

Carbon Monoxide:

Carbon monoxide (CO) is a poisonous, colorless, odorless, and tasteless gas. Carbon monoxide is a common industrial hazard resulting from the incomplete burning of natural gas and any other material containing carbon such as gasoline, kerosene, oil, propane, coal, or wood. Forges, blast furnaces and coke ovens produce CO, but one of the most common sources of exposure in the workplace is the internal combustion engine.

Besides tightness across the chest, initial symptoms of CO poisoning may include headache, fatigue, dizziness, drowsiness, or nausea. Sudden chest pain may occur in people with angina. During prolonged or high exposures, symptoms may worsen and include vomiting, confusion, and collapse in addition to loss of consciousness and muscle weakness. Symptoms vary widely from person to person. CO poisoning may occur sooner in those most susceptible: young children, elderly people, people with lung or heart disease, people at high altitudes, or those who already have elevated CO blood levels, such as smokers. Also, CO poisoning poses a special risk to fetuses.

The OSHA PEL is 50 parts per million (ppm). OSHA standards prohibit worker exposure to more than 50 parts of the gas per million parts of air averaged during an 8-hour time period. Carbon monoxide was **not detected** within any of the areas tested.

Volatile Organic Compounds (VOCs):

Volatile organic compounds are chemicals used to manufacture and maintain building materials, interior furnishing, cleaning products and personal care products. "Volatile" means that these chemicals evaporate or can easily get into the air at room temperature. "Organic" means these chemicals are carbon based. The term "chemical emissions" refers to VOCs as they evaporate into the air from products.

Studies by the U.S. Environmental Protection Agency (U.S.EPA) and other researchers have found that VOCs are common in indoor environments and that their levels may be two to a thousand times higher than outdoors. There may be anywhere from 50 to hundreds of individual VOCs in the indoor air at any one time. Some may produce objectionable odors at very low levels, but many have no noticeable smell. Many VOCs are irritants and can cause headaches, eye, nose and throat irritation and dizziness. Long-term exposure to certain VOCs may lead to chronic diseases or cancer. At high concentrations, some VOCs are toxic. VOCs were **not detected** during the survey.

Hydrogen Sulfide:

Hydrogen sulfide is a colorless gas with the characteristic foul odor of rotten eggs. Hydrogen sulfide often results from the microbial breakdown of organic matter in the absence of oxygen gas, such as in swamps and sewers. Hydrogen sulfide gas is created and released into the air when waste water remains stagnant for a long period of time, and becomes depleted of dissolved oxygen. Hydrogen sulfide also occurs in volcanic gases, natural gas, and in some sources of well water. People living or working near improperly functioning sewage systems can be affected by this toxic gas. Higher levels of hydrogen sulfide are often found within the steam rising from manhole covers in cities, which can be brought into homes and buildings through HVAC systems causing adverse health effects for occupants.

Hydrogen sulfide exposure causes a variety of adverse health issues. Low levels of hydrogen sulfide can cause respiratory issues, eye irritation, dizziness, nausea, headache and drowsiness. At high levels, hydrogen sulfide can cause rapid loss of consciousness and even death. Hydrogen sulfide is also responsible for an estimated 50-70% of the sewage pipe corrosion in the United States. This corrosion occurs when hydrogen sulfide gas reacts with the moisture on the walls of the pipe to form caustic sulfuric acid (H₂SO₄), which corrodes the infrastructure of the sewage system. This corrosion leads to the need for costly pipe repairs, and increases the likelihood that additional hydrogen sulfide will be released into the air near offices and homes. Hydrogen sulfide was **not detected** in any area of the areas tested at Warwick Veterans Junior High School.

Percent Oxygen:

The MultiRae Plus measured the percentage of oxygen in the air within the sampled areas. Percent oxygen is used to determine the combustibility of atmospheric gases, as well to determine unusually low or high oxygen levels, which can be caused by a lack of make-up air, such as within a confined space, or the leakage of oxygen using equipment. The percentage of oxygen within the sampled areas was **20.9%**, which is within the acceptable range of 19.5% to 23.5%.

Warwick Veterans Junior High School - Direct Reading Results 5/19/17

Area	Time	Temp	Relative Humidity	CO ² (ppm)
Room 908	8:36	63.6	54.9%	430
Room B105	8:45	67.5	46.8%	402
Room B108	8:52	67.8	46.2%	449
Room B205	9:00	64.9	44.6%	397
Room B206	9:08	65.5	44.5%	402
Exterior	9:18	51.9	81.0%	386

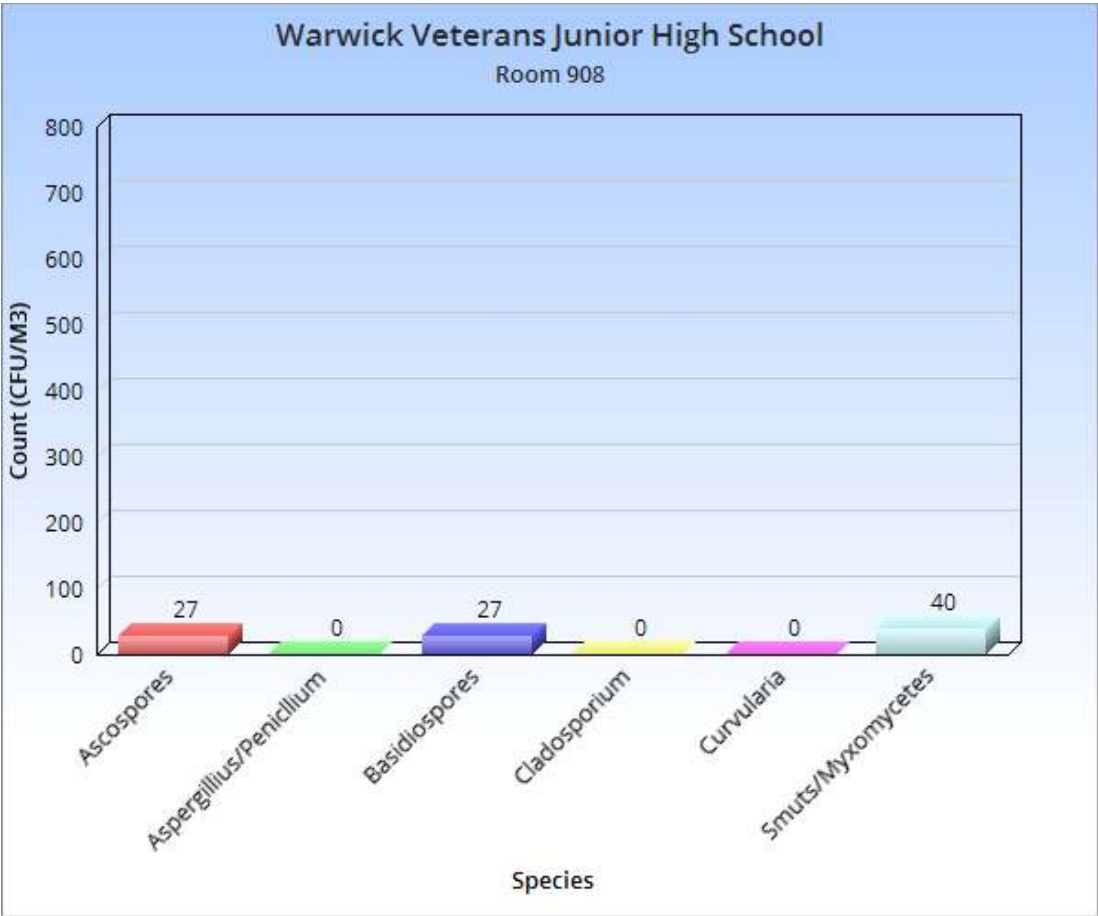
Fungal Air Samples:

Molds are ubiquitous, and their populations inside and outside a structure fluctuate depending upon many factors including time of year, weather conditions, locale, ventilation, vegetation, lighting, and most especially, moisture. Varying sensitivities by people to the different mold spores also come into play as related to any potential health effects. As such, there are no set Federal or State standards for their numbers. The EPA does however, have a guideline for what constitutes an elevated spore count - (CFU's – Colony Forming Units per cubic meter of air). A sample with more than 10,000 spores/m³ is considered elevated and steps should be taken to reduce counts. Five non-viable fungal air samples were collected within the area, along with an exterior sample for comparison purposes. The nonviable fungal air samples were collected utilizing Buck Bioslide cassettes to collect a volume of 75 L of air. Refer to the charts that follow for the amount of fungal spores detected.

