

MOLD ASSESSMENT AND TESTING SERVICES



GEORGE WASHINGTON MIDDLE SCHOOL

1005 MOUNT VERNON AVENUE
ALEXANDRIA, VIRGINIA 22301

ECS PROJECT NO. 47:1519-C8

FOR: ALEXANDRIA CITY PUBLIC SCHOOLS

APRIL 07, 2020





April 07, 2020

Ms. Nicole Settles
Alexandria City Public Schools
1340 Braddock Place
Suite 620
Alexandria, Virginia 22314

ECS Project No. 47:1519-C8

Reference: Mold Assessment and Testing Services, George Washington Middle School, 1005 Mount Vernon Avenue, Alexandria, Virginia

Dear Ms. Settles:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide Alexandria City Public Schools with the results of the above-referenced Mold Assessment and Testing Services performed at George Washington Middle School located at 1005 Mount Vernon Avenue in Alexandria, Virginia. This report summarizes our observations, analytical results, findings, and recommendations related to the work performed. The work described in this report was performed by ECS in general accordance with the Scope of Services described in ECS Proposal Number 47:13520-EPR2 and the terms and conditions of the agreement authorizing those services.

ECS appreciates this opportunity to provide Alexandria City Public Schools with our services. If we can be of further assistance to you, please do not hesitate to contact us.

Sincerely,

ECS Mid-Atlantic, LLC

A handwritten signature in dark ink, appearing to read 'Bobby L. Rhett', with a long, sweeping flourish extending to the right.

Bobby L. Rhett
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1.0 SITE DESCRIPTION

The subject building is the George Washington Middle School located at 1005 Mount Vernon Avenue in Alexandria, Virginia. The school is divided into four "wings" designated A, B, C, and D. The oldest portion of the school is the A Wing, which is three stories high, and contains a basement boiler room and storage areas. The A Wing contains classroom spaces, offices, the auditorium and band areas, the cafeteria, and enclosed courtyards. The B Wing is two stories high, and contains the library, classrooms, offices, and mechanical space. The C Wing is one and two stories high, and contains classrooms, offices, mechanical spaces, family and consumer science rooms, industrial arts, and the Headstart and family services programs. The D Wing contains the gymnasiums, physical education, dance, and health programs.

ECS understands that occupants of the school have reported concerns of historic and ongoing water-affected building materials and suspected mold growth in various areas of the school. ECS performed several limited mold and moisture assessments over the past five years, most notably a survey of multiple areas of the school in 2017 (ECS Report Reference 47:1519-C2, December 20, 2017).

2.0 PURPOSE

The purpose of the Mold Assessment and Testing Services was to perform a non-invasive survey to evaluate concerns of moisture intrusion or visible suspected mold growth in accessible areas within the school, and to provide guidance for mold remediation.

3.0 METHODOLOGY

Mold and Moisture

ECS performed the authorized Scope of Services in general accordance with our proposal and standard industry practice(s) for the assessment of mold and moisture concerns.

Visual Survey

Walk-thru observations were made for the surveyed common areas for evidence of visible suspect mold or moisture-affected building materials. Selected readily accessible components of the Heating, Ventilation, and Air Conditioning (HVAC) equipment were assessed for overall cleanliness and evidence of moisture or microbial growth. ECS did not dismantle any HVAC units as part of this survey.

ECS conducted a visual non-invasive survey of accessible areas of the above-referenced school to assess selected building materials. The ECS site personnel observed readily accessible areas and selected building materials to evaluate visible suspect fungal growth and/or moisture impacted materials. A reasonable effort was made to identify water and mold impacted areas; however, this does not imply a guarantee that all possible reservoirs (growth or airborne) of mold growth were identified because mold or water-impacted building materials may be hidden by walls, flooring, partitions, etc.

Direct-Read Measurements

ECS conducted infrared screening of selected areas to assess thermal differences in building materials that may indicate potential moisture intrusion concerns. Potentially moisture-affected areas identified by the infrared screening were subsequently tested using a moisture meter to evaluate moisture content. ECS measured the moisture content in various building materials in multiple locations within the surveyed areas utilizing a Delmhorst Model BD 2100 moisture meter. Based on the Delmhorst moisture meter scales for materials, moisture levels greater than 1.0% for gypsum and 15% for wood materials are considered elevated. This was not a comprehensive moisture mapping survey of all building materials within the areas surveyed but rather a non-invasive survey of moisture in select areas of specific building materials which may be impacted by moisture.

Ambient temperature and relative humidity was measured during the survey using a Fluke direct read thermo-hygrometer. The purpose of these measurements was to evaluate if interior temperature and RH were sufficient to support spontaneous mold growth. Relative humidity is defined as the ratio of the amount of moisture contained in the measured air to the maximum amount of moisture the air can contain at that specific temperature. The EPA recommends maintaining the relative humidity (RH) below 60%, ideally 30 to 50%, to prevent mold growth.

Fungal Spore Air and Surface Sampling

Air samples were collected using a high volume sampling pump and Air-o-Cell® cassettes to sample ambient air for airborne fungal spores, hyphal fragments, insect fragments, and pollen. Analytical background levels on the slides of skin fragments, fibers, and other debris are also reported. Samples were collected approximately four feet from the floor to represent the approximate breathing zone. Samples were collected with an air flow of 15 liters per minute for a duration of five minutes. The sampling pumps were calibrated before and after sample collection using a calibrated rotameter.

Surfaces with visual staining or otherwise suspected of exhibiting microbial growth were sampled using surface wipe method. Samples were collected using sterile transporter swabs manufactured by Healthlink. The swabs contain Stuarts transport medium for preservation of microorganisms from the time of sampling until preparation in the laboratory.

Samples were labeled with unique identifiers and hand delivered to Aerobiology Laboratory Associates (ALA) located in Dulles, Virginia for analysis. The ALA laboratory is accredited by the Environmental Microbiology Laboratory Accreditation Program, administered by the American Industrial Hygiene Association. The air samples were analyzed for total spore concentrations in accordance with the laboratory's quantification methods. Surface samples were analyzed to identify fungal spores, hyphae, fruiting bodies, and other particulate to the genus or group level, with semi-quantitative indication of the concentration detected.

It is important to note that microbial samples represent a snapshot in time of a constantly changing microbiome. Environmental conditions such as temperature, humidity, surface moisture, wind, vibration, sunlight, and many others all have an influence on microbes in the built environment, and consequently also influence sample results. The goal of the sampling performed was not to establish precise numerical concentrations over time, but rather to generally identify the dominant fungi in the sampled locations and the general significance of their relative concentrations.

4.0 RESULTS

The following is a summary of laboratory results, findings, and observations.

4.1 Mold and Moisture

At the request of the Client, ECS visited the school building on February 29, and March 6, 2020, to perform a mold evaluation within accessible locations at the George Washington Middle School. The focus of this evaluation was to provide observations and testing services for mold within accessible areas of the school as requested by the client. ACPS staff provided ECS a list of "areas of concern" created by building occupants, although the scope of the survey was not limited to areas on the list.

Observations were made for readily accessible impacted areas and were limited in general by the presence of stored items, furniture, and/or equipment. The building was unoccupied during the observations and testing. ECS was assisted by representatives of ACPS security and building custodians for access to the surveyed areas. ECS entered each room in the building with the exception of areas listed below as inaccessible.

Building materials in the A Wing generally consisted of vinyl floor tile; brick and/or concrete masonry unit (CMU) block walls, and/or gypsum board interior partition walls; and acoustic tile ceilings. Plaster ceilings were located above the suspended acoustic tile ceilings. In some areas, one foot by one foot acoustic tile was glued to the surface of the plaster ceiling. On the third (top) floor, steel trusses and gypsum roof sheathing were located above the plaster ceilings. The space above the suspended acoustic tile ceilings was used as a return air plenum. Ventilation ducts, mechanical water pipes, domestic water pipes, sprinkler pipes, and roof drain pipes were located above the suspended ceiling.

The B, C, and D Wings appeared to be of newer construction and did not have plaster ceilings similar to the A Wing.

The following areas listed below were observed to have been impacted by significant visible water stains and/or suspected visible mold in the above-referenced school:

- The weight room walls were observed to have significant staining, likely as a result of frequent hand contact on the "climbing wall" surfaces.
- The electrical/storage room adjacent to the weight room was observed to have visible water stains and suspect visible mold growth on walls and stored materials.
- Significant water impact and suspect visible mold was observed on the floor in Classroom A336.
- Foul "dirty sock" odors were detected in the Auditorium, Auditorium Balcony, and Band Practice Room areas.
- Musty odors were detected in Classroom A129. The odors may have been related to a jar of water located in a cabinet.

