

**SPORE SAMPLING REPORT
FOR
GLENWOOD MIDDLE SCHOOL
2680 ROUTE 97
GLENWOOD, MD 21738**

PREPARED FOR:

**HOWARD COUNTY PUBLIC SCHOOL SYSTEM
10910 ROUTE 108
ELLCOTT CITY, MD 21043**

PREPARED BY:



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APRIL 19, 2016

150876

**SPORE TRAP SAMPLING REPORT
FOR GLENWOOD MIDDLE SCHOOL
APRIL 5, 2016**

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**SPORE TRAP SAMPLING REPORT
FOR GLENWOOD MIDDLE SCHOOL
APRIL 5, 2016**

EXECUTIVE SUMMARY

Aria Environmental, Inc. (AE) was contracted by Howard County Public School System to perform spore trap sampling at the Glenwood Middle School at the end of August 2015 due to air quality concerns expressed by staff and parents and to monitor the school after a heating, ventilation and air-conditioning (HVAC) system upgrade performed in summer, 2015. AE made measurements for particles and collected microbial spore trap sampling for fungal spore identification and counting on April 5, 2016 as part of a series of spore sampling events that will occur regularly during the 2015 - 2016 school year. This report presents the results of air sampling made on April 5, 2016.

**Spore Trap Sampling Report
For Glenwood Middle School
April 5, 2016**

I. BACKGROUND

Representatives from Aria Environmental, Inc. (AE) visited Glenwood Middle School on April 5, 2016 to perform air monitoring in response to an ongoing indoor air quality complaint at the school. Measurements for particulate matter and microbial spore trap sampling were collected from classrooms 3, 4, 12, 13, 29, 30, 34, FACS Room 35 and portable classrooms 60 and 61. Outdoor air samples were also collected for comparison purposes in one courtyard and outside near portable classroom 61. This monitoring was performed in response to employee and parental complaints and as a follow up to HVAC improvements.

There was no visible evidence of mold growth nor observed odors consistent with mildew in the classrooms sampled. Some cooking odors presumably from after school activities were perceptible in the FACS Room 35 and slightly in Room 34. Weather on the day of monitoring was sunny and warm. Measurements for temperature, relative humidity, carbon dioxide and carbon monoxide were not collected during this sampling session because the monitor was not available.

II. OBSERVATIONS AND MEASUREMENTS

A. Observations and Measurements on April 5, 2016

Particulate matter or PM is the term for a mixture of solid particles and liquid droplets found in the air. It does not distinguish between the types of particles in the air (e.g., pollen, skin cells, mold spores, soil, etc.). Particulate matter includes "inhalable coarse particles," with diameters larger than 2.5 micrometers and smaller than 10 micrometers (PM 10) and "fine particles," with diameters that are 2.5 micrometers and smaller (PM 2.5). Particle loads expected to be a part of the school environment include carpet and clothing fiber, soil tracked from outside, paper dust, chalk dust, and dust and fibers from building materials. The American Society for Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 62.1–2013 suggests target indoor concentrations for PM 2.5 and PM 10 of 15 $\mu\text{g}/\text{m}^3$ and 50 $\mu\text{g}/\text{m}^3$, respectively. These concentrations are taken from the EPA's National Ambient Air Quality Standards (NAAQS) based on annual arithmetic means deemed acceptable for outdoor air quality. Occupational standards and guidelines for particles are nearly an order of magnitude higher than concentrations typically found in non-occupational settings and are not appropriate for comparison.

Particle measurements were taken with an Aerocet 531 particulate monitor. The particle monitor takes a two minute averaged sample of particle concentrations in 5 size fractions (PM 1, PM 2.5, PM 7, PM 10 and total suspended particles (TSP)). Results of particulate monitoring, presented in Table 1, revealed that PM 2.5 and PM 10 particle concentrations were well below the ASHRAE target concentrations in all areas monitored.

**Spore Sampling Report
For Glenwood Middle School
April 5, 2016**

Table 1: Particle Measurements Collected on April 5, 2016 at Glenwood Middle School

Location	Time	PM1 ($\mu\text{g}/\text{m}^3$)	PM2.5 ($\mu\text{g}/\text{m}^3$)	PM7 ($\mu\text{g}/\text{m}^3$)	PM10 ($\mu\text{g}/\text{m}^3$)	TSP ($\mu\text{g}/\text{m}^3$)
CR 03	3:42 PM	0	0	6	11	17
CR 04	3:45 PM	0	0	1	1	4
CR 12	3:56 PM	0	0	3	5	11
CR 13	3:59 PM	0	0	1	1	3
CR 29	4:10 PM	0	0	1	1	1
CR 30	4:16 PM	0	0	1	1	1
CR 34	4:25 PM	2	4	7	7	9
CR 35	4:29 PM	4	10	14	15	16
PCR 60	4:37 PM	0	0	0	0	0
PCR 61	4:39 PM	0	0	0	0	0
Out 1	4:52 PM	0	0	1	1	4
Out 2 CY	4:55 PM	0	0	1	1	1