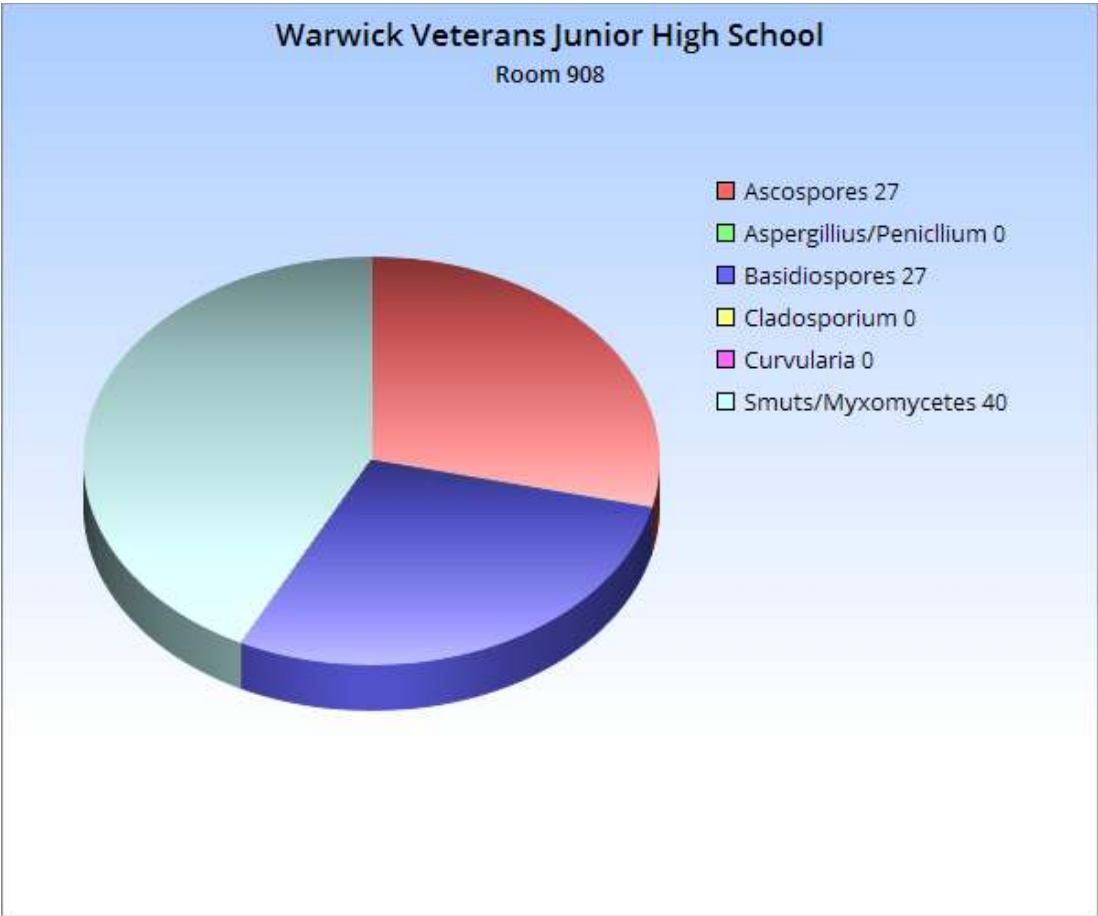
Warwick Veterans Junior High School – Non-viable Fungal Air Sample Results 5/13/17

Location	Total Spore Count	Species Identified (CFU/M ³)
Room 908	93	Ascospores - 27 Basidiospores - 27 Smuts/Myxomycetes – 40 Dander – 1867 Pollen - 13
Room B105	107	Basidiospores - 107 Dander – 1600 Pollen - 0
Room B108	120	Ascospores - 13 Aspergillus/Penicillium – 27 Basidiospores - 67 Curvularia - 13 Dander – 2800 Pollen - 0
Room B205	67	Ascospores - 40 Basidiospores - 27 Dander – 2800 Pollen - 0
Room B206	120	Ascospores - 93 Basidiospores - 13 Smuts/Myxomycetes – 13 Dander – 3147 Pollen - 0
Exterior	133	Ascospores - 40 Basidiospores - 67 Cladosporium – 27 Dander – 133 Pollen - 67