- Water stains and suspect visible mold growth were observed on the wall below a pipe in File Storage Room A236.
- Water stains were observed on the wall beside the window in the LAN Room beside Band A244.
- Water stains and suspect visible mold growth were observed on the floor tile in Mechanical Room B204.
- Water stains and suspect visible mold growth were observed on wood trim in Room C200. Water stains were above the suspended ceiling in this area, and appeared to be related to past roof leaks. Water stains continued into Room C204.
- Water stains and suspect visible mold growth were observed on the wall in the custodial closet adjacent to Classroom C207.
- Significant suspect visible mold was observed on the plaster ceiling above Rooms A160, A161, A162, and A163.
- Suspect visible mold was observed on pipe insulation in the ceiling plenum in the following areas:
 - Classrooms A124, A129, A161, A162, C106;
 - Teacher's Lounge A165; and,
 - Hallway outside Classroom A160.
- Water stains were observed on the ceiling tiles below the roof drains in the following rooms:
 - Classrooms A315, A317, A111, B202;
 - Sixth Grade Counselor's Office; and,
 - Media Center Student Helpdesk Storeroom.
- Water stains were observed on the ceiling tiles below the ventilation ducts in the following rooms:
 - Classrooms A317, A202, A110, A122, C108, C112, C138, C202, D102;
 - Boy's Restroom near A220; and,
 - Girl's Restroom near A218.
- Water stains were observed on the ceiling tiles below pipes in the following rooms:
 - Resource Room A322 (copy room, bottled water room);
 - Sixth Grade Academic Principal Office;
 - Classrooms A240, A236, A228, A221, A220, A214, A212, A202, A201, A110, A111, A112, A113, A114, A119, A120, A121, A122, A124, A128, A129, A131, A136, A138, A163, C101, C109, C110, C111, C112;
 - File Room A236;
 - Conference Room and Suite 1 in A215 Offices;
 - Stairwell to Interior Courtyard outside Band A242;
 - Piano Practice Room behind Band A242;

- Hallway outside Room B100;
 - Hallway outside Mechanical Room B104; and,
 - Hallway outside Room C119.
- Water stains were observed on the ceiling tiles where the source of water was suspected as historic roof leaks or the source of water was not apparent, in the following rooms:
 - Classrooms A340, C200, C202, C204, C116, C120, C122, C125, C126, C131, C133, C135, C136, C137, C138, C140, C144;
 - Stairwell adjacent to Room B207;
 - Stairwell adjacent to the Band Room;
 - Hallway outside Rooms C200, C204, C126; and,
 - Teacher's Lounge C124.

Water staining was also observed in numerous other areas (not referenced above) on the ceiling tiles, on the ceiling plaster, and on the one-foot by one-foot ceiling tile glued to the plaster ceiling. ECS also observed some ceiling tiles that contained white paint over old discolorations (apparently from past staining from water leaks).

Water-stained ceiling tiles, some with visible suspected mold growth, were observed remaining above the suspended ceiling or stored in mechanical/electrical rooms throughout the school.

The following rooms were observed to have exterior windows left open over the weekend at the time of the survey on February 29, 2020:

- Classrooms A332, A336, A340, A344, A238, and A208.

Significantly damaged suspect asbestos-containing pipe insulation was observed above the Teacher's Lounge C124.

Classroom A342 was not able to be unlocked during the survey, and was not accessible. The basement storage areas and boiler room were excluded from the survey. The equipment storage room in the auxiliary gym and the physical education teacher's offices were inaccessible during the survey. The librarian's office was also inaccessible during the survey.

Below is a summary of the sampling data collected as part of this evaluation.

4.1.1 Spore-Trap Air Samples

Fungal spore-trap air samples were collected from selected indoor areas. Outdoor samples were collected for comparison. The following table summarizes the results of the sample analysis.

Spore-Trap Sample Results - February 29, 2020

Sample Number	Sample Location	Total Fungal Spore Concentration (spores/cubic meter)
5215-02	Weight Room	292
5228-03	Electrical Room At Weight Room	534
5248-04	Gym Entrance	280
5211-05	Gym	159
5249-06	Dance Room	253
5217-07	Bike Storage	320
5234-08	Main Office, Front	293
5246-09	Main Office, Rear	280
5210-10	A 302	240
5239-11	A 304	186
5207-12	A 308	119
5235-13	A 312	159
5245-14	A 224	187
5227-15	A 330	107
5247-16	A 336	253
5209-17	A 340	334
5223-18	A208	386
5244-19	A 212	240
5312-20	A 216	1,960
5243-21	A 223	66
5237-22	A 230	40
5212-23	A 234	27
5221-24	A 240	40
5206-25	A 242	66
5263-26	A 244	40
5258-27	Auditorium	93
5273-28	A 246	27

Sample Number	Sample Location	Total Fungal Spore Concentration (spores/cubic meter)
5254-29	A 203	40
5275-31	Cafeteria	27
5216-32	Kitchen	26
5241-33	Media Center	40
5250-34	A 108	79
5259-35	A 113	26
5218-36	A 116	13
5270-37	A 122	40
5268-38	A 161	26
5220-39	A 162	39
5224-40	A 132	13
5251-41	A 136	133
5251-42	Teacher's Lounge	119
5225-01	Outdoors 1	239
5253-30	Outdoors 2	280
5260-43	Outdoors 3	160
5264-44	Outdoors 4	173

Spore-Trap Sample Results - March 7, 2020

Sample Number	Sample Location	Total Fungal Spore Concentration (spores/cubic meter)
4417-03	C101	119
4416-04	C107	80
4095-05	C111	27
4092-06	C118	252
4448-07	C125	67
4325-08	C133	93
4332-09	C128	27



Sample Number	Sample Location	Total Fungal Spore Concentration (spores/cubic meter)
4330-10	C144	40
4395-11	C200	53
4399-12	C203	80
4093-13	C207	94
4396-14	B202	39
4094-15	D102	40
4087-01	Outdoors 1	387
4402-02	Outdoors 2	653

Interpretation of fungal spore air sample results relies on comparison of the samples collected in targeted indoor areas to samples collected in unaffected indoor areas and outdoors. For each sample set, the total fungal spore concentration was compared to outdoors to identify anomalies.

As illustrated in the tables above, the results exceeded 400 spores/m³ in only two indoor locations, Classroom A216 and the Electrical/Storage room adjacent to the weight room. Visible mold growth was observed in the electrical/storage room adjacent to the weight room. No suspect sources were identified in Classroom A216. Classroom A216 was surveyed again on March 25, 2020, and no suspected mold source was identified. The elevated result is considered likely due to custodial activities immediately prior to air sample collection. Complete tables of the air sample results are attached to this report as an appendix. The laboratory reports are also attached for reference.

There are currently no accepted regulatory standards or guidelines with respect to acceptable fungal levels inside buildings. It is important to note that spore trap measurements can fluctuate rapidly in response to environmental conditions, and the readings reported should not be used as a definitive indication that mold and or health hazards related to mold are present or absent.

4.1.2 Direct Surface Fungi Samples

Surface swab samples were collected from selected surfaces in the surveyed areas. Sample locations were selected from areas suspected to have fungal spore concentrations present due to water staining on building materials, suspect visible mold growth, or other observations made by ECS indicative of possible fungal spore growth. The laboratory reports the results in accordance with the following density rating:

- Occasional: 1-5 per slide
- Few: More than 5 per slide but less than 1 per 5 fields
- Moderate: At least 1 per 5 fields, average up to 2 per field
- Numerous: Average 3-4 per field minimum

(Note: "slide" refers to a prepared microscope slide, and a "field" refers to the microscope field of view.)

The following table summarizes the results of sample analysis.

