

INDUSTRIAL HYGIENE REPORT

Prepared For:

Robert Morris School
122 Elizabeth Street
South Bound Brook, New Jersey 08880

Report Presented To:

Vincent Caravello
South Bound Brook School District
Business Administrator
Robert Morris School
122 Elizabeth Street
South Bound Brook, New Jersey 08880

Report Prepared By:

Garden State Environmental, Inc.
555 Broad Street, Suite K
Glen Rock, New Jersey 07452

Date of Report:

November 14, 2018

I. INTRODUCTION

The subject of this report is a fungal (mold) related assessment conducted on October 29 and November 1, 2018, by Tara E. Ekiert, B.S., an Industrial Hygienist from Garden State Environmental, Inc. (GSE) at Robert Morris School, located at 133 Elizabeth Street, South Bound Brook, New Jersey.

Mr. Vincent Caravello, School Business Administrator, has retained GSE to assess any mold-related conditions in various rooms around the school, due to previous mold related issues in the Child Study Team Offices on the second floor. The investigation consisted of a detailed visual inspection of accessible areas of concern and the collection of moisture measurements and environmental samples.

Our findings are summarized in the report that follows.

II. BACKGROUND

The subject building is a two (2)-story elementary school built in 2001.

Due to previous mold conditions in the Child Study Team Office Suite in September, 2018, Mr. Caravello asked GSE to return to Robert Morris School to inspect and test other locations to be certain no unusual mold growth was present anywhere else in the school.

III. INSPECTION FINDINGS:

October 29:

Outdoors:

Temperature = 63.5 °F
Relative Humidity (RH) = 50.3%

Various Rooms (range):

Temperature = 70.9-76.9°F
RH = 39.1 – 47.5%

November 1:

Outdoor:

Temperature = 74.4°F
RH = 56.9

Various Rooms (range):

Temperature = 70.8 - 74.9
RH = 48.8 – 60.9%

Digital Images are included in Appendix I

October 29:

Rooms: 135, 125, 116, 110, 102, 111:

Interior finishes in these rooms include suspended acoustical ceiling tiles, vinyl floor tiles and painted block walls.

No mold-like or other unusual odors were detected upon entry into any of these rooms.

No visible suspect mold growth was observed on any surfaces and/or building materials. For the most part, ceiling tiles appeared clean although a few had small dry water stains with no evidence of associated mold growth.

Many surfaces had light to moderate layers of dust and most HVAC registers were dusty and/or dirty.

Room 140:

The room is constructed of a wooden paneled ceiling, cement block walls and carpeted floor.

No mold-like or other unusual odors were detected upon entry and no suspect mold growth was observed on any surfaces.

Room 132:

The room is constructed of wood paneled ceiling, cement block walls and vinyl floor tiles.

No odors were detected upon entry into the room.

Small area of suspect mold growth was observed on the wood paneled ceiling joist; surface sample was taken. Moisture measurements of the wood paneling were at acceptable levels <6% moisture content. Normal moisture content for wood is 15% or less on the wood reference scale on the moisture meter.

Rooms 127, 129, 143, 137:

Each room is constructed of wood paneled ceilings, cement block walls and vinyl floor tiles.

No mold-like or other unusual odors were detected in each of the four (4) rooms. No suspect visible mold was observed on any surfaces in these rooms.

Moisture content of the wood paneled ceilings were all acceptable at <5% MC.

Room 145:

The room is constructed of suspended ceiling tiles, vinyl floor tiles and cement block walls with

a throw rug in the middle of the room.

No odors were detected within the room and no suspect visible mold was observed on any surfaces, rugs or books. The HVAC registers in this room had heavy layer of dust.

November 1:

Rooms 214, 218, Music Room, 208, 206, 202:

Each room is constructed of suspended ceiling tiles, vinyl floor tiles, and cement block walls. Overall, all ceiling tiles appeared dry although a few had dry wet stains with no evidence of associated mold growth.

No suspect visual mold growth was seen on any surfaces, personal items or building materials and no mold-like or unusual odors were detected.

Many HVAC registers appeared dusty and dirty.

Library:

No mold-like or unusual odors were detected when entering the room.

The room is constructed of cement block walls, carpet flooring with vinyl floor tiles near the entry doors and a split ceiling comprised of gypsum wallboard and wood paneling.

All surfaces, including the ceiling and books appeared clean with no suspect mold growth present.

Moderate layer of dust found on HVAC registers and the top surfaces of bookcases/shelves.

IV. SAMPLING METHODS

Moisture Measurements

Moisture mapping was conducted with a Delmhorst TotalCheck Moisture Meter. This instrument measures temperature and relative humidity and offers surface, contact pin, and cavity probe attachments. Moisture mapping was performed in representative locations to determine the extent of any remaining moisture levels. The pin probe was used to determine moisture content (MC) in gypsum board (normal levels <0.5%) as well as structural wood framing (normal levels <15%).