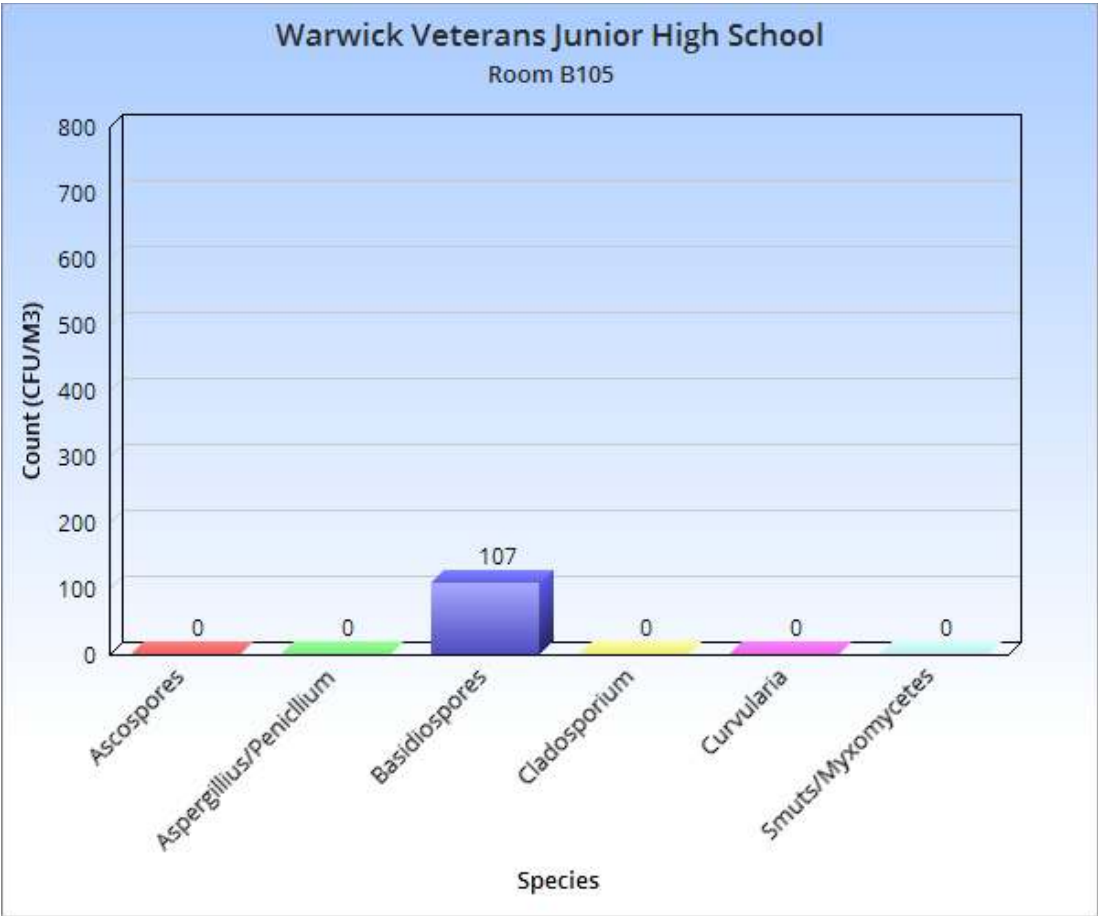
Non-Viable Air Sample 1 – Room 908



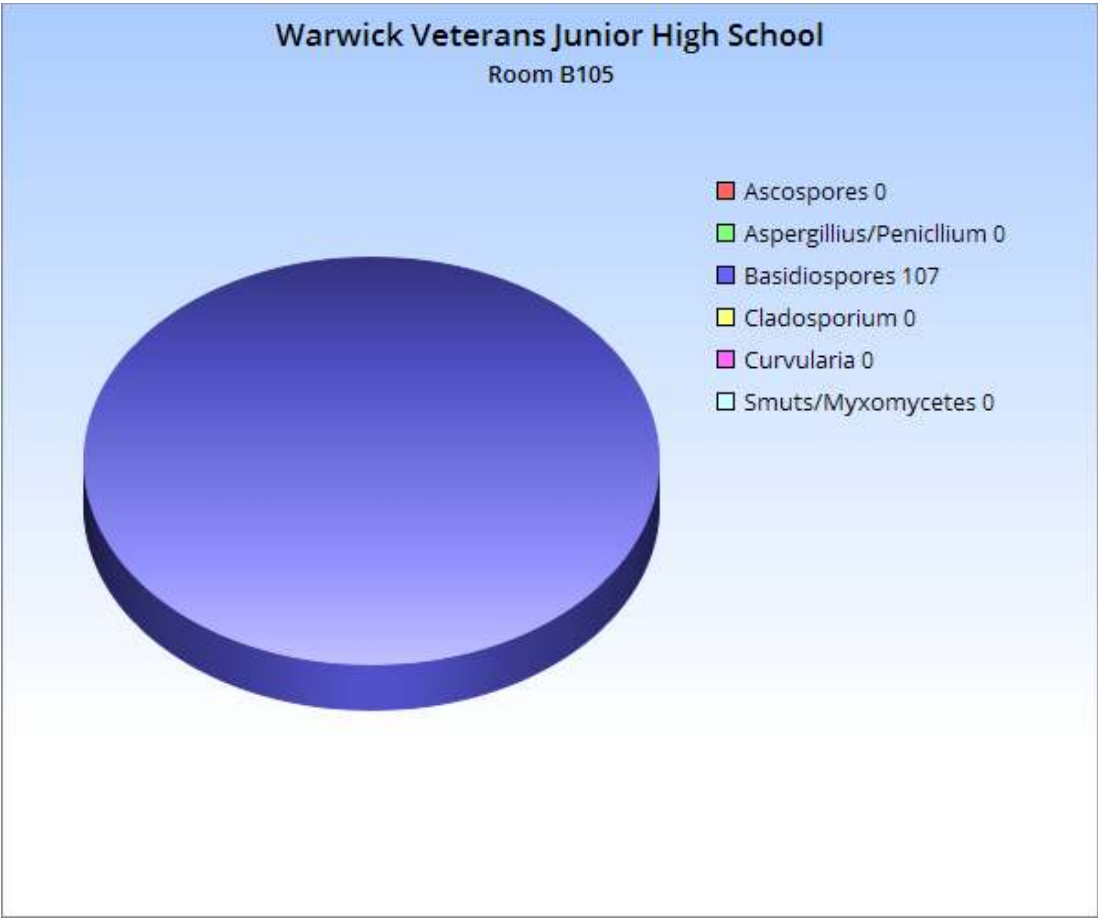
Non-Viable Air Sample 1- Room 908



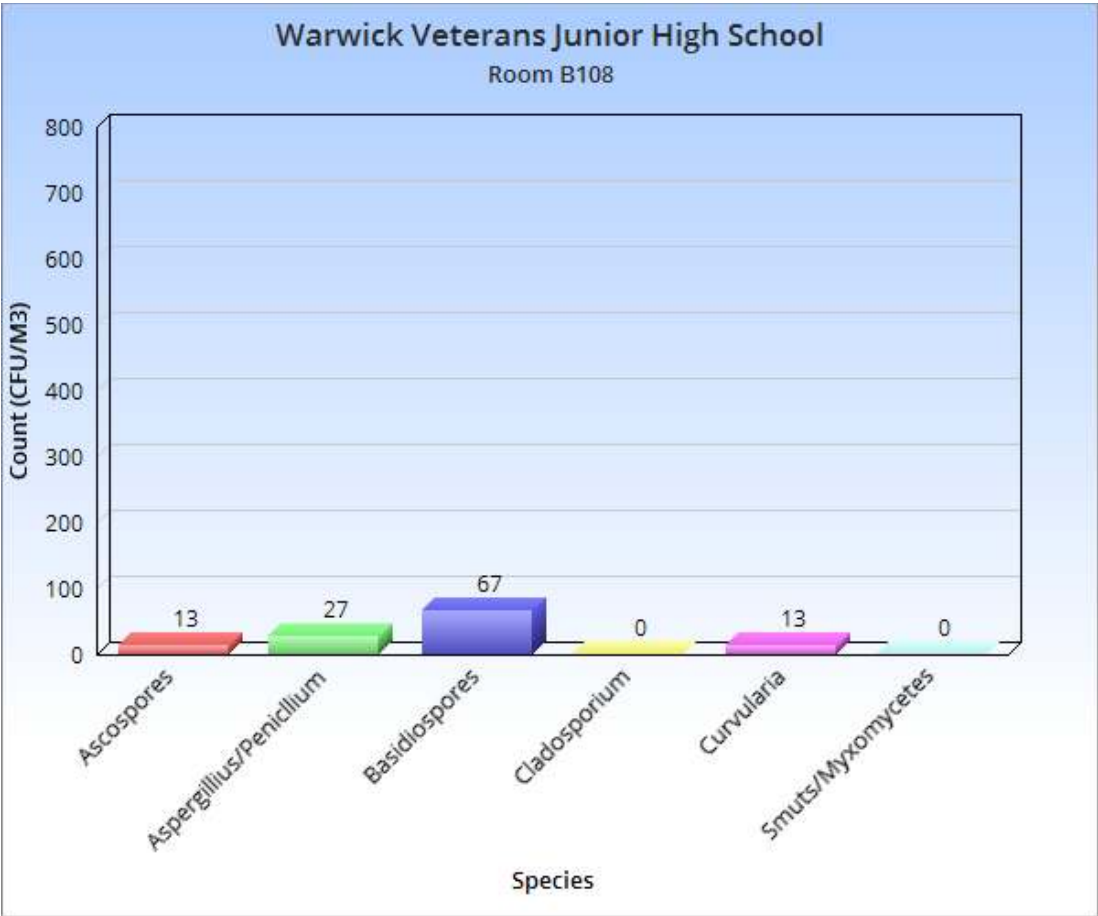
Non-Viable Air Sample 2 – Room B105



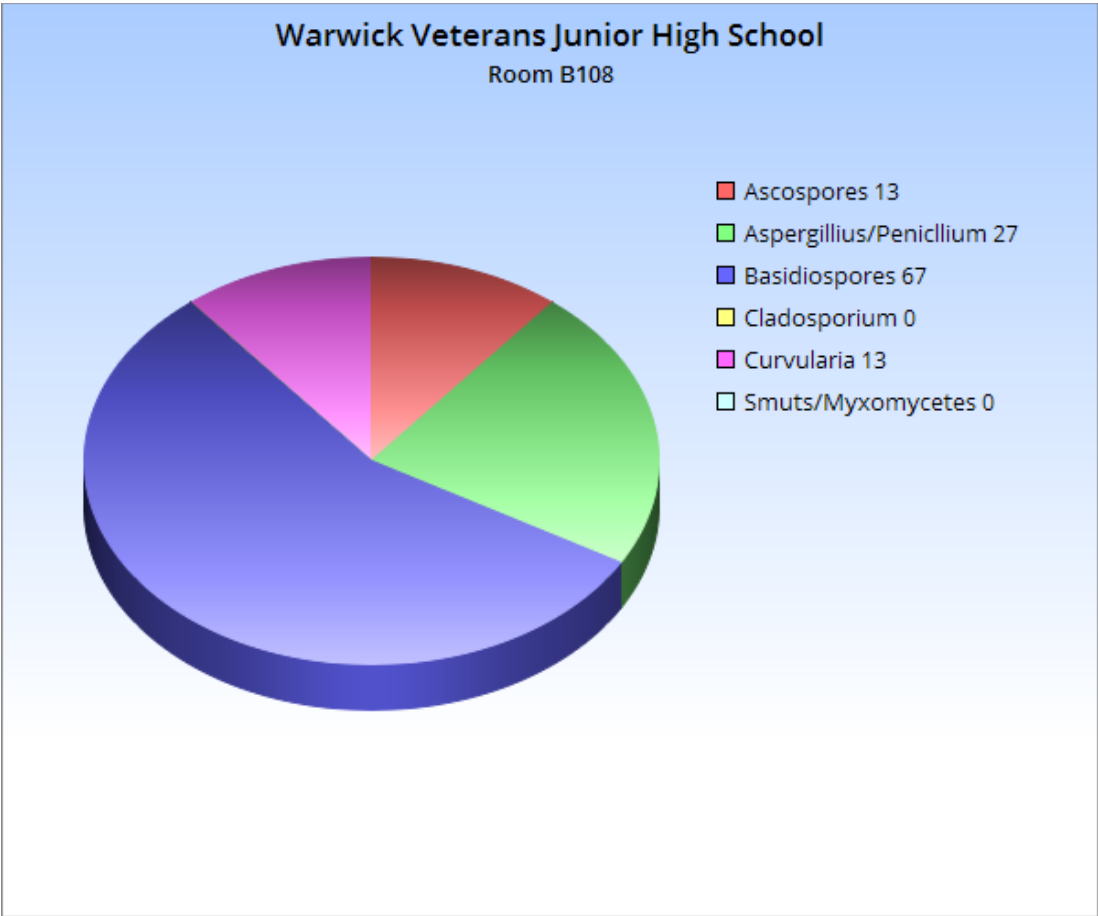
Non-Viable Air Sample 2 – Room B105



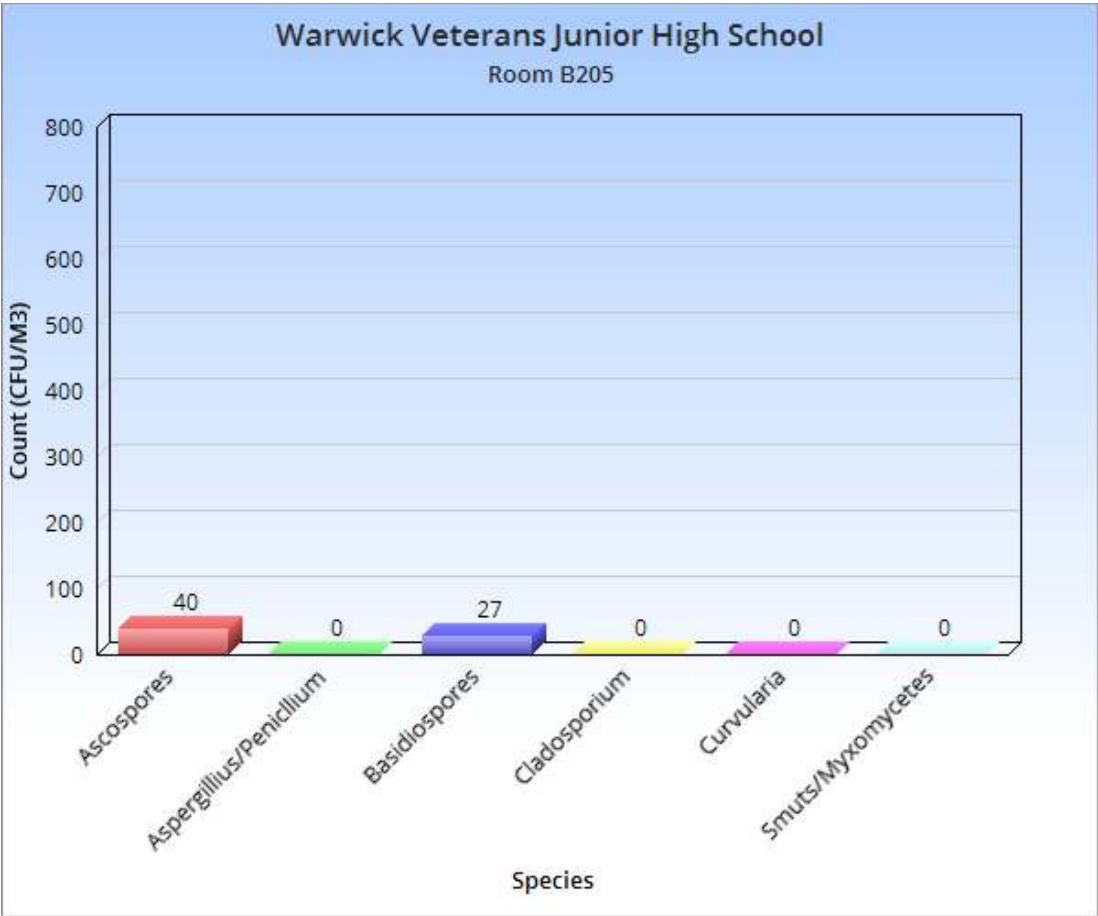
Non-Viable Air Sample 3 – Room B108



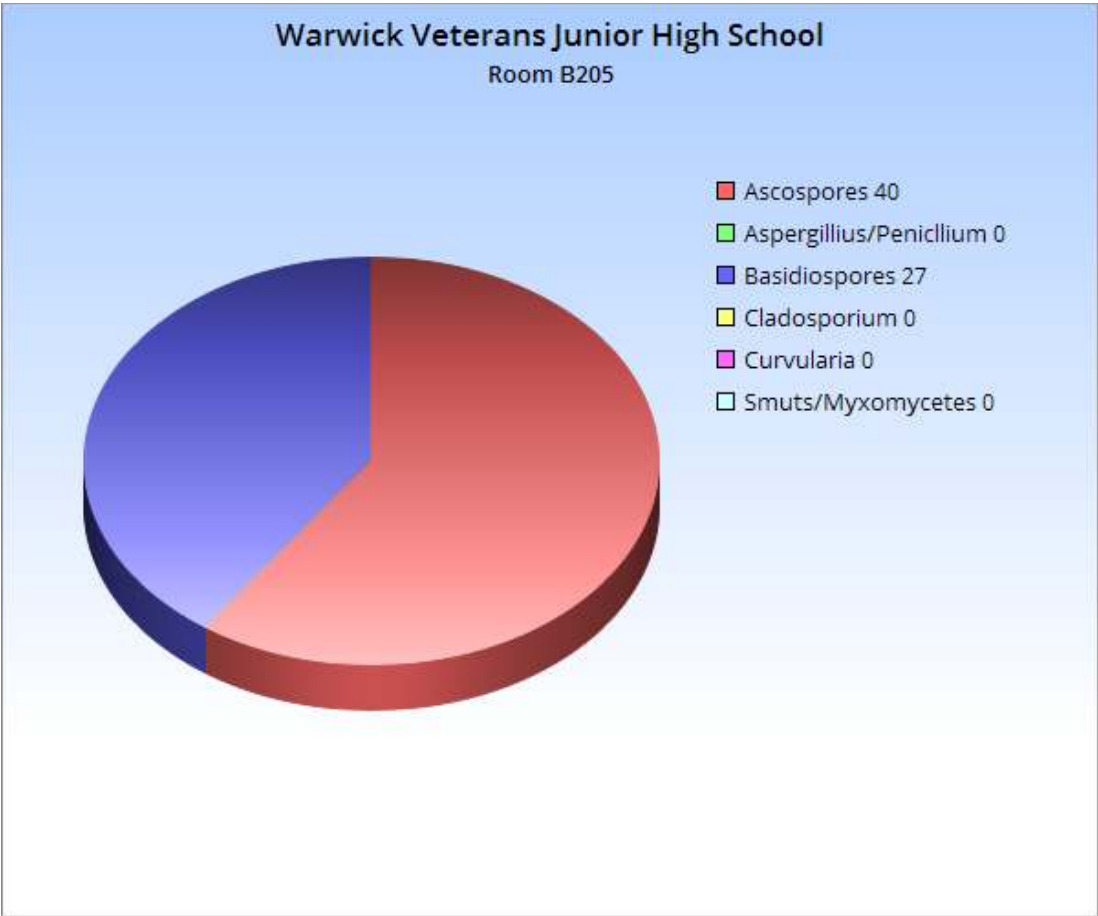
Non-Viable Air Sample 3 – Boom B108



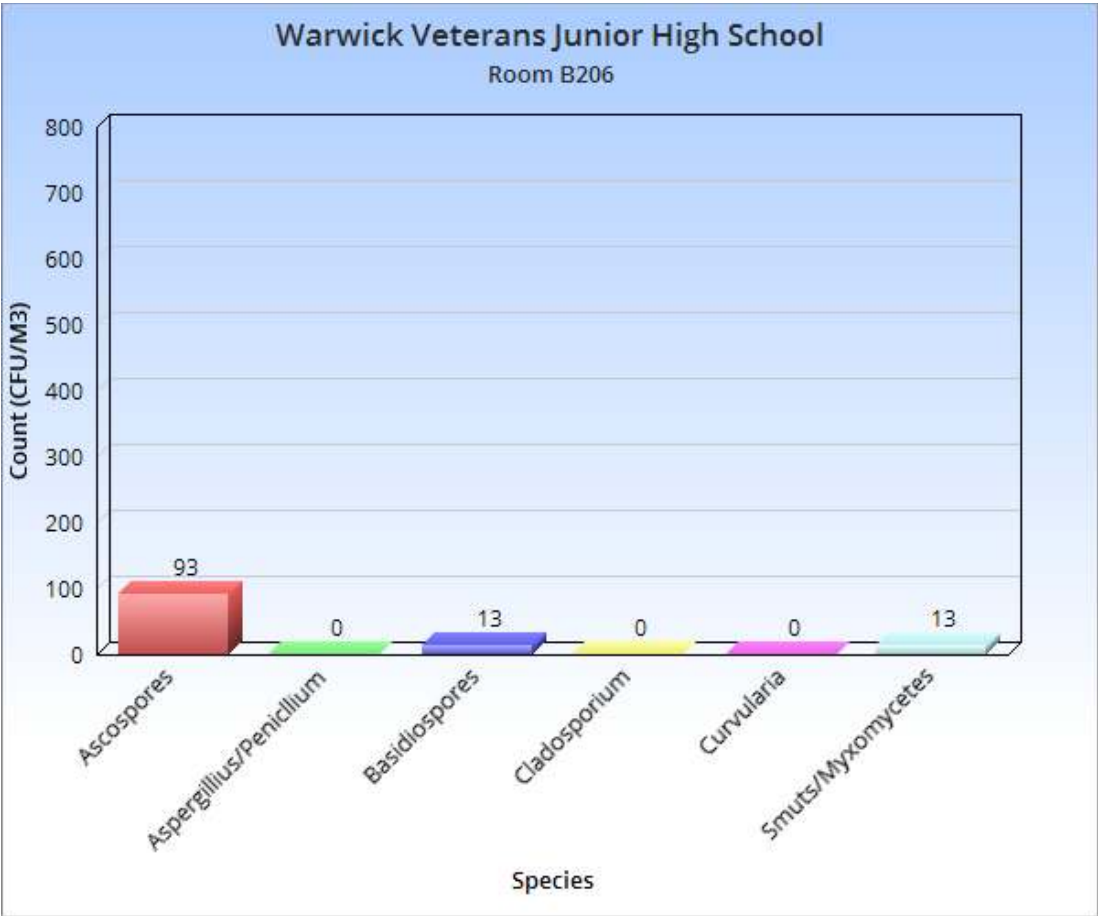
Non-Viable Air Sample 4 – Boom B205



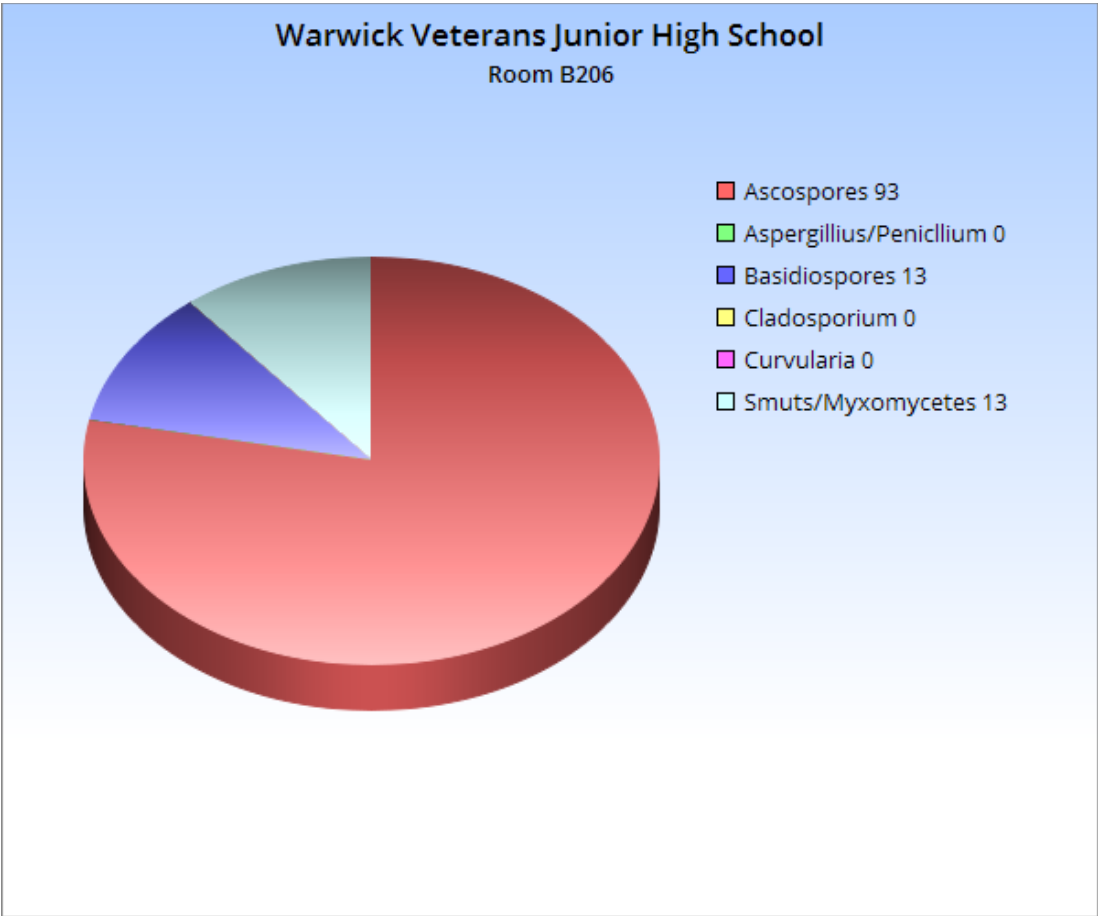
Non-Viable Air Sample 4 – Boom B205



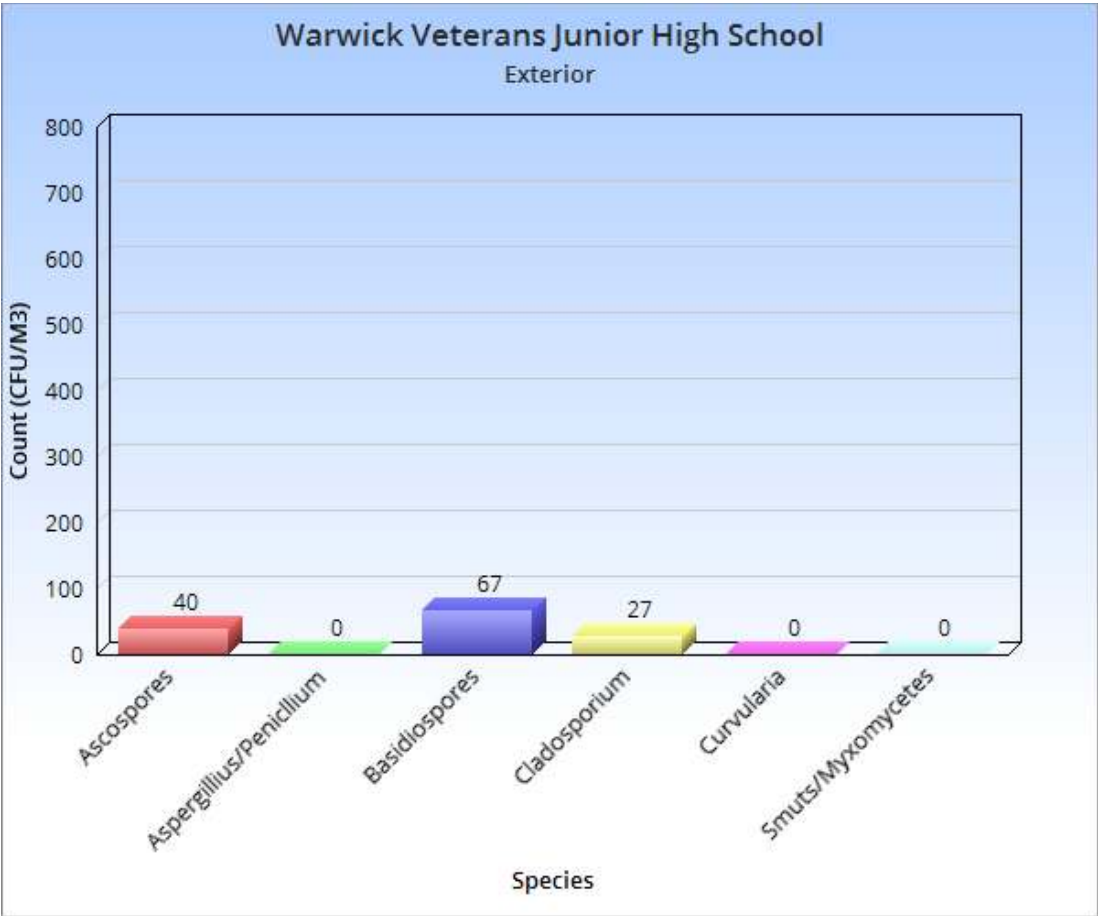
Non-Viable Air Sample 5 – Boom B206



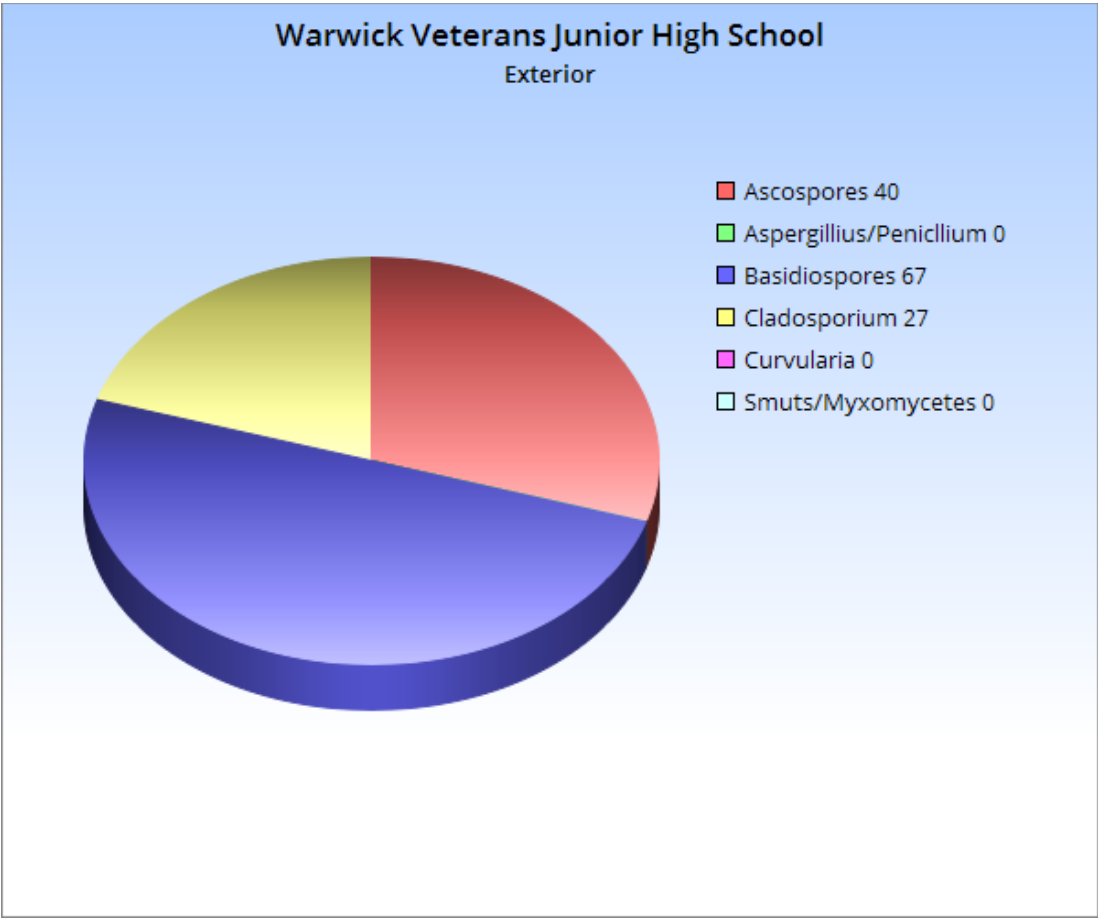
Non-Viable Air Sample 5 – Boom B206



Non-Viable Air Sample 6 – Exterior



Non-Viable Air Sample 6 – Exterior



CONCLUSIONS AND RECOMMENDATIONS

The direct readings detected for temperature, relative humidity, carbon monoxide/dioxide, volatile organic compounds (VOCs), hydrogen sulfide, and oxygen were all within their ASHRAE recommended ranges.

The overall fungal spore counts within the area were found to be extremely low. In general it is recommended that fungal spore counts be consistent with outdoor levels, and the levels above 10,000 CFM are considered elevated and steps should be taken to reduce counts. The levels detected within the classrooms tested at Warwick Veterans