other animals. Research studies have implicated several of these toxins as carcinogens in laboratory animals following inhalation. A wide number of organisms have been grouped into these two genera. Extremely difficult to identify down to species level. Typically identified in soil, cellulose, food, paint, compost piles, carpeting, wallpaper and in the fiberglass insulation used in interior ductwork.
Alternaria Spores	Reported to be allergenic. Commonly found growing in carpets and on indoor textiles. This fungi has been indicated as a potential cause of hypersensitivity pneumonitis. Rare species known to produce tenuazonic acid and other toxic metabolites that may cause disease in humans.
Aureobasidium Spores	Reported to be allergenic. Commonly found in high moisture areas such as bathrooms and kitchens. Rarely associated with skin disorders.
Drechslera/Bipolaris Group Spores	Toxigenic. Also recognized as an allergen. Under certain conditions, these fungi have been documented to produce the mycotoxin, sterigmatocystin. Studies have indicated that this toxin may cause damage to the liver and kidneys in laboratory animals.
Pyricularia Spores	No information regarding the health effects of this genus is available at this time. All mold should be treated as potential allergens.
Curvularia Spores	Reported to be allergenic. No additional health data for this genus is available at this time.
Stachybotrys Spores	Toxigenic. Also recognized as an allergen. Typically, a fungus of dark green/black coloration, it grows readily on building materials with a high cellulose content but low in nitrogen, and is rarely observed in outdoor samples. Certain strains of Stachbotrys may produce the mycotoxin, trichothecene under appropriate conditions which has been documented to cause problems associated with the circulatory, alimentary, skin and nervous systems. Absorption of trichothecene into the tissues of the human lung may cause a condition known as pneumomycosis. Although there have been conflicting studies concerning the toxicity of this fungi, it still appears that extreme caution should be practiced when dealing with this mold.
Torula Spores	Toxigenic. Also recognized as an allergen. Studies have shown that certain species may produce a toxin in the laboratory.
Pithomyces Spores	Reported to be allergenic. Some species may, in rare instances, produce the toxin sporidesmin.
Epicoccum Spores	Reported to be allergenic. Commonly found on plants, textiles and products made of paper.
Cercospora Spores	No information regarding the health effects of this genus is available at this time. All molds should be treated as potential allergens.
Nigrospora Spores	Reported to be allergenic. No additional health data for this genus is available at this time.
Fusarium Spores	Toxigenic. Also recognized as an allergen. Certain species of Fusarium may produce the mycotoxin, trichothecene, under appropriate conditions, which has been documented to cause problems associated with the circulatory, alimentary, skin and nervous systems. Absorption of trichothecene into the tissues of the human lung may cause a condition known as pneumomycosis. Symptoms may appear following exposure from either inhalation or ingestion. Rarely connected to infections of the eye, skin and nails.
Smuts, Periconia, Myxomycetes	Reported to be allergenic. This class of fungal spores is most often related to agriculture and plant disease and is rarely found indoors.