Direct Surface Fungi Samples

Sample Number	Sample Location	Results
W-01	B 204 Mech. Room, Floor	Moderate <i>Penicillium/Aspergillus</i> group spores
W-02	Custodial Closet At C207, Wall	Few Colorless spores Occasional Rusts spores
W-03	A 336, stained floor	Numerous <i>Penicillium/Aspergillus</i> group spores Moderate <i>Chaetomium</i> spores Moderate Clear brown spores Few <i>Cladosporium</i> spores Numerous hyphal elements Moderate <i>Monodictys</i> spores
W-04	Room 236, above ceiling	Moderate <i>Stachybotrys</i> spores Occasional <i>Stachybotrys</i> conidiophores Moderate hyphal elements
W-05	LAN Room At A244, Wall	Occasional <i>Penicillium/Aspergillus</i> group spores
W-06	C-200, Wall at millwork	Numerous <i>Penicillium/Aspergillus</i> group spores Numerous <i>Chaetomium</i> Spores Few <i>Chaetomium</i> perithecia Numerous hyphal elements
W-07	Hall Outside A160, Pipe	Numerous <i>Cladosporium</i> spores Moderate hyphal elements
W-08	A161, Light Fixture	Numerous <i>Cladosporium</i> spores Moderate hyphal elements
W-09	A162, Ceiling	Moderate <i>Cladosporium</i> spores Few <i>Penicillium/Aspergillus</i> group spores Moderate hyphal elements
W-10	A165, Pipe	Numerous <i>Cladosporium</i> spores Numerous hyphal elements Few Insect pellets



Sample Number	Sample Location	Results
W-11	A138, Pipe	Numerous <i>Cladosporium</i> spores Occasional <i>Stachybotrys</i> spores Numerous hyphal elements Numerous Colorless spores
W-12	C106, Pipe	Numerous <i>Cladosporium</i> spores Occasional <i>Penicillium/Aspergillus</i> group spores Numerous hyphal elements
W-13	D102, Vent	Numerous <i>Cladosporium</i> spores Occasional <i>Epicoccum</i> spores Numerous hyphal elements Occasional <i>Pithomyces</i> spores

Samples W-2 and W-5 identified only "occasional" spores, which represents typical fungal ecology in occupied buildings and does not indicate selective growth of fungal organisms.

The results from the other eleven sampled locations indicate selective mold growth on the sampled surfaces.

There are currently no accepted regulatory standards or guidelines with respect to acceptable fungal levels inside buildings. Surface samples are generally qualitative in that they reflect the type and quantity of mold present only at the sampled location at the time the sample was collected.

5.0 RECOMMENDATIONS

Based on our understanding of the purpose of the Mold Assessment and Testing Services, the results of laboratory analysis, and our findings and observations, ECS presents the following recommendations.

Mold and Moisture

Based on our observations, visible mold, discolorations and/or water staining were observed on ceiling tiles, thermal system pipe insulation, and/or ceiling plaster in selected areas throughout the school. Elevated levels of individual fungal spores were detected in the surface swab samples collected from various locations with suspected visible mold growth throughout the school.

Based on New York City Department of Health, OSHA, and US EPA guidance, small areas of mold (up to one square foot) can be cleaned up by either custodial or contract personnel using proper protective equipment. Larger areas of fungal growth should be addressed by professional contractors with trained personnel using appropriate engineering controls and work practices. For specific areas of fungal activity were identified that should be addressed by a mold remediation contractor:



- The Electrical/Storage Room adjacent to the Weight room;
- Flooring in Classroom A336;
- Health Room D102;
- First Floor Rooms 160-165 and associated Hallway; and,
- Classroom C200.

These areas should be addressed with a Mold Remediation Protocol under separate cover.

Concurrent with or following the mold remediation, ECS recommends that the HVAC systems serving D102, the Auditorium, and Rooms 160-165 be inspected by a professional HVAC engineer/contractor for proper operation and evidence of mold. Any visible soiling should be cleaned in accordance with National Air Duct Cleaners Association (NADCA) standards.

The remaining work areas can be addressed by personnel with an awareness of mold hazards using protective equipment that includes, at a minimum, impermeable gloves, face shield or goggles, and a dust mask. Where vacuuming is necessary, workers should use a High-Efficiency Particulate Air (HEPA) filtered vacuum. Remediation activities should be performed in general accordance with the guidelines described in the EPA document "Mold Remediation in Schools and Commercial Buildings" and under the OSHA 2010 Guidelines for Mold in the Workplace.

1. All visibly water stained ceiling tiles should be removed and discarded. This includes tiles that were previously stained and have been painted. Any stained ceiling tiles stored in custodial closets, electrical closets, or other storage rooms should likewise be discarded.
 - Replacement of the ceiling tiles with new, unstained tiles is important for several reasons. This documents that the water leak has been addressed. New, unstained ceiling tiles are also needed to identify recurring leaks for appropriate action.
 - Any ceiling tiles with suspect visible mold growth (e.g. black or green stains) should be immediately bagged and the bag sealed prior to removing the tile(s) from the rooms.
2. The source of moisture affecting each location should be identified and eliminated, where possible.
 - The majority of moisture sources observed were from condensation on pipes and/or ducts, which can be eliminated through proper insulation and control of indoor humidity.
 - Pipe insulation that exhibits mold growth should be examined for insulation deficiencies. Cleaning or removing and replacing the insulation will not provide a long term solution if the source of moisture is not repaired.
3. Where water stains are below roof drains, the roof drains should be examined to determine if the drains are leaking or if the moisture is caused by condensation.
 - Classrooms A315, A317, A111, B202;
 - Sixth Grade Counselor's Office; and,
 - Media Center Student Helpdesk Storeroom.
4. Where water stains are below ventilation ducts, the duct insulation should be examined and repaired.

- Classrooms A317, A202, A110, A122, C108, C112, C138, C202, D102;
 - Boy's Restroom near A220; and,
 - Girl's Restroom near A218.
5. The weight room walls were observed to have significant staining, likely as a result of frequent hand contact on the "climbing wall" surfaces.
 - ECS understands that a thorough cleaning and disinfection of the school was performed in response to COVID-19. If the weight room walls were not thoroughly cleaned and disinfected during the COVID-19 response, they should be cleaned as part of the mold remediation using a detergent solution and stiff bristle brush.
 - This high-contact surfaces should be added to the periodic cleaning schedule
 6. The small area of water stains and visible mold growth should be cleaned from the wall in the corner of File Storage Room A236.
 7. The floor of Mechanical Room B204 should be cleaned and disinfected to remove the staining and mold growth.
 8. Staff should be reminded to close windows prior to departing for the evening. Windows in Classrooms A332, A336, A340, A344, A238, and A208 were open over the weekend.
 9. The HVAC diffuser vent covers that are visibly soiled should be removed and cleaned with a detergent solution and a stiff bristle brush. If the vents are unable to be cleaned, they should be disposed of and replaced with new vent covers.
 10. The survey and recommendations are limited to mold and moisture, and do not include remediation or abatement for asbestos, lead, or other hazardous containing materials. ECS is aware of the presence of some asbestos-containing materials within the school. Prior to performing any remediation work or other disturbance related to mold remediation, the building owner should address abatement of hazardous materials. All federal, state, and local regulations should be followed.
 - Significantly damaged suspect asbestos-containing pipe insulation was observed above the Teacher's Lounge C124.
 11. As an ongoing measure, ECS recommends that all staff and faculty be directed, encouraged, and reminded to report all water stains or moisture intrusion concerns promptly to facilities personnel to be addressed.
 12. After moisture intrusion concerns have been identified and corrected, and mold remediation has been completed, ECS recommends performing post remediation services for the above-referenced school. Post remediation services include performing a visual survey and possibly testing services. The industrial hygienist will require that negative air machines be turned off for a period of 24 to 48 hours prior to any air testing (if performed).

Because of the nature of the environment, complete elimination of all microbial organisms within a building cannot be expected and is not the goal of remediation. The goal of remediation is to restore the affected materials to at least the condition of unaffected materials. It is important to note that the reported mold levels are only reflective of conditions at the time of this test and that mold populations can vary over time, depending upon a number of conditions, including environmental factors (i.e., temperature and relative humidity).

Note: The purpose of this survey was to evaluate areas where visible or apparent mold growth and/or moisture intrusion has occurred and provide findings and recommendations for remedial work efforts. Identification and recommendation(s) for correction of all moisture intrusion concerns was outside of the scope of services for this work. As good practice all moisture intrusion concerns should be identified and corrected by a qualified contractor/engineer.

6.0 LIMITATIONS

The conclusions and recommendations presented within this report are based upon a reasonable level of assessment within normal bounds and standards of professional practice for a site in this particular geographic setting. ECS is not responsible or liable for the discovery and elimination of hazards that may potentially cause damage, accidents, or injuries.