Junior High School were lower than outdoors and well below 10,000 CFM. The species detected are all commonly found indoors and no "red flag" species or secondary colonizers that could indicate an ongoing mold issue were present. Dander counts observed were also very low, indicating there doesn't appear to be a lack of adequate housekeeping. Overall the fungal spore counts were excellent and it does not appear that there is an airborne fungal health concern within the classrooms tested at this time.

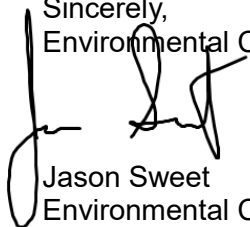
LIMITATIONS

All observations documented in this report were made under the conditions existing at the time of the survey. Indoor air quality is affected by a wide variety of conditions including weather, time of year, occupancy, and exterior conditions.

The levels documented within this report should only be used as a general guideline of current exposure conditions. Should conditions change they should be brought to the attention of ECM Inc. for further investigation. New information, verified by ECM Inc. personnel, may lead to modification of the observations and conclusions presented in this report. No warranties other than those expressed in the contract for this project are expressed or implied.

If you have any further questions feel free to contact myself at (401)374-4350.

Sincerely,
Environmental Consulting & Management



Jason Sweet
Environmental Consultant/Project Manager

Attachment #1

Fungal Air and Wipe Sample Analysis

SanAir Technologies Laboratory

Analysis Report

prepared for

Environmental Consulting & Management Inc

Report Date: 5/17/2017
Project Name: Warwick Veterans
Junior High School
Project #: 170079B
SanAir ID#: 17017760



NVLAP LAB CODE 200870-0



Certification # 652931



License # LAB0166



804.897.1177

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Environmental Consulting & Management Inc
50 Kickemuit Ave
Bristol, RI 02809

May 17, 2017

SanAir ID # 17017760
Project Name: Warwick Veterans Junior High School
Project Number: 170079B

Dear Jason Sweet,

We at SanAir would like to thank you for the work you recently submitted. The 6 sample(s) were received on Tuesday, May 16, 2017 via FedEx. The final report(s) is enclosed for the following sample(s): 01, 02, 03, 04, 05, 06.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

L. Claire Macdonald
Microbiology Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

sample conditions:
6 sample(s) in Good condition



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SanAir ID Number
17017760
FINAL REPORT

Name: Environmental Consulting & Management Inc
Address: 50 Kickemuit Ave
Bristol, RI 02809

Project Number: 170079B
P.O. Number: 170079B
Project Name: Warwick Veterans Junior High School

Collected Date: 5/13/2017
Received Date: 5/16/2017 10:25:00 AM
Report Date: 5/17/2017 9:48:56 AM
Analyst: Acharya, Uttam