CR = Classroom; PCR = Portable Classroom; CY = Courtyard;
Bold type indicates measurements outside of guidelines

**Spore Sampling Report
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B. Air Monitoring for Fungal Identification and Counting on April 5, 2016

In the absence of visual sources of mold amplification and growth in the classrooms, non-viable spore trap samples were collected from eight classrooms within the main school building (Classrooms 3, 4, 12, 13, 29, 30, 34, FACS Room 35) and two portable classrooms (60 and 61) and two outdoor locations to determine whether there was a difference between mold spore loads inside the building versus outside.

The spore trap samples were collected using AllergenCo-D cassettes attached to a Buck BioAire™ sampling pump calibrated to 15 liter per minute (LPM) air flow. The samples were collected for a period of ten minutes, the time period recommended for spore trap sampling in a clean indoor environment. The spore trap samples were submitted to Aerobiology Laboratory for analysis. The sample results are reported as the spores per cubic meter of air (spores per m³) of hyphal fragments and total fungal spores. Depending upon the morphology of the spores, they were counted by their unique genus or were grouped into spores exhibiting common characteristics (e.g., *Penicillium*/*Aspergillus* group). Tables 2 and 3 present the results of the spore trap samples collected at Glenwood Middle School on April 5, 2016.

Indoor spore counts ranged from 7 to 40 total spores per cubic meter of air (m³) in the main school building and ranged from 7 to 120 in the portable classrooms on April 5, 2016. All indoor samples had total spore counts lower than the outdoor samples which ranged from 980 to 10960 spores per m³. All individual spore types detected indoors had counts lower than the outdoor sample counts with the following exceptions: Colorless spores in Classroom 3 (7 spores/m³) and *Penicillium*/*Aspergillus* in Portable Classroom 61 (87 spores/m³). These spore counts were above the range of spores detected in the outdoor samples; however, the counts were generally considered low and not problematic. Windows were not open during sampling.

The secondary colonizers *Chaetomium* and *Stachybotrys* were not detected in any samples. Hyphal elements were detected in two of the ten indoor samples, both with spore counts of 7 elements per m³ per sample. The outdoor sample in the courtyard had a hyphal element count of 7 elements per m³; hyphal elements were not detected in the outdoor sample near Portable Classroom 60. Variations in outdoor spore concentrations are a function of diurnal rhythms of spore release, weather-related factors (e.g., wind, rain, snow cover, temperature), and physical spatial factors. Certificates of analysis are included as Attachment B.

**Spore Sampling Report
For Glenwood Middle School
April 5, 2016**

Table 2: Results of Spore Trap Sampling in Selected Classrooms in Glenwood Middle School on April 5, 2016

Location	Outside near PCR 60	Outside in Courtyard	Room 03	Room 04	Room 12	Room 13	Room 29	Room 30	Room 34	Room 35
	(Out 1)	(Out 2)	(GM 03)	(GM 04)	(GM 12)	(GM 13)	(GM 29)	(GM 30)	(GM 34)	(GM 35)
Spore Type	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³
Ascospores	40	20	-	-	7	-	-	-	-	-
Basidiospores	833	10,880	-	-	-	13	7	7	7	7
Cladosporium	67	20	7	-	-	-	-	-	-	-
Colorless	-	-	7	-	-	-	-	-	-	-
Epicoccum	7	-	-	-	-	-	-	-	-	-
Hyphal Elements	-	13	7	-	-	-	7	-	-	-
Penicillium/Aspergillus	33	13	7	20	33	27	13	7	-	-
Smuts, Periconia, myxomycetes	-	7	7	-	-	-	-	-	-	-
Unknown	-	7	7	-	-	-	-	-	-	-
Total Fungi	980	10,960	40	20	40	40	27	13	7	7

Bold numbers represent spore concentrations above the outdoor counts. Dashes designate none detected.