Surface Sampling:

Surface samples, collected with a cello-tape (tape-lift samples), and/or with sterile swabs (swab samples); bulk material samples, can be analyzed by direct microscopic examination. Such samples are chosen for the rapid collection and qualitative and semi-quantitative analysis for

fungal spores and related structures. Direct microscopic examination identifies molds to the genus level and gives a semi-quantitative evaluation of their concentrations, i.e., no fungal spores seen, occasional, few, moderate or numerous spores or related fungal elements.

Surface samples may also be collected through the use of pre-moistened sterile swabs, which are used to collect surface contaminants from a defined surface area (e.g. 1 square inch). The sample is then cultured in the laboratory under controlled conditions that are conducive to microbial growth. This process results in both quantitation (e.g. number of colony forming units per square inch) and identification of the predominant species of organisms cultured.

Microbial

Currently there is no standardized sampling technique and analytical method to uniformly identify and quantify different species and genera that occur in the biological diversity of the microbiological world. A variety of specific approaches are used to retrieve, enumerate and identify each kind of microorganism from air, surfaces, and different materials suspected of contamination.

Airborne Spore Trap (non-viable) Mold Sampling

Airborne mold samples were collected through the use of a Model ALAI-5000 Aerotrap Total Fungal Air Sampler. This air sampler is factory calibrated on an annual basis and undergoes field calibration prior to each project. Field calibration is conducted with a factory calibrated Rotometer - Model ALAI-5002. This sampling technique is designed for short-term sampling via a sampling orifice which collects air at fifteen (15) liters per minute (LPM) onto a slide coated with mixed cellulose ester (MCE) adhesive.

The slides are then examined under a microscope by an Accredited Environmental Microbiology Laboratory.

This method measures all fungal spores and fragments, not only the portion of mold that will grow in cultures, under laboratory conditions. This provides useful information in the overall assessment of the air quality in the tested environment.

This is a well-accepted methodology for spore trap analysis that is in widespread use in the industry. This technique differs from Air-o-Cell cassettes, another common spore trap sampling technique, primarily in the type of slides and adhesive used. Studies have shown the Aerotrap methodology to be highly effective at capturing a broad spectrum of fungal spores while requiring a minimum of manual field and laboratory preparations, thereby reducing the potential for human error.

Laboratory Analysis

All analysis for this project was conducted by:

International Asbestos Testing Laboratories (iATL)
 9000 Commerce Parkway, Suite B
 Mount Laurel, New Jersey 08054

iATL ensures their quality control by participating in a quarterly proficiency testing program. The lab has a current accreditation by the American Industrial Hygiene Association's (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP) for Environmental Microbiology. The EMLAP is specifically for labs identifying microorganisms commonly detected in air, fluids, and bulk samples during indoor air quality studies.

AIHA EMPAT # 100188.

V. SAMPLING RESULTS

October 29, 2018:

Total airborne spore counts are reported in *spores and fungal fragments per cubic meter (spores/m³)*.

Non-viable Spore Trap Air Samples – October 29, 2018			
Sample ID	Location	Total Count (spores/m³)	Indicator Organisms (genus - % concentration)
10-29-TE-01	Outside Control #1	160	N/D*
10-29-TE-02	Room 140	53	N/D
10-29-TE-03	Room 135	110	N/D
10-29-TE-04	Room 125	320	N/D
10-29-TE-05	Room 116	53	N/D
10-29-TE-06	Room 110	53	N/D
10-29-TE-07	Room 102	None Detected	N/D
10-29-TE-09	Room 127	None Detected	N/D
10-29-TE-10	Room 137	None Detected	N/D
10-29-TE-11	Room 143	270	N/D
10-29-TE-12	Room 145	53	N/D
10-29-TE-13	Room 129	110	N/D
10-29-TE-14	Room 111	110	N/D
10-29-TE-15	Outside Control #2	210	N/D

*None Detected

Direct microscopic examination identifies molds to the genus level and gives a semi-quantitative evaluation of their concentrations, i.e., high (>10%), medium (1-10%), and low (<1%) loading.

Surface Samples – October 29, 2018			
Sample ID	Matrix	Location	Indicator Organisms Identified- (<i>genus-loading</i>)
10-29-TE-08	Swab	Room 132 Ceiling Wood Paneling Joist	<i>None Detected</i>

November 1, 2018:

Total airborne spore counts are reported in *spores and fungal fragments per cubic meter (spores/m³)*.