This survey is not intended to represent an exhaustive research of every potential hazard or condition that may exist, nor does it claim to represent indoor conditions or events that arise after the survey. This report has been prepared in accordance with generally accepted environmental practices. Our conclusions and findings are based, in part, upon information provided to us by others and our site observations. We have not verified the completeness or accuracy of the information provided by others. The scope of services performed was limited to those requested by the Client and does not constitute a full microbial assessment of the site or a comprehensive moisture survey of the site. The data provided in this study is only indicative of conditions sampled at the immediate time of the study.

This report does not warrant against future operations or conditions, nor does it warrant against extant, or future, conditions of a type or at a location not investigated. Because of the nature of this type of work and the difficulties involved in conducting remediation work, ECS cannot guarantee that the methods or recommendations described in this report will eliminate all potential indoor air quality issues. Since performance of the remediation work is also beyond ECS scope of services, ECS also cannot be held responsible for the execution of the remediation work. The reported microbial levels are only reflective of conditions at the time of this test and that microbial populations can vary over time, depending upon a number of conditions, including environmental factors (i.e., temperature and relative humidity). The work performed in conjunction with this assessment and the data developed is intended as a description of available information at the dates and locations given.

The observations, conclusions, and recommendations pertaining to environmental conditions at the subject site are necessarily limited to conditions observed, and/or materials reviewed at the time this study was undertaken. No warranty, expressed or implied, is made with regard to the conclusions and recommendations presented within this report. This report is provided for the exclusive use of the client. This report is not intended to be used or relied upon in connection with other projects or by other unidentified third parties without the written consent of ECS and the client.

Our recommendations are in part based on federal, state, and local regulations and guidelines. ECS does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state, or federal public agencies, any conditions at the site that may present a potential danger to public health, safety, or the environment. Under this scope of services, ECS assumes no responsibility regarding any response actions initiated as a result of these findings. General compliance with regulations and response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements.



Appendix I: Fungal Spore Air Sample Results



Fungal Spore Trap Air Sample Results Gym, Library, Main Office, Cafeteria

Sample Number	Sample Location	Organisms Identified									Total*
		Ascospores	Basidiospores	Chaetomium	Cladosporium	Gliomastix	Hyphae / Hyphal fragments	Penicillium/Aspergillus	Pithomyces	Smuts/Periconia/Myxomycetes	
5215-02	Weight Room		93	13	27		13	133	13		292
5228-03	Electrical Room At Weight Room	27	387		40		27	53			534
5248-04	Gym Entrance	13	147		40			67		13	280
5211-05	Gym		93				13	53			159
5249-06	Dance Room	27	133				13	67		13	253
5217-07	Bike Storage	13	200				13	67		27	320
5234-08	Main Office, Front		173		80			27		13	293
5246-09	Main Office, Rear		107		27	13	40	40		53	280
5275-31	Cafeteria		27								27
5216-32	Kitchen		13					13			26
5241-33	Media Center	13	27								40
5225-01	Outdoors 1		93					133		13	239
5253-30	Outdoors 2	40	160		27	13	13	27			280
5260-43	Outdoors 3		80		27			40		13	160
5264-44	Outdoors 4	13	67		27			53		13	173

All results are in spores per cubic meter (spores/m3)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.



Fungal Spore Trap Air Sample Results A Wing, 3rd Floor

Sample Number	Sample Location	Organisms Identified									Total*
		Ascospores	Basidiospores	Cladosporium	Epicoccum	Hyphae / Hyphal fragments	Penicillium/Aspergillus	Smuts/Periconia/Myxomycetes	Unknown/Other		
5210-10	A 302		107			13	67	53			240
5239-11	A 304		107	13		13	53				186
5207-12	A 308		93				13	13			119
5235-13	A 312		93	13		27	13			13	159
5227-15	A 330		40				67				107
5247-06	A 336	13	120	27			80	13			253
5209-17	A 340	27	160	40			107				334
5225-01	Outdoors 1		93				133	13			239
5253-30	Outdoors 2	40	160	27	13	13	27				280
5260-43	Outdoors 3		80	27			40	13			160
5264-44	Outdoors 4	13	67	27			53	13			173

All results are in spores per cubic meter (spores/m³)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.



Fungal Spore Trap Air Sample Results A Wing, 2nd Floor

Sample Number	Sample Location	Organisms Identified							Total*
		Ascospores	Basidiospores	Cladosporium	Gliomastix	Hyphae / Hyphal fragments	Penicillium/Aspergillus	Smuts/Periconia/Myxomycetes	
5245-14	A 224	27	107	13		27	13		187
5223-18	A208		187	93		13	93		386
5244-19	A 212		120	13		27	80		240
5312-20	A 216	40	227	53		67	1,560	13	1,960
5243-21	A 223		53				13		66
5237-22	A 230		27			13			40
5212-23	A 234		27						27
5221-24	A 240		27	13					40
5206-25	A 242		40			13	13		66
5263-26	A 244	13	27						40
5258-27	Auditorium		40	27		13	13		93
5273-28	A 246		27						27
5254-29	A 203		40						40
5225-01	Outdoors 1		93				133	13	239
5253-30	Outdoors 2	40	160	27	13	13	27		280
5260-43	Outdoors 3		80	27			40	13	160
5264-44	Outdoors 4	13	67	27			53	13	173

All results are in spores per cubic meter (spores/m3)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.



Fungal Spore Trap Air Sample Results A Wing, 1st Floor

Sample Number	Sample Location	Organisms Identified								Total*
		Ascospores	Basidiospores	Cladosporium	Gliomastix	Hyphae / Hyphal fragments	Penicillium/Aspergillus	Smuts/Periconia/Myxomycetes	Clear Brown	
5250-34	A 108		13			13	53			79
5259-35	A 113		13				13			26
5218-36	A 116		13							13
5270-37	A 122		13				27			40
5268-38	A 161		13			13				26
5220-39	A 162		13	13					13	39
5224-40	A 132		13							13
5251-41	A 136		53			27	53			133
5251-42	Teacher's Lounge	13	53				40	13		119
5225-01	Outdoors 1		93				133	13		239
5253-30	Outdoors 2	40	160	27	13	13	27			280
5260-43	Outdoors 3		80	27			40	13		160
5264-44	Outdoors 4	13	67	27			53	13		173

All results are in spores per cubic meter (spores/m³)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.



Fungal Spore Trap Air Sample Results C and D Wings, 1st Floor

Sample Number	Sample Location	Organisms Identified						Total*
		Ascospores	Basidiospores	Cladosporium	Hyphae / Hyphal fragments	Penicillium/Aspergillus	Smuts/Periconia/Myxomycetes	
4417-03	C101		53	13		53		119
4416-04	C107		40			40		80
4095-05	C111		27					27
4092-06	C118	40	53		13	133	13	252
4448-07	C125		27	13		27		67
4325-08	C133		40	13		40		93
4332-09	C128		27					27
4330-10	C144		40					40
4094-15	D102		13			27		40
4087-01	Outdoors 1	13	307	27		27	13	387
4402-02	Outdoors 2		120	53		227	253	653

All results are in spores per cubic meter (spores/m3)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.



Fungal Spore Trap Air Sample Results C and D Wings, 2nd Floor

Sample Number	Sample Location	Organisms Identified					Total*
		Ascospores	Basidiospores	Cladosporium	Penicillium/ Aspergillus	Smuts/Periconia/ Myxomycetes	
4395-11	C200		13	27		13	53
4399-12	C203		40	27	13		80
4093-13	C207		27		67		94
4396-14	B202	13		13	13		39
4087-01	Outdoors 1	13	307	27	27	13	387
4402-02	Outdoors 2		120	53	227	253	653

All results are in spores per cubic meter (spores/m³)
 Blank = None detected **Bold** = organisms of concern detected in greater concentrations indoors than outdoors
 *Note: Total counts may not match laboratory reports due to rounding.