**Table 3: Results of Spore Trap Sampling in Portable Classrooms
at Glenwood Middle School on April 5, 2016**

Location	Outside near PCR 60	Outside in Courtyard	Room 60	Room 61
	(Out 1)	(Out 2)	(GM 60)	(GM 61)
Spore Type	Spores/ m ³	Spores/ m ³	Spores/ m ³	Spores/ m ³
Ascospores	40	20	-	-
Basidiospores	833	10,880	-	20
Cladosporium	67	20	7	7
Epicoccum	7	-	-	7
Hyphal Elements	-	13	-	-
Penicillium/Aspergillus	33	13	-	87
Smuts, Periconia, myxomycetes	-	7	-	-
Unknown	-	7	-	-
Total Fungi	980	10,960	7	120

Bold numbers represent spore concentrations above the outdoor counts.
Dashes designate none detected.

**Spore Sampling Report
For Glenwood Middle School
April 5, 2016**

III. CONCLUSIONS AND RECOMMENDATIONS

Aria Environmental, Inc. (AE) was contracted by Howard County Public School System to perform spore trap sampling at the Glenwood Middle School at the end of August 2015 due to air quality concerns expressed by staff and parents and to monitor the school after a recent heating, ventilation and air-conditioning (HVAC) system upgrade. AE made measurements for temperature, humidity, carbon monoxide, carbon dioxide and collected microbial spore trap samples on April 5, 2016.

Temperature, humidity, carbon dioxide and carbon monoxide were not measured this week because the IAQ-Calc monitor was not available. Particle measurements were within acceptable ranges for good indoor air quality in all areas monitored.

Indoor spore counts ranged from 7 to 40 total spores per cubic meter of air (m³) in the main school building and ranged from 7 to 120 in the portable classrooms on April 5, 2016. All indoor samples had total spore counts lower than the outdoor samples which ranged from 980 to 10,960 spores per m³. All individual spore types detected indoors had counts lower than the outdoor sample counts with the following exceptions: Colorless spores in Classroom 3 (7 spores/m³) and Penicillium/Aspergillus in Portable Classroom 61 (87 spores/m³). These spore counts were above the range of spores detected in the outdoor samples; however, the counts were generally considered low and not problematic. Hyphal elements were detected in two of the ten indoor samples, both with spore counts of 7 elements per m³ per sample. The outdoor sample in the courtyard had a hyphal element count of 7 elements per m³; hyphal elements were not detected in the outdoor sample near Portable Classroom 60. Windows were not open during sampling.

Table 4 presents a summary of spore sampling results to date in the 2015 - 2016 school year. The indoor and outdoor ranges demonstrate the variable nature of spore counts.

Table 4 – Summary of Spore Sampling Results to Date at GMS in the 2015-2016 School Year

Date	Indoor Spore Count Range Spores per m³	Outdoor Spore Count Range Spores per m³
August 25, 2015	1,787 to 8,807	34,001 to 37,316
August 27, 2015	400 to 747	9,433 to 10,960
September 2, 2015	1,860 to 7,960	33,294 to 37,306
September 9, 2015	1,053 to 3,173	21,890 to 31,876
September 16, 2015	447 to 3,493	17,543 to 20,287
September 24, 2015	273 to 2,480	24,680 to 25,020
September 30, 2015	1,267 to 12,767	55,396 to 69,421
October 7, 2015	213 to 14,120	49,146 to 51,759
October 14, 2015	140 to 2,700	8,807 to 10,153
October 21, 2015	307 to 2,367	11,447 to 20,560
October 27, 2015	87 to 680	8,827 to 9,427
November 4, 2015	73 to 780	26,592 to 27,484
November 11, 2015	133 to 6,427	23,808 to 28,018
November 18, 2015	40 to 673	3,080 to 3,553
November 25, 2015	53 to 333	4,827 to 5,747
December 3, 2015	100 to 4,900	5,340 to 6,207
December 9, 2015	40 to 187	10,940 to 11,087
December 16, 2015	33 to 1,320	5,920 to 11,995

**Spore Sampling Report
For Glenwood Middle School
April 5, 2016**

Date	Indoor Spore Count Range Spores per m³	Outdoor Spore Count Range Spores per m³
December 21, 2015	33 to 373	5,673 to 6,600
December 28, 2015	160 to 1,513	9,253 to 15,073
January 19, 2016	40 to 300	200 to 307
January 27, 2016	0 to 113	127 to 167
February 4, 2016	7 to 493	4,093 to 4,367
February 10, 2016	7 to 40	127 to 180
February 18, 2016	13 to 127	200 to 240
February 26, 2016	7 to 260	87 to 173
March 2, 2016	7 to 33	113 to 167
March 9, 2016	20 to 800	3,060 to 3,840
March 16, 2016	60 to 14,672	19,510 to 23,190
March 22, 2016	13 to 1,867	2,173 to 2,220
March 30, 2016	67 to 3,167	1,660 to 2,333
April 5, 2016	7 to 120	980 to 10,960

Spore measurements collected in classrooms were generally acceptable compared to outdoor samples with outdoor total spore counts 50 times higher on average than the indoor counts. Indoor sample total spore counts and individual spore counts were all lower than the outdoor sample counts with the exceptions described above. Follow up air sampling has been scheduled for April 13, 2016. Air sampling will be performed regularly in order to monitor changes in conditions affected by seasonal variations and the new HVAC system.