Air Cassette Analysis

SanAir ID Number	17017760-001	17017760-002	17017760-003	17017760-004
Analysis Using STL:	105C	105C	105C	105C
Sample Number	01	02	03	04
Sample Identification	Room 908	Room B105	Room B108	Room B205
Sample Type	Impact Slide	Impact Slide	Impact Slide	Impact Slide
Volume	75 Liters	75 Liters	75 Liters	75 Liters
Limit of Detection	13 Count/M ³	13 Count/M ³	13 Count/M ³	13 Count/M ³
Background Density	1+	1+	2	2
Other				
Dander	Raw Count: 140 Count/M ³ : 1867 %: n/a	Raw Count: 120 Count/M ³ : 1600 %: n/a	Raw Count: 210 Count/M ³ : 2800 %: n/a	Raw Count: 210 Count/M ³ : 2800 %: n/a
Fibers	Raw Count: 12 Count/M ³ : 160 %: n/a	Raw Count: 3 Count/M ³ : 40 %: n/a	Raw Count: 4 Count/M ³ : 53 %: n/a	Raw Count: 2 Count/M ³ : 27 %: n/a
Pollen	Raw Count: 1 Count/M ³ : 13 %: n/a			
Fungal Identification				
Ascomycetes	Raw Count: 2 Count/M ³ : 27 %: 29	Raw Count: 8 Count/M ³ : 107 %: >99	Raw Count: 1 Count/M ³ : 13 %: 11	Raw Count: 3 Count/M ³ : 40 %: 60
Aspergillus/Penicillium			Raw Count: 2 Count/M ³ : 27 %: 22	
Basidiospores	Raw Count: 2 Count/M ³ : 27 %: 29		Raw Count: 5 Count/M ³ : 67 %: 56	Raw Count: 2 Count/M ³ : 27 %: 40
Cladosporium species				
Curvularia species			Raw Count: 1 Count/M ³ : 13 %: 11	
Smuts/Myxomycetes	Raw Count: 3 Count/M ³ : 40 %: 43			
Total	Raw Count: 7 Count/M ³ : 93	Raw Count: 8 Count/M ³ : 107	Raw Count: 9 Count/M ³ : 120	Raw Count: 5 Count/M ³ : 67

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

Signature: *Uttam Acharya*

Date: 5/17/2017

Reviewed: *S. Claire Macdonald*

Date: 5/17/2017



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Analyst: Acharya, Uttam

Air Cassette Analysis

SanAir ID Number		17017760-005		17017760-006	
ND = None Detected. Blank spaces indicate no spores detected.					
Analysis Using STL:					
Sample Number	105C	105C	06		
Sample Identification	Room B206	Room B206	Exterior		
Sample Type	Impact Slide	Impact Slide	Impact Slide		
Volume	75 Liters	75 Liters	75 Liters		
Limit of Detection	13 Count/M³	13 Count/M³	13 Count/M³		
Background Density	1+	1+	1+		
Other					
Dander	Raw Count	Count/M³	%	Raw Count	Count/M³
	236	3147	n/a	10	133
Fibers	Raw Count	Count/M³	%	5	67
	3	40	n/a		
Pollen	Raw Count	Count/M³	%		
Fungal Identification					
Ascomycetes	Raw Count	Count/M³	%	Raw Count	Count/M³
Aspergillus/Penicillium	7	93	78	3	40
Basidiospores	Raw Count	Count/M³	%	Raw Count	Count/M³
Cladosporium species	1	13	11	5	67
Curvularia species	Raw Count	Count/M³	%	Raw Count	Count/M³
Smuts/Myxomycetes	1	13	11	2	27
Total	9	120		10	133

Date: 5/17/2017

Reviewed: *S. Claire Macdonald*

Date: 5/17/2017

Date: 5/17/2017

Signature: *Uttam Acharya*

Date: 5/17/2017



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Project Name: Warwick Veterans Junior High School

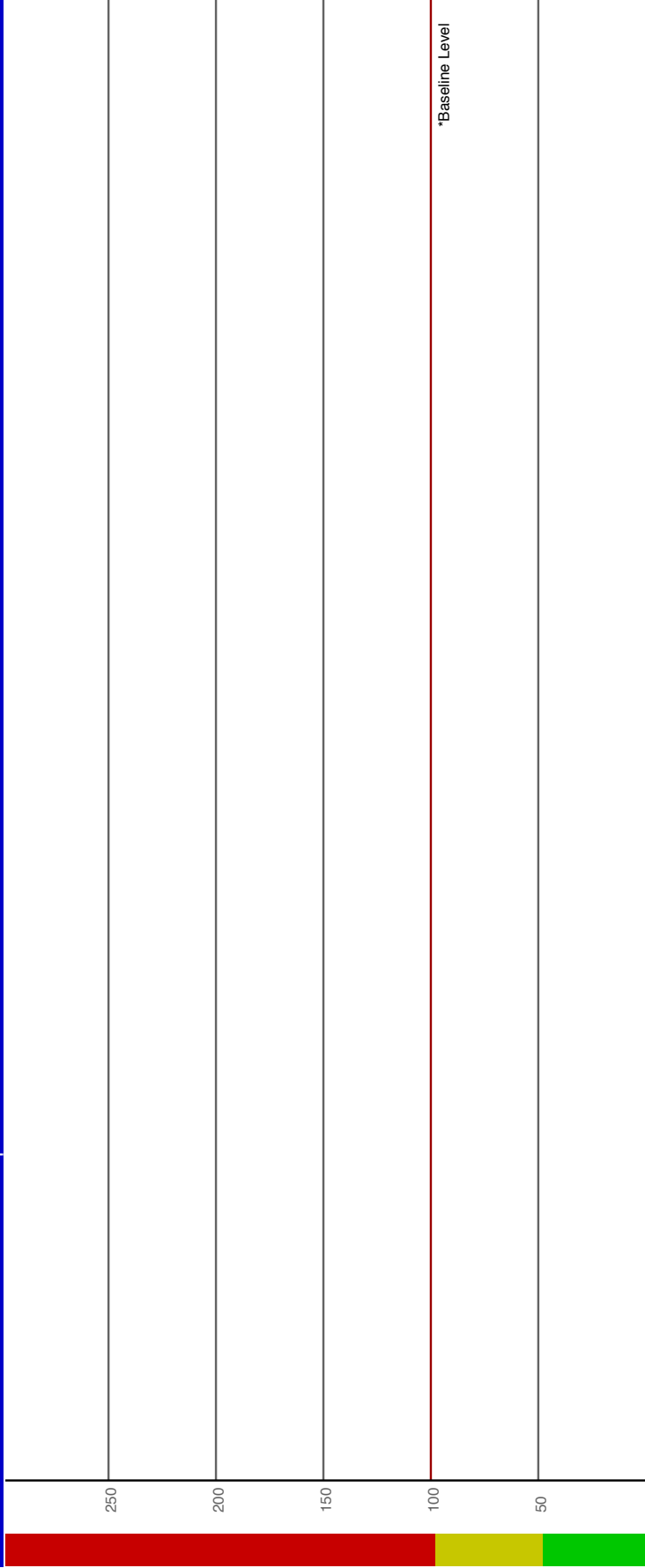
Collected Date: 5/13/2017
Received Date: 5/16/2017 10:25:00 AM
Report Date: 5/17/2017 9:48:56 AM
Analyst: Acharya, Uttam

Air Cassette Analysis - Spores % of Exterior Air

SanAir ID : 17017760-1

Sample # : 01

ID : Room 908



Probable mold amplification
 Possible mold amplification
 No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

*The Baseline Level (100%) represents the average baseline sample counts. Counts above the baseline may indicate higher than expected levels of a given result.



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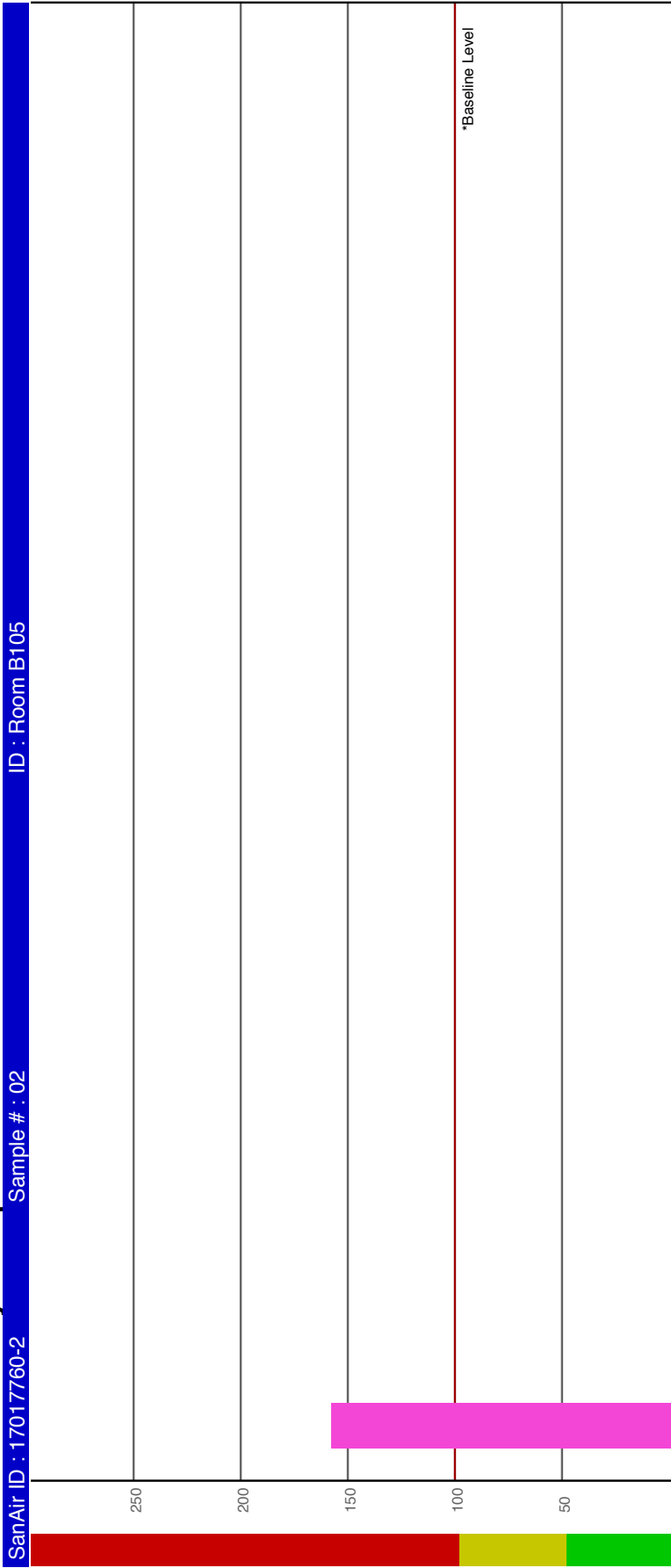
SanAir ID Number
17017760
FINAL REPORT