Appendix II: Fungal Spore Surface Sample Results



Fungal Spore Surface Sample Results

Sample #	Sample Location	Fungal spores (direct microscopic exam)
W-01	B 204 Mech. Room Floor	Moderate Penicillium/Aspergillus group spores
W-02	Closet At C207 Wall	Few Colorless spores Occasional Rusts spores
W-03	A 336 Floor	Numerous Penicillium/Aspergillus group spores Moderate Chaetomium spores Moderate Clear brown spores Few Cladosporium spores Numerous hyphal elements Moderate Monodictys spores
W-04	Room 236 Ceiling	Moderate Stachybotrys spores Occasional Stachybotrys conidiophores Moderate hyphal elements
W-05	LAN Room At A244 Wall	Occasional Penicillium/Aspergillus group spores
W-06	C-200 Wall	Numerous Penicillium/Aspergillus group spores Numerous Chaetomium Spores Few Chaetomium perithecia Numerous hyphal elements
W-07	Hall Outside A160, Pipe Insulation	Numerous Cladosporium spores Moderate hyphal elements
W-08	Classroom A161, Top of Light Fixture	Numerous Cladosporium spores Moderate hyphal elements
W-09	A162, Ceiling	Moderate Cladosporium spores Few Penicillium/Aspergillus group spores Moderate hyphal elements
W-10	A165, Pipe	Numerous Cladosporium spores Numerous hyphal elements Few Insect pellets
W-11	A138, Pipe	Numerous Cladosporium spores Occasional Stachybotrys spores Numerous hyphal elements Numerous Colorless spores
W-12	C106, Pipe	Numerous Cladosporium spores Occasional Penicillium/Aspergillus group spores Numerous hyphal elements
W-13	D102, Vent	Numerous Cladosporium spores Occasional Epicoccum spores Numerous hyphal elements Occasional Pithomyces spores

Notes: Bold = Organisms and/or concentrations of concern.
 The laboratory reports the direct microscopic examination results in accordance with the following density rating:
Occasional = 1-5 per slide; Few = More than 5 per slide but less than 1 per 5 fields;
Moderate = At least 1 per 5 fields, average up to 2 per field; Numerous = Average 3-4 per field minimum;
 "Slide" refers to a prepared specimen on a microscope slide, and "field" refers to the microscope field of view, approximately 1/1,000 of a slide.
Hyphae are the vegetative growth of fungal organisms. Conidiophores or fruiting bodies are the reproductive structures on some fungi that generate spores.

Note: There are no regulations or industry standards for surface concentrations. AIHA and ACGIH guidance does not support numerical classification, and focuses on the type of organisms identified and evidence of selective amplification.

Appendix III: Laboratory Report(s)

ECS Mid Atlantic, LLC
14026 Thunderbolt Place
Chantilly, Virginia 20151
Attn: Bobby Rhett
Project: **47-1519-C8 GWMS**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 02/29/2020
Date Received: 03/02/2020
Date Analyzed: 03/03/2020
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Project ID: 20008713
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1054 Spore Trap Analysis: SOP 3.8

Client Sample Number	5225-01				5215-02				5228-03				5264-44			
Sample Location	Outdoors 1				Weight Room				Electrical Room At Weight Room				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-001				20008713-002				20008713-003				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	2	27	5	2/1	1	13	8	-
basidiospores	7	93	39	1/1	7	93	32	1/1	29	387	72	6/1	5	67	38	-
Chaetomium	-	-	-	-	1	13	5	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	2	27	9	1/1	3	40	8	2/1	2	27	15	-
hyphal elements	-	-	-	-	1	13	5	-	2	27	5	-	-	-	-	-
Penicillium/Aspergillus group	10	133	56	3/1	10	133	45	3/1	4	53	10	1/1	4	53	31	-
Pithomyces	-	-	-	-	1	13	5	-	-	-	-	-	-	-	-	-
Smuts,Periconia,Myxomycetes	1	13	6	1/1	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	18	240	~100%	1/1	22	293	~100%	2/1	40	533	~100%	3/1	13	173	~100%	-

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Client Sample Number	5248-04				5211-05				5249-06				5264-44			
Sample Location	Gym Entrance				Gym				Dance Room				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-004				20008713-005				20008713-006				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	1	13	5	1/1	-	-	-	-	2	27	11	2/1	1	13	8	-
basidiospores	11	147	52	2/1	7	93	58	1/1	10	133	53	2/1	5	67	38	-
Cladosporium	3	40	14	2/1	-	-	-	-	-	-	-	-	2	27	15	-
hyphal elements	-	-	-	-	1	13	8	-	1	13	5	-	-	-	-	-
Penicillium/Aspergillus group	5	67	24	1/1	4	53	33	1/1	5	67	26	1/1	4	53	31	-
Smuts,Periconia,Myxomycetes	1	13	5	1/1	-	-	-	-	1	13	5	1/1	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	21	280	~100%	2/1	12	160	~100%	1/1	19	253	~100%	1/1	13	173	~100%	-

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Client Sample Number	5217-07				5234-08				5246-09				5264-44			
Sample Location	Bike Storage				Main Office, Front				Main Office, Rear				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-007				20008713-008				20008713-009				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	1	13	4	1/1	-	-	-	-	-	-	-	-	1	13	8	-
basidiospores	15	200	62	3/1	13	173	59	3/1	8	107	38	2/1	5	67	38	-
Cladosporium	-	-	-	-	6	80	27	3/1	2	27	10	1/1	2	27	15	-
Gliomastix	-	-	-	-	-	-	-	-	1	13	5	-	-	-	-	-
hyphal elements	1	13	4	-	-	-	-	-	3	40	14	-	-	-	-	-
Penicillium/Aspergillus group	5	67	21	1/1	2	27	9	1/2	3	40	14	1/1	4	53	31	-
Smuts,Periconia,Myxomycetes	2	27	8	2/1	1	13	5	1/1	4	53	19	4/1	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	24	320	~100%	2/1	22	293	~100%	2/1	21	280	~100%	2/1	13	173	~100%	-

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Client Sample Number	5210-10				5239-11				5207-12				5264-44			
Sample Location	A 302				A 304				A 308				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-010				20008713-011				20008713-012				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
basidiospores	8	107	44	2/1	8	107	57	2/1	7	93	78	1/1	5	67	38	-
Cladosporium	-	-	-	-	1	13	7	1/2	-	-	-	-	2	27	15	-
hyphal elements	1	13	6	-	1	13	7	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	5	67	28	1/1	4	53	29	1/1	1	13	11	1/4	4	53	31	-
Smuts,Periconia,Myxomycetes	4	53	22	4/1	-	-	-	-	1	13	11	1/1	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	18	240	~100%	1/1	14	187	~100%	1/1	9	120	~100%	1/1	13	173	~100%	-

ECS Mid Atlantic, LLC
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Client Sample Number	5235-13				5245-14				5227-15				5264-44			
Sample Location	A 312				A 224				A 330				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-013				20008713-014				20008713-015				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	2	27	14	2/1	-	-	-	-	1	13	8	-
basidiospores	7	93	58	1/1	8	107	57	2/1	3	40	38	1/2	5	67	38	-
Cladosporium	1	13	8	1/2	1	13	7	1/2	-	-	-	-	2	27	15	-
hyphal elements	2	27	17	-	2	27	14	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	1	13	8	1/4	1	13	7	1/4	5	67	62	1/1	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
Unknown	1	13	8	-	-	-	-	-	-	-	-	-	-	-	-	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	12	160	~100%	1/1	14	187	~100%	1/1	8	107	~100%	1/2	13	173	~100%	-

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Client Sample Number	5247-06				5209-17				5223-18				5264-44			
Sample Location	A 336				A 340				A 208				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-016				20008713-017				20008713-018				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	1	13	5	1/1	2	27	8	2/1	-	-	-	-	1	13	8	-
basidiospores	9	120	47	2/1	12	160	48	2/1	14	187	48	3/1	5	67	38	-
Cladosporium	2	27	11	1/1	3	40	12	2/1	7	93	24	4/1	2	27	15	-
hyphal elements	-	-	-	-	-	-	-	-	1	13	3	-	-	-	-	-
Penicillium/Aspergillus group	6	80	32	2/1	8	107	32	2/1	7	93	24	2/1	4	53	31	-
Smuts,Periconia,Myxomycetes	1	13	5	1/1	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	19	253	~100%	1/1	25	333	~100%	2/1	29	387	~100%	2/1	13	173	~100%	-