IV. LIMITATIONS

This report has been prepared for the exclusive use of the Howard County Public School System and/or their agents. This service has been performed in accordance with generally accepted environmental practices. No other warranty, expressed or implied, is made. Our conclusions and recommendations 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 to us by others, unless otherwise noted. Our observations and recommendations are based upon conditions readily visible at the site at the time of our site visit, and upon current industry standards. Destructive sampling was not performed as part of this survey. No observations were made behind solid walls, ceilings or in pipe chases that weren't already openly visible.

By virtue of providing the services described in this report, the preparer 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. It is the Client's responsibility to notify the appropriate local, state, or federal public agencies as required by law, or otherwise to disclose, in a timely manner, any information that may be necessary to prevent any danger to public health, safety, or the environment. Under this scope of services, the preparer assumes no responsibility regarding response actions (e.g. abatement, removal, etc.) initiated as a result of these findings. Response actions are the sole responsibility of the Client and should be conducted in accordance with local, state, and/or federal requirements, and should be performed by appropriately licensed personnel as warranted.

Attachment A:

Building Layout and Sample Location Plan for April 5, 2016

TECH ED LAB and CLASSROOM (40A and 40B)

Spore sampling locations
for April 5, 2016



Glenwood Middle School Floor Plan

As of 8/02/13



Attachment B:

**Report of Analysis and Chain of Custody Forms
April 5, 2016**

Aria Environmental
P.O. Box 286
Woodbine, Maryland 21797
Attn: Julie Barth
Project: **J15-876 GMS / Glenwood MS**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 04/05/2016
Date Received: 04/07/2016
Date Analyzed: 04/11/2016
Date Reported: 04/12/2016
Project ID: 16010373

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1054 Spore Trap Analysis: SOP 3.8

Client Sample Number	GM-03				Out 1			
Sample Location	Classroom 3				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-001				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	-	-	-	-	125	833	85	-
Cladosporium	1	7	17	1/10	10	67	7	-
Colorless	1	7	17	-	-	-	-	-
Epicoccum	-	-	-	-	1	7	1	-
hyphal elements	1	7	17	-	-	-	-	-
Penicillium/Aspergillus group	1	7	17	1/5	5	33	3	-
Smuts,Periconia,Myxomycetes	1	7	17	-	-	-	-	-
Unknown	1	7	17	-	-	-	-	-
Debris Rating 3				Debris Rating 3				
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	6	40	~100%	1/25	147	980	~100%	-

Client Sample Number	GM-04				Out 1			
Sample Location	Room 4				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-002				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	-	-	-	-	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	3	20	100	1/2	5	33	3	-
Debris Rating 3				Debris Rating 3				
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	3	20	~100%	1/49	147	980	~100%	-

Aria Environmental
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Project ID: 16010373

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Client Sample Number	GM-12				Out 1			
Sample Location	Classroom 12				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-003				16010373-011			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
ascospores	1	7	17	1/6	6	40	4	-
basidiospores	-	-	-	-	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	5	33	83	1/1	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	6	40	~100%	1/25	147	980	~100%	-

Client Sample Number	GM-13				Out 1			
Sample Location	Classroom 13				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-004				16010373-011			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	2	13	33	1/63	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	4	27	67	1/1	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	6	40	~100%	1/25	147	980	~100%	-

Aria Environmental
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Project: **J15-876 GMS / Glenwood MS**
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Date Received: 04/07/2016
Date Analyzed: 04/11/2016
Date Reported: 04/12/2016
Project ID: 16010373
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Client Sample Number	GM-29				Out 1			
Sample Location	Classroom 29				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-005				16010373-011			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	1	7	25	1/125	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
hyphal elements	1	7	25	-	-	-	-	-
Penicillium/Aspergillus group	2	13	50	1/3	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	4	27	~100%	1/37	147	980	~100%	-

Client Sample Number	GM-30				Out 1			
Sample Location	Room 30				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-006				16010373-011			
Spore Identification	Raw Ct	spr/m³	% Ttl	In/Out	Raw Ct	spr/m³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	1	7	50	1/125	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	1	7	50	1/5	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	2	13	~100%	1/74	147	980	~100%	-