Name: Environmental Consulting & Management Inc
Address: 50 Kickemuit Ave
Bristol, RI 02809

Project Number: 170079B
P.O. Number: Warwick Veterans Junior High
Project Name: School

Collected Date: 5/13/2017
Received Date: 5/16/2017 10:25:00 AM
Report Date: 5/17/2017 9:48:56 AM
Analyst: Acharya, Uttam

Air Cassette Analysis - Spores % of Exterior Air



160%
A

- Probable mold amplification
- Possible mold amplification
- No evidence of mold amplification

- A Basidiospores

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Project Name: Warwick Veterans Junior High School

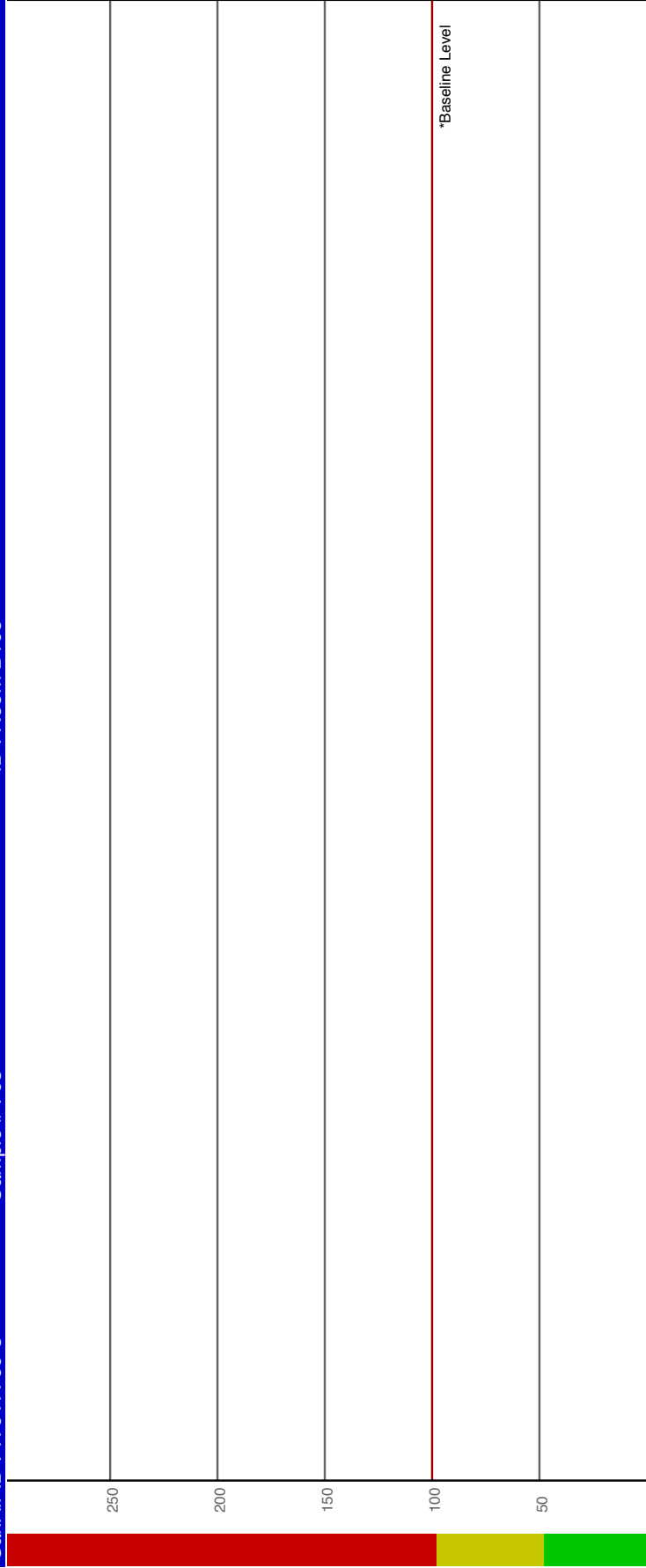
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Analyst: Acharya, Uttam

SanAir ID Number
17017760
FINAL REPORT

Air Cassette Analysis - Spores % of Exterior Air

SanAir ID : 17017760-3 Sample # : 03

ID : Room B108



Probable mold amplification
 Possible mold amplification
 No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

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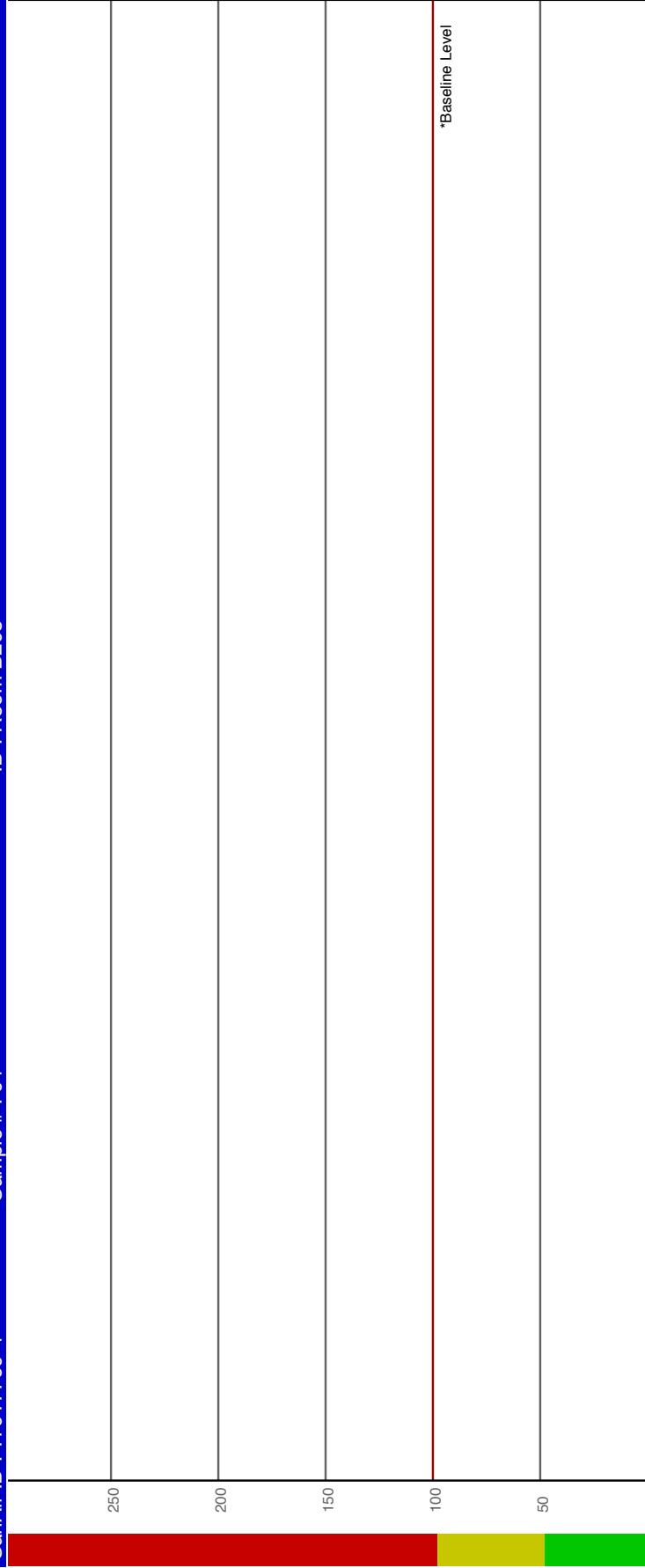
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Report Date: 5/17/2017 9:48:56 AM
Analyst: Acharya, Uttam

SanAir ID Number
17017760
FINAL REPORT

Air Cassette Analysis - Spores % of Exterior Air

SanAir ID : 17017760-4 Sample # : 04

ID : Room B205



Probable mold amplification
 Possible mold amplification
 No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

*The Baseline Level (100%) represents the average baseline sample counts. Counts above the baseline may indicate higher than expected levels of a given result.