ECS Mid Atlantic, LLC
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Chantilly, Virginia 20151
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Client Sample Number	5244-19				5312-20				5243-21				5264-44			
Sample Location	A 212				A 216				A 223				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-019				20008713-020				20008713-021				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	3	40	2	3/1	-	-	-	-	1	13	8	-
basidiospores	9	120	50	2/1	17	227	12	3/1	4	53	80	1/1	5	67	38	-
Cladosporium	1	13	6	1/2	4	53	3	2/1	-	-	-	-	2	27	15	-
hyphal elements	2	27	11	-	5	67	3	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	6	80	33	2/1	117	1560	80	29/1	1	13	20	1/4	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	1	1/1	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	18	240	~100%	1/1	147	1960	~100%	11/1	5	67	~100%	1/3	13	173	~100%	-

ECS Mid Atlantic, LLC
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Date Analyzed: 03/03/2020
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Client Sample Number	5237-22				5212-23				5221-24				5264-44			
Sample Location	A 230				A 234				A 240				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-022				20008713-023				20008713-024				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
basidiospores	2	27	67	1/3	2	27	100	1/3	2	27	67	1/3	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	1	13	33	1/2	2	27	15	-
hyphal elements	1	13	33	-	-	-	-	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	-	-	-	-	-	-	-	-	-	-	-	-	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	3	40	~100%	1/4	2	27	~100%	1/7	3	40	~100%	1/4	13	173	~100%	-

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Project: **47-1519-C8 GWMS**
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Client Sample Number	5206-25				5263-26				5258-27				5264-44			
Sample Location	A 242				A 244				Auditorium				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-025				20008713-026				20008713-027				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	33	1/1	-	-	-	-	1	13	8	-
basidiospores	3	40	60	1/2	2	27	67	1/3	3	40	43	1/2	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	2	27	29	1/1	2	27	15	-
hyphal elements	1	13	20	-	-	-	-	-	1	13	14	-	-	-	-	-
Penicillium/Aspergillus group	1	13	20	1/4	-	-	-	-	1	13	14	1/4	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments																
Total *See Footnotes	5	67	~100%	1/3	3	40	~100%	1/4	7	93	~100%	1/2	13	173	~100%	-

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Client Sample Number	5273-28				5254-29				5253-30				5264-44			
Sample Location	A 246				A 203				Outdoor 2				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-028				20008713-029				20008713-030				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	3	40	14	3/1	1	13	8	-
basidiospores	2	27	100	1/3	3	40	100	1/2	12	160	57	2/1	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	2	27	10	1/1	2	27	15	-
Epicoccum	-	-	-	-	-	-	-	-	1	13	5	-	-	-	-	-
hyphal elements	-	-	-	-	-	-	-	-	1	13	5	-	-	-	-	-
Penicillium/Aspergillus group	-	-	-	-	-	-	-	-	2	27	10	1/2	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 1				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.															
Total *See Footnotes	2	27	~100%	1/7	3	40	~100%	1/4	21	280	~100%	2/1	13	173	~100%	-

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Client Sample Number	5275-31				5216-32				5241-33				5264-44			
Sample Location	Cafeteria				Kitchen				Media Center				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-031				20008713-032				20008713-033				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	1	13	33	1/1	1	13	8	-
basidiospores	2	27	100	1/3	1	13	50	1/5	2	27	67	1/3	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	-	-	-	-	2	27	15	-
Penicillium/Aspergillus group	-	-	-	-	1	13	50	1/4	-	-	-	-	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 1				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.															
Total *See Footnotes	2	27	~100%	1/7	2	27	~100%	1/7	3	40	~100%	1/4	13	173	~100%	-

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Client Sample Number	5250-34				5259-35				5218-36				5264-44			
Sample Location	A 108				A 113				A 116				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-034				20008713-035				20008713-036				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
basidiospores	1	13	17	1/5	1	13	50	1/5	1	13	100	1/5	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	-	-	-	-	2	27	15	-
hyphal elements	1	13	17	-	-	-	-	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	4	53	67	1/1	1	13	50	1/4	-	-	-	-	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 2				Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments									Very light trace.							
Total *See Footnotes	6	80	~100%	1/2	2	27	~100%	1/7	1	13	~100%	1/13	13	173	~100%	-

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Client Sample Number	5270-37				5268-38				5220-39				5264-44			
Sample Location	A 122				A 161				A 162				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-037				20008713-038				20008713-039				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
basidiospores	1	13	33	1/5	1	13	50	1/5	1	13	33	1/5	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	1	13	33	1/2	2	27	15	-
Clear brown	-	-	-	-	-	-	-	-	1	13	33	-	-	-	-	-
hyphal elements	-	-	-	-	1	13	50	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	2	27	67	1/2	-	-	-	-	-	-	-	-	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	-	-	-	-	1	13	8	-
	Debris Rating 2				Debris Rating 1				Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments					Very light trace.				Very light trace.							
Total *See Footnotes	3	40	~100%	1/4	2	27	~100%	1/7	3	40	~100%	1/4	13	173	~100%	-

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Client Sample Number	5224-40				5251-41				5251-42				5264-44			
Sample Location	A 132				A 136				Teacher's Lounge				Outdoors 4			
Sample Volume (L)	75				75				75				75			
Lab Sample Number	20008713-040				20008713-041				20008713-042				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	-	-	-	-	1	13	11	1/1	1	13	8	-
basidiospores	1	13	100	1/5	4	53	40	1/1	4	53	44	1/1	5	67	38	-
Cladosporium	-	-	-	-	-	-	-	-	-	-	-	-	2	27	15	-
hyphal elements	-	-	-	-	2	27	20	-	-	-	-	-	-	-	-	-
Penicillium/Aspergillus group	-	-	-	-	4	53	40	1/1	3	40	33	1/1	4	53	31	-
Smuts,Periconia,Myxomycetes	-	-	-	-	-	-	-	-	1	13	11	1/1	1	13	8	-
	Debris Rating 1				Debris Rating 2				Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.															
Total *See Footnotes	1	13	~100%	1/13	10	133	~100%	1/1	9	120	~100%	1/1	13	173	~100%	-

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Client Sample Number	5260-43				5264-44			
Sample Location	Outdoors 3				Outdoors 4			
Sample Volume (L)	75				75			
Lab Sample Number	20008713-043				20008713-044			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	8	-
basidiospores	6	80	50	1/1	5	67	38	-
Cladosporium	2	27	17	1/1	2	27	15	-
Penicillium/Aspergillus group	3	40	25	1/1	4	53	31	-
Smuts,Periconia,Myxomycetes	1	13	8	1/1	1	13	8	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments								
Total *See Footnotes	12	160	~100%	1/1	13	173	~100%	-

Client Sample #: W-01
Sample Location: B 204 Mech. Room Floor
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-045

Results:
Moderate Penicillium/Aspergillus group spores seen

Observation
1 per 5 fields

Debris Rating: 2

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Client Sample #: W-02
Sample Location: Closet At C207 Wall
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-046

Results:

Few Colorless spores seen
Occasional Rusts spores seen

Observation
5 per cover slip
1-5 per cover slip

Debris Rating: 2

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Client Sample #: W-03
Sample Location: A 336 Floor
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-047

Results:	Observation
Moderate Chaetomium spores seen	1 per 5 fields
Few Cladosporium spores seen	5 per cover slip
Moderate Clear brown spores seen	1 per 5 fields
Numerous hyphal elements seen	3-4 per field (minimum)
Moderate Monodictys spores seen	1 per 5 fields
Numerous Penicillium/Aspergillus group spores seen	3-4 per field (minimum)

Debris Rating: 4

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Client Sample #: W-04
Sample Location: Room 236 Ceiling
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-048

Results:	Observation
Moderate hyphal elements seen	1 per 5 fields
Moderate Stachybotrys spores seen	1 per 5 fields
Occasional Stachybotrys conidiophores seen	1-5 per cover slip

Debris Rating: 3

Client Sample #: W-05
Sample Location: LAN Room At A244 Wall
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-049

Results:	Observation
Occasional Penicillium/Aspergillus group spores seen	1-5 per cover slip

Debris Rating: 4

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Client Sample #: W-06
Sample Location: C-200 Wall
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20008713-050

Results:	Observation
Numerous Chaetomium spores seen	3-4 per field (minimum)
Few Chaetomium perithecia seen	5 per cover slip
Numerous hyphal elements seen	3-4 per field (minimum)
Numerous Penicillium/Aspergillus group spores seen	3-4 per field (minimum)

Debris Rating: 4

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Footnotes and Additional Report Information

Debris Rating Table

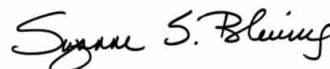
1	Minimal (<5%) particulate present	Reported values are minimally affected by particulate load.
2	5% to 25% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
3	26% to 75% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
4	75% to 90% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
5	Greater than 90% of the trace occluded with particulate	Quantification not possible due to large negative bias. A new sample should be collected at a shorter time interval or other measures taken to reduce particulate load.