Non-viable Spore Trap Air Samples – November 1, 2018			
Sample ID	Location	Total Count (spores/m ³)	Indicator Organisms (genus - % concentration)
11-1-TE-01	Outside Control #1	4,500	N/D*
11-1-TE-02	Library Back Left	53	N/D
11-1-TE-03	Library Front Right	110	N/D
11-1-TE-04	Room 202	53	N/D
11-1-TE-05	Room 206	270	N/D
11-1-TE-06	Room 208	320	N/D
11-1-TE-07	Room 214	None Detected	N/D
11-1-TE-08	Room 218	110	N/D
11-1-TE-09	Music Room	53	N/D
11-1-TE-10	Outside Control #2	5,400	N/D

*None Detected

VI. DISCUSSION:

Visual inspection of all areas inspected was acceptable with no visible mold growth, odors or moisture detected in the areas. The laboratory results of the swab sample taken on the wood panel ceiling joist in Room 132 came back as non-detect for mold spores. We believe the tested discoloration is dirt/dust.

Overall, relative humidity (RH) levels were acceptable at a range of 39.1 – 47.5% on October 29 and 48.8 – 60.9% on November 1. A few rooms: Room 214, 218, Music Room, 208, 206 and 202s showed RH levels >55% which is at the high end of the recommended range. OSHA recommends humidity control within a 20% to 60% range in their technical manual for indoor air quality investigations. Humidity above 60% adds excess moisture to the air and can contribute to microbial growth. ASHRAE has established a recommended range for RH of 30-60%. The ideal comfortable RH range has been reported as 40% to 60%, as long as building materials or contents are not adversely affected. High humidity levels can promote the growth of microorganisms on building surfaces and furnishings, and cause or contribute to microbial IAQ problems. It is recommended to maintain relative humidity levels below 55% at all times.

In addition to our visual inspection, spore trap air sampling was used to help evaluate the potential for hidden mold growth and the mold-related indoor air quality in tested areas.

Since there are no regulatory or industry standards for airborne mold, the evaluation is based on a comparison of the indoor and outdoor mold concentrations, the distribution of types of organisms identified, and considered in the context of the visual findings. The lab results showed all indoor airborne mold concentrations below the outdoor control samples collected with no elevation in indicator molds.

VII. CONCLUSION AND RECOMMENDATIONS

The results for all twenty-one rooms tested were consistent with expected background conditions and do not indicate an unusual mold condition in the tested areas. Results are deemed acceptable for continued safe occupancy.

We offer these general recommendations to reduce the risk of future mold conditions:

1. Have a qualified HVAC engineer or contractor periodically evaluate the HVAC systems to ensure proper functioning.
2. Reduce outside air intake percentage during high humidity weather conditions.
3. Carefully monitor ceiling tiles and HVAC registers and diffusers for evidence of water staining and mold. If found, respond immediately to identify and correct the source(s) of water.
4. Carry out regular preventive maintenance of all systems including inspections of air handler interiors, seasonal replacement of filters and regular cleaning of registers and diffusers. All such activities must be fully documented in the District's NJPEOSH Indoor Air Quality (IAQ) compliance files.
5. At a minimum, the District should have a portable hygrometer to monitor temperature and relative humidity. One example can be found via this link: https://www.grainger.com/product/4GE36?gclid=EAIAIQobChMI74vB5bDj3gIVjY7IC h2M9guIEAQYASABEgJLSPD_BwE&cm_mmc=PPC:+Google+PLA&ef_id=EAIAIQobChMI74vB5bDj3gIVjY7IC h2M9guIEAQYASABEgJLSPD_BwE:G:s&s_kwcid=AL12966!3!281733071186!!!g!539404094770!
6. Purchase a meter to regularly monitor basic indoor air quality parameters including temperature, relative humidity, carbon monoxide and carbon dioxide. There are a number of good meters available; one example can be found at <http://www.tsi.com/q-trak-indoor-air-quality-monitor-7575/>.

VIII. CONDITIONS and LIMITATIONS

The findings described in this report are reflective of the conditions existent at the time of inspection and testing. In the field of environmental sampling, various environmental parameters such as temperature, humidity, winds, may significantly impact the results.

Our findings and conclusions must be considered probabilities based upon professional judgment concerning the significance of the limited data gathered during the course of investigation. The results and recommendations set forth by GSE in this report will be valid as of the date of the report and are limited to the site condition at the time of investigation.

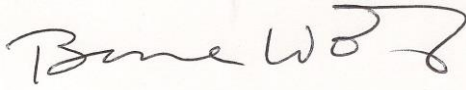
Please feel free to call GSE at 201-652-1119 with any questions about this report.

Respectfully submitted,



Tara E. Ekiert, B.S.
Industrial Hygienist

Reviewed by:



Bruce D. Wolf, MPA, HO
Sr. Vice President

TE/te/bw
Enclosure

APPENDIX I
DIGITAL IMAGES

#1 –Room 132 – Wood Paneled Ceiling Joist with dust.



#2 – Room 135 – Ceiling ventilation register with light dust.



#3 – Room 140 – Wood paneled ceiling – Normal Findings



#4 – Library – Normal Findings



#5 – Room 208 – Bottom of classroom table – normal findings.



APPENDIX II
LABORATORY CERTIFICATES
(Attached Separately)