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P.O. Number: Warwick Veterans Junior High
Project Name: School

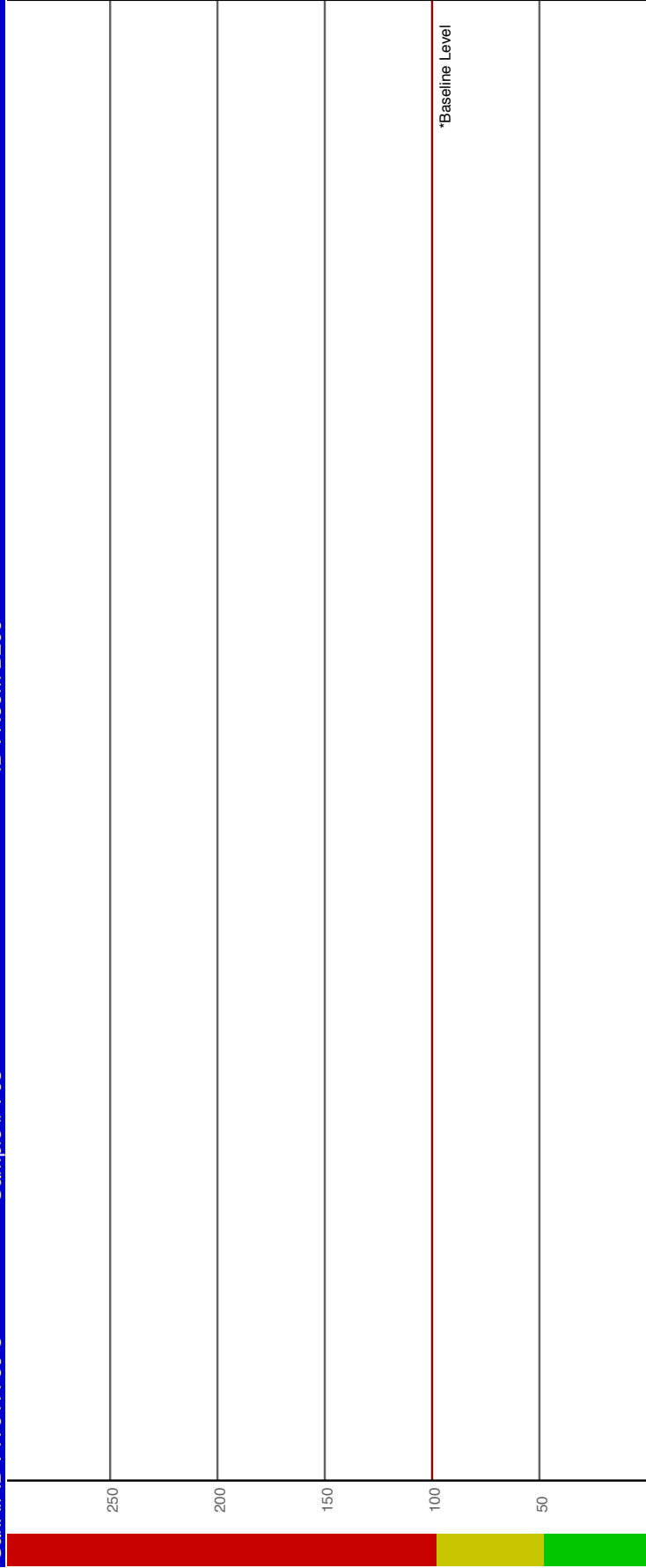
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Report Date: 5/17/2017 9:48:56 AM
Analyst: Acharya, Uttam

SanAir ID Number
17017760
FINAL REPORT

Air Cassette Analysis - Spores % of Exterior Air

SanAir ID : 17017760-5 Sample # : 05

ID : Room B206



Probable mold amplification
 Possible mold amplification
 No evidence of mold amplification

No organisms to graph. Normalized organism counts may not have exceeded the organism thresholds, or there were no organism counts for this sample. Please refer to the analysis report.

*The Baseline Level (100%) represents the average baseline sample counts. Counts above the baseline may indicate higher than expected levels of a given result.



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SanAir ID Number

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FINAL REPORT

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Project Number: 170079B
P.O. Number:
Project Name: Warwick Veterans Junior High School

Collected Date: 5/13/2017
Received Date: 5/16/2017 10:25:00 AM
Report Date: 5/17/2017 9:48:56 AM
Macdonald, Claire

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.

POLLEN - Produced by trees, flowers, weeds and grasses. The level of pollen production can depend on water availability, precipitation, temperature, and light. Pollen is usually dispersed by either insects or the wind. *Health Effects:* Mostly effects the respiratory tract with hay fever symptoms but has also been shown to trigger asthma in some people.

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 exercised 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 disperse 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.

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 bronchospasms, chronic cases may develop pulmonary emphysema. Illnesses caused by this genus can include phaeoophomycosis, 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.

CURVULARIA SPECIES - Curvularia is found on plant material and is considered a saprobe. It has also been isolated from dust samples and from wallpaper. *Health Effects:* It has been reported to cause type I hypersensitivity and to be a cause of allergic fungal sinusitis. It may cause corneal infections, mycetoma and infections in immune compromised hosts.

References: De Hoog, G.S., J. Guarro, J. Gene, and M.J. Figueras. Atlas of Clinical Fungi, 2nd Edition. The Netherlands: CBS, 2000.



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17017760

FINAL REPORT

Name: Environmental Consulting & Management Inc
Address: 50 Kickemuit Ave
Bristol, RI 02809

Project Number: 170079B
P.O. Number:
Project Name: Warwick Veterans Junior High School

Collected Date: 5/13/2017
Received Date: 5/16/2017 10:25:00 AM
Report Date: 5/17/2017 9:48:56 AM
Macdonald, Claire

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.

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.

Additional Information

Air Cassette Analyses

Air cassette reports indicate the genus and concentration of viable (living) and non-viable mold spores detected on the slide (A2 Analysis). Whether or not these spores are viable cannot be determined using this type of analysis. However, keep in mind that spores can remain allergenic even after cellular death. Other possible allergens include dander, pollen and fibers which are included in air cassette reports for the A1 Analysis. A1 and A2 analyses are performed on several types of air cassettes. Light microscopy at a 400 to 1000x magnification is used for air cassette sample analysis. SanAir always analyzes 100% of the impacted slide.

Explanation of Background Densities

The background density of an air cassette aids in the overall interpretation of results as it indicates the level of background debris present (e.g. dander, pollen, fibers, insect parts, soot, fly ash, etc.). Excessive background debris may mask the presence of fungal spores thereby reducing the accuracy of the count. It may also serve as an alert that the volume of air pulled was too high or too low. The following table explains background densities.

Air Cassette Density	Amount of Particulate on Slide	Explanation
1	Insignificant	Should not skew any counts
1+	Low	Should not skew any counts
2	Low to Moderate	Should not skew any counts
2+	Moderate to High	May cause occlusion of small spores
3	High	May cause occlusion of small to medium spores
3+	Very High	Will cause occlusion of spores
4	Overloaded	Level of particulate too high to perform analysis

A Note About the Fungal Spores

In some instances certain groups of fungi cannot be identified due to a lack of distinguishing characteristics. These fungi will be categorized as "unknown spores" on the final report.

The genera *Aspergillus* and *Penicillium* are typically composed of small, round spores that are difficult to distinguish from each other; therefore, they are grouped into the category *Aspergillus / Penicillium*. Other fungi that produce spores of similar characteristics may also be placed into this category, including *Paecilomyces*, *Gliocladium*, and *Trichoderma*, among others.

Stachybotrys and *Memnoniella* spores are coated with a sticky "slime" layer that may inhibit aerosolization.

Any genus of fungi detected on an air cassette with a high raw count (i.e. exceeding 500 spores) may be estimated. Any estimate higher than 12,000 spores will be reported as >12,000.

Understanding the Air Cassette Report

Each sample has 3 columns of information provided. The left is the raw count which is the number of spores for that fungal type detected on the trace. The middle column is the count per cubic meter (Count/m³) which is the raw count converted based on the total volume pulled for that sample. It represents the number of spores that should be expected in a cubic meter of air from the location in question *if* the spores were distributed evenly throughout the air. This column is helpful for interpreting results when the samples were pulled at different total volumes. In other words, the raw count of a cassette pulled at 75 liters should not be compared to the raw count of a cassette pulled at 150 liters because there may be higher counts associated with the higher volume. By comparing the "Count/m³" columns the difference in volumes are accounted for.

The limit of detection is the lowest spore count detectable with reasonable certainty, and it is calculated this way using a raw count of one. Keep in mind there are 1,000 liters in a cubic meter.

$$1 \times (1,000 / \text{Total Volume in Liters})$$

How to calculate the count per cubic meter:

$$\text{Raw Count} \times (1,000 / \text{Total Volume in Liters})$$

The last column on the right shows the percentage for which each spore type comprised the total spore count.

Understanding the Air Cassette Graph (If included in the final report)

The graph is a visual representation of the baseline sample (usually the outdoor air sample) compared individually against each indoor sample. Each spore type found on the indoor sample is compared to what was found outdoors per cubic meter.

The graph shows the percentile representation of each indoor spore count derived by dividing the indoor Count/m³ by the outdoor Count/m³. If the percentage is below 50% of the outside count, then the bar is below 50 on the chart, which corresponds to "No evidence of mold amplification." If the percentage is between 50 and 100%, then the bar on the chart will stop between 50 and 100, which corresponds to "Possible mold amplification." If the percentage is greater than 100%, then the bar will be above 100 on the chart, which corresponds to "Probable mold amplification."

Each organism is given a threshold level for the Count/m³. If this threshold level is not met in an inside sample, then the organism will not be graphed on the chart. This is used to prevent the graph from showing every spore type that is commonly found outside and doesn't typically indicate a possible moisture problem inside. For example, most common outdoor spores (e.g. ascospores, basidiospores, and *Cladosporium*) have a threshold level of 100. Therefore, in order to show up on the chart, the inside Count/m³ must be above 100. On the other hand, fungi that may indicate water damage (e.g. *Stachybotrys*, *Ulocladium*, *Chaetomium*, *Memnoniella*, etc.) are given lower threshold levels. These fungi have a higher water activity value and therefore require more moisture to grow. *Stachybotrys* and *Chaetomium* have threshold values of 14 and 30, respectively, as even a low count of those types of spores may indicate an issue with excess moisture.

Keep in mind that this graph is to be used only as a tool in the inspection of a building. Visual examination and knowledge of water damage, past remediation, and weather conditions, among other elements, is essential in the decision regarding the indoor air quality of a building.

Assistance with Remediation Projects

more information pertaining to interpretation of results is available on our website www.sanair.com

For assistance in a remediation project you may consult the Institute of Inspection, Cleaning and Restoration Certification (IICRC) S500 and S520 protocols. The S500 is a reference guide for water-damage restoration and the S520 pertains specifically to mold remediation. Other standards and guidelines regarding Indoor Air Quality that may assist in remediation projects:

- AIHA (Recognition, Evaluation, and Control of Indoor Mold)
- AIHA (The Facts About Mold)
- NADCA (ACR 2006)
- IESO (Standards of Practice for the Assessment of Indoor Air Quality)
- EPA (Mold Remediation in Schools and Commercial Buildings)
- New York City Department of Health and Mental Hygiene (Guidelines on Assessment and Remediation of Fungi in Indoor Environments)