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1. Penicillium/Aspergillus group spores are characterized by their small size, round to ovoid shape, being unicellular, and usually colorless to lightly pigmented. There are numerous genera of fungi whose spore morphology is similar to that of the Penicillium/Aspergillus type. Two common examples would be Paecilomyces and Acremonium. Although the majority of spores placed in this group are Penicillium, Aspergillus, or a combination of both. Keep in mind that these are not the only two possibilities.
2. Ascospores are sexually produced fungal spores formed within an ascus. An ascus is a sac-like structure designed to discharge the ascospores into the environment, e.g. Ascobolus.
3. Basidiospores are typically blown indoors from outdoors and rarely have an indoor source. However, in certain situations a high basidiospore count indoors may be indicative of a wood decay problem or wet soil.
4. The colorless group contains colorless spores which were unidentifiable to a specific genus. Examples of this group include Acremonium, Aphanocladium, Beauveria, Chrysosporium, Engyodontium microconidia, yeast, some arthrospores, as well as many others.
5. Hyphae are the vegetative mode of fungi. Hyphal elements are fragments of individual Hyphae. They can break apart and become airborne much like spores and are potentially allergenic. A mass of hyphal elements is termed the mycelium. Hyphae in high concentration may be indicative of colonization.
6. Dash (-) in this report, under raw count column means 'not detected (ND)'; otherwise 'not applicable' (NA).
7. The positive-hole correction factor is a statistical tool which calculates a probable count from the raw count, taking into consideration that multiple particles can impact on the same hole; for this reason the sum of the calculated counts may be less than the positive hole corrected total.
8. Due to rounding totals may not equal 100%.
9. Analytical Sensitivity for each spores is different for Non-viable sample when the spores are read at different percentage. Analytical Sensitivity is calculated as spr/m^3 divided by raw count. $spr/m^3 = \text{raw counts} \times (100/\% \text{ read}) \times (1000/\text{Sample volume})$. If Analytical Sensitivity is $13 spr/m^3$ at 100% read, Analytical Sensitivity at 50% read would be $27 spr/m^3$, which is 2 times higher. Analytical Sensitivity provided on the report is based on an assumed 100% of the trace being analyzed.
10. Minimum Reporting Limits (MRL) for BULKs, DUSTS, SWABS, and WATER samples are a calculation based on the sample size and the dilution plate on which the organism was counted. Results are a compilation of counts taken from multiple dilutions and multiple medias. This means that every genus of fungi or bacteria recovered can be counted on the plate on which it is best represented.
11. If the final quantitative result is corrected for contamination based on the blank, the blank correction is stated in the sample comments section of the report.
12. The results in this report are related to this project and these samples only.
13. For samples with an air volume of < 100L, the number of significant figures in the result should be considered (2) two. For samples with air volumes between 100-999L, the number of significant figures in the result should be considered (3) three. For example, a sample with a result of 55,443 spr/m^3 from a 75L sample using significant figures should be considered 55,000. The same result of 55,443 from a 150L sample using significant figures should be considered 55,400 spr/m^3 .
14. If the In/Out ratio is greater than 100 times it is indicated >100/1, rather than showing the real value.

Terminology Used in Direct Exam Reporting

Conidiophores are a type of modified hyphae from which spores are born. When seen on a surface sample in moderate to numerous concentrations they may be indicative of fungal growth.



Suzanne S. Blevins, B.S., SM (ASCP)

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14026 Thunderbolt Place
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Condition of Sample(s) Upon Receipt: Acceptable

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Laboratory Director

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Project: **47-1519-C8 GWMS**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 03/07/2020
Date Received: 03/09/2020
Date Analyzed: 03/11/2020
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1054 Spore Trap Analysis: SOP 3.8

Client Sample Number	4402-02				4087-01			
Sample Location	Outdoors				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-002				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	9	120	18	1/3	23	307	79	-
Cladosporium	4	53	8	2/1	2	27	7	-
Penicillium/Aspergillus group	17	227	35	9/1	2	27	7	-
Smuts,Periconia,Myxomycetes	19	253	39	19/1	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments								
Total *See Footnotes	49	653	~100%	2/1	29	387	~100%	-

Client Sample Number	4417-03				4087-01			
Sample Location	C101				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-003				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	4	53	44	1/6	23	307	79	-
Cladosporium	1	13	11	1/2	2	27	7	-
Penicillium/Aspergillus group	4	53	44	2/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments								
Total *See Footnotes	9	120	~100%	1/3	29	387	~100%	-

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Attn: Bobby Rhett
Project: **47-1519-C8 GWMS**
Condition of Sample(s) Upon Receipt: Acceptable

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Client Sample Number	4416-04				4087-01			
Sample Location	C107				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-004				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	3	40	50	1/8	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	3	40	50	2/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments								
Total *See Footnotes	6	80	~100%	1/5	29	387	~100%	-

Client Sample Number	4095-05				4087-01			
Sample Location	C111				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-005				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	2	27	100	1/12	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	-	-	-	-	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments	Very light trace.							
Total *See Footnotes	2	27	~100%	1/15	29	387	~100%	-

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Client Sample Number	4092-06				4087-01			
Sample Location	C118				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-006				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	3	40	16	3/1	1	13	3	-
basidiospores	4	53	21	1/6	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
hyphal elements	1	13	5	-	-	-	-	-
Penicillium/Aspergillus group	10	133	53	5/1	2	27	7	-
Smuts,Periconia,Myxomycetes	1	13	5	1/1	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments								
Total *See Footnotes	19	253	~100%	1/2	29	387	~100%	-

Client Sample Number	4448-07				4087-01			
Sample Location	C125				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-007				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	2	27	40	1/12	23	307	79	-
Cladosporium	1	13	20	1/2	2	27	7	-
Penicillium/Aspergillus group	2	27	40	1/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments								
Total *See Footnotes	5	67	~100%	1/6	29	387	~100%	-

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Client Sample Number	4325-08				4087-01			
Sample Location	C133				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-008				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	3	40	43	1/8	23	307	79	-
Cladosporium	1	13	14	1/2	2	27	7	-
Penicillium/Aspergillus group	3	40	43	2/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 2				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments								
Total *See Footnotes	7	93	~100%	1/4	29	387	~100%	-

Client Sample Number	4332-09				4087-01			
Sample Location	C128				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-009				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	2	27	100	1/12	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	-	-	-	-	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.							
Total *See Footnotes	2	27	~100%	1/15	29	387	~100%	-

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Client Sample Number	4330-10				4087-01			
Sample Location	C144				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-010				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	3	40	100	1/8	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	-	-	-	-	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.							
Total *See Footnotes	3	40	~100%	1/10	29	387	~100%	-

Client Sample Number	4395-11				4087-01			
Sample Location	C200				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-011				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	1	13	25	1/23	23	307	79	-
Cladosporium	2	27	50	1/1	2	27	7	-
Penicillium/Aspergillus group	-	-	-	-	2	27	7	-
Smuts,Periconia,Myxomycetes	1	13	25	1/1	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.							
Total *See Footnotes	4	53	~100%	1/7	29	387	~100%	-

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Client Sample Number	4399-12				4087-01			
Sample Location	C203				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-012				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	3	40	50	1/8	23	307	79	-
Cladosporium	2	27	33	1/1	2	27	7	-
Penicillium/Aspergillus group	1	13	17	1/2	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.							
Total *See Footnotes	6	80	~100%	1/5	29	387	~100%	-

Client Sample Number	4093-13				4087-01			
Sample Location	C207				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-013				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	2	27	29	1/12	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	5	67	71	3/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m ³				Analytical Sensitivity: 13 spr/m ³			
Comments	Very light trace.							
Total *See Footnotes	7	93	~100%	1/4	29	387	~100%	-

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Client Sample Number	4396-14				4087-01			
Sample Location	B202				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-014				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	1	13	33	1/1	1	13	3	-
basidiospores	-	-	-	-	23	307	79	-
Cladosporium	1	13	33	1/2	2	27	7	-
Penicillium/Aspergillus group	1	13	33	1/2	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments	Very light trace.							
Total *See Footnotes	3	40	~100%	1/10	29	387	~100%	-