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Condition of Sample(s) Upon Receipt: Acceptable

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Date Received: 04/07/2016
Date Analyzed: 04/11/2016
Date Reported: 04/12/2016
Project ID: 16010373

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Client Sample Number	GM-34				Out 1			
Sample Location	Classroom 34				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-007				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	1	7	100	1/125	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	-	-	-	-	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m ³				Analytical Sensitivity: 7 spr/m ³			
Comments								
Total *See Footnotes	1	7	~100%	1/147	147	980	~100%	-

Client Sample Number	GM-35				Out 1			
Sample Location	FACS Classroom 35				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-008				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	1	7	100	1/125	125	833	85	-
Cladosporium	-	-	-	-	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	-	-	-	-	5	33	3	-
	Debris Rating 2				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m ³				Analytical Sensitivity: 7 spr/m ³			
Comments								
Total *See Footnotes	1	7	~100%	1/147	147	980	~100%	-

Aria Environmental
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Date Received: 04/07/2016
Date Analyzed: 04/11/2016
Date Reported: 04/12/2016
Project ID: 16010373

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Client Sample Number	GM-60				Out 1			
Sample Location	Portable Classroom 60				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-009				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	-	-	-	-	125	833	85	-
Cladosporium	1	7	100	1/10	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
Penicillium/Aspergillus group	-	-	-	-	5	33	3	-
	Debris Rating 3				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m ³				Analytical Sensitivity: 7 spr/m ³			
Comments								
Total *See Footnotes	1	7	~100%	1/147	147	980	~100%	-

Client Sample Number	GM-61				Out 1			
Sample Location	Portable Classroom 61				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-010				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	-	-	-	-	6	40	4	-
basidiospores	3	20	17	1/42	125	833	85	-
Cladosporium	1	7	6	1/10	10	67	7	-
Epicoccum	1	7	6	1/1	1	7	1	-
Penicillium/Aspergillus group	13	87	72	3/1	5	33	3	-
	Debris Rating 2				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m ³				Analytical Sensitivity: 7 spr/m ³			
Comments								
Total *See Footnotes	18	120	~100%	1/8	147	980	~100%	-

Aria Environmental
P.O. Box 286
Woodbine, Maryland 21797
Attn: Julie Barth
Project: **J15-876 GMS / Glenwood MS**
Condition of Sample(s) Upon Receipt: Acceptable

Date Collected: 04/05/2016
Date Received: 04/07/2016
Date Analyzed: 04/11/2016
Date Reported: 04/12/2016
Project ID: 16010373

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Client Sample Number	Out 2 CY				Out 1			
Sample Location	Outside Courtyard				Outside Near PCR 60			
Sample Volume (L)	150				150			
Lab Sample Number	16010373-012				16010373-011			
Spore Identification	Raw Ct	spr/m ³	% Ttl	In/Out	Raw Ct	spr/m ³	% Ttl	In/Out
ascospores	3	20	<1	1/2	6	40	4	-
basidiospores	102	10880	99	13/1	125	833	85	-
Cladosporium	3	20	<1	1/3	10	67	7	-
Epicoccum	-	-	-	-	1	7	1	-
hyphal elements	2	13	<1	-	-	-	-	-
Penicillium/Aspergillus group	2	13	<1	1/3	5	33	3	-
Smuts,Periconia,Myxomycetes	1	7	<1	-	-	-	-	-
Unknown	1	7	<1	-	-	-	-	-
	Debris Rating 2				Debris Rating 3			
Analytical Sensitivity	Analytical Sensitivity: 7 spr/m³				Analytical Sensitivity: 7 spr/m³			
Comments								
Total *See Footnotes	114	10960	~100%	11/1	147	980	~100%	-

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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.

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. $\text{spr}/\text{m}^3 = \text{raw counts} \times (100/\% \text{ read}) \times (1000/\text{Sample volume})$. 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.

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. Analysis conducted on non-viable spore traps is completed using Indoor Environmental Standards Organization (IESO) Standard 2210.

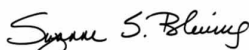
13. The results in this report are related to this project and these samples only.

14. 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 .

15. 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

16010373



LAB #192683 (CO)
LAB #102977 (GA)
LAB #163063 (VA)
LAB #210229 (AZ)

NVLAP Lab Code 200860-0 (CO)
NVLAP Lab Code 200829-0 (VA)
NVLAP Lab Code 500097-0 (AZ)

AZ, CO, GA, VA, NJ

Aerobiology Client