Client Sample Number	4094-15				4087-01			
Sample Location	D102				Outdoors			
Sample Volume (L)	75				75			
Lab Sample Number	20009864-015				20009864-001			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	1	13	3	-
basidiospores	1	13	33	1/23	23	307	79	-
Cladosporium	-	-	-	-	2	27	7	-
Penicillium/Aspergillus group	2	27	67	1/1	2	27	7	-
Smuts,Periconia,Myxomycetes	-	-	-	-	1	13	3	-
	Debris Rating 1				Debris Rating 2			
Analytical Sensitivity	Analytical Sensitivity: 13 spr/m³				Analytical Sensitivity: 13 spr/m³			
Comments	Very light trace.							
Total *See Footnotes	3	40	~100%	1/10	29	387	~100%	-

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Client Sample #: W-07
Sample Location: Hall Outside A160, Pipe
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-016

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Moderate hyphal elements seen	1 per 5 fields

Debris Rating: 2

Client Sample #: W-08
Sample Location: A161, Light Fixture
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-017

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Moderate hyphal elements seen	1 per 5 fields

Debris Rating: 3

Client Sample #: W-09
Sample Location: A162, Ceiling
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-018

Results:	Observation
Moderate Cladosporium spores seen	1 per 5 fields
Moderate hyphal elements seen	1 per 5 fields
Few Penicillium/Aspergillus group spores seen	5 per cover slip

Debris Rating: 1

Client Sample #: W-10
Sample Location: A165, Pipe
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-019

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Numerous hyphal elements seen	3-4 per field (minimum)
Few Insect pellets seen	5 per cover slip

Debris Rating: 2

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Client Sample #: W-11
Sample Location: A138, Pipe
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-020

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Numerous Colorless spores seen	3-4 per field (minimum)
Numerous hyphal elements seen	3-4 per field (minimum)
Occasional Stachybotrys spores seen	1-5 per cover slip

Debris Rating: 2

Client Sample #: W-12
Sample Location: C106, Pipe
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-021

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Numerous hyphal elements seen	3-4 per field (minimum)
Occasional Penicillium/Aspergillus group spores seen	1-5 per cover slip

Debris Rating: 2

Client Sample #: W-13
Sample Location: D102, Vent
Test: 1051, Surface - Qualitative Direct Microscopic Exam SOP 3.7

Lab Sample #: 20009864-022

Results:	Observation
Numerous Cladosporium spores seen	3-4 per field (minimum)
Occasional Epicoccum spores seen	1-5 per cover slip
Numerous hyphal elements seen	3-4 per field (minimum)
Occasional Pithomyces spores seen	1-5 per cover slip

Debris Rating: 2

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Footnotes and Additional Report Information

Debris Rating Table

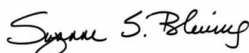
1	Minimal (<5%) particulate present	Reported values are minimally affected by particulate load.
2	5% to 25% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
3	26% to 75% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
4	75% to 90% of the trace occluded with particulate	Negative bias is expected. The degree of bias increases directly with the percent of the trace that is occluded.
5	Greater than 90% of the trace occluded with particulate	Quantification not possible due to large negative bias. A new sample should be collected at a shorter time interval or other measures taken to reduce particulate load.

Aerobiology Laboratory shall be responsible for all the information provided in the report, except when information is provided by the customer. Aerobiology Laboratory is not responsible for the sampling activity, such as air and water volume, area and mass unit. The report shall not be reproduced except in full without approval of the laboratory can provide assurance that parts of a report are not taken out of context.

1. Penicillium/Aspergillus group spores are characterized by their small size, round to ovoid shape, being unicellular, and usually colorless to lightly pigmented. There are numerous genera of fungi whose spore morphology is similar to that of the Penicillium/Aspergillus type. Two common examples would be Paecilomyces and Acremonium. Although the majority of spores placed in this group are Penicillium, Aspergillus, or a combination of both. Keep in mind that these are not the only two possibilities.
2. Ascospores are sexually produced fungal spores formed within an ascus. An ascus is a sac-like structure designed to discharge the ascospores into the environment, e.g. Ascobolus.
3. Basidiospores are typically blown indoors from outdoors and rarely have an indoor source. However, in certain situations a high basidiospore count indoors may be indicative of a wood decay problem or wet soil.
4. The colorless group contains colorless spores which were unidentifiable to a specific genus. Examples of this group include Acremonium, Aphanocladium, Beauveria, Chrysosporium, Engyodontium microconidia, yeast, some arthrospores, as well as many others.
5. Hyphae are the vegetative mode of fungi. Hyphal elements are fragments of individual Hyphae. They can break apart and become airborne much like spores and are potentially allergenic. A mass of hyphal elements is termed the mycelium. Hyphae in high concentration may be indicative of colonization.
6. Dash (-) in this report, under raw count column means 'not detected (ND)'; otherwise 'not applicable' (NA).
7. The positive-hole correction factor is a statistical tool which calculates a probable count from the raw count, taking into consideration that multiple particles can impact on the same hole; for this reason the sum of the calculated counts may be less than the positive hole corrected total.
8. Due to rounding totals may not equal 100%.
9. Analytical Sensitivity for each spores is different for Non-viable sample when the spores are read at different percentage. Analytical Sensitivity is calculated as spr/m^3 divided by raw count. $spr/m^3 = \text{raw counts} \times (100/\% \text{ read}) \times (1000/\text{Sample volume})$. If Analytical Sensitivity is 13 spr/m^3 at 100% read, Analytical Sensitivity at 50% read would be 27 spr/m^3 , which is 2 times higher. Analytical Sensitivity provided on the report is based on an assumed 100% of the trace being analyzed.
10. Minimum Reporting Limits (MRL) for BULKS, DUSTS, SWABS, and WATER samples are a calculation based on the sample size and the dilution plate on which the organism was counted. Results are a compilation of counts taken from multiple dilutions and multiple medias. This means that every genus of fungi or bacteria recovered can be counted on the plate on which it is best represented.
11. If the final quantitative result is corrected for contamination based on the blank, the blank correction is stated in the sample comments section of the report.
12. The results in this report are related to this project and these samples only.
13. For samples with an air volume of < 100L, the number of significant figures in the result should be considered (2) two. For samples with air volumes between 100-999L, the number of significant figures in the result should be considered (3) three. For example, a sample with a result of 55,443 spr/m^3 from a 75L sample using significant figures should be considered 55,000. The same result of 55,443 from a 150L sample using significant figures should be considered 55,400 spr/m^3 .
14. If the In/Out ratio is greater than 100 times it is indicated >100/1, rather than showing the real value.

Terminology Used in Direct Exam Reporting

Conidiophores are a type of modified hyphae from which spores are born. When seen on a surface sample in moderate to numerous concentrations they may be indicative of fungal growth.



Suzanne S. Blevins, B.S., SM (ASCP)
Laboratory Director

Appendix IV: Mold Reference and Guidance Documents

REFERENCE AND GUIDANCE DOCUMENTS

A Brief Guide to Mold in the Workplace, Occupational Safety and Health Administration
OSHA, OSHA 3093-10-10, updated 11-08-13

ANSI/CES S520 Standard and Reference Guide for Professional Mold Remediation,
Institute of Inspection, Cleaning, and Restoration Certification, 2015.

ANSI/CES S500 Standard and Reference Guide for Professional Water Damage
Restoration, Institute of Inspection, Cleaning, and Restoration Certification, 2015.

Bioaerosols: Assessment and Controls, American Conference of Governmental
Industrial Hygienists, 1999.

Building Air Quality: A Guide for Building Owners and Facility Managers, EPA, EPA 402-
91-102, December 1991

Centers for Disease Control and Prevention (CDC) <https://www.cdc.gov/mold/index.html>

Department of Energy and the Environment (EEO), Mold Assessment and
Remediation License Regulations.

EPA Mold Resources, <https://www.epa.gov/mold>

Guidelines on Assessment and Remediation of Mould in Indoor Environments, New York
City Department of Health and Mental Hygiene, November 2008.

Mold Moisture and Your Home, EPA, EPA-402-F-02-003, September 2012

Mold Remediation in Schools and Commercial Buildings, EPA, EPA 402-F-01-001,
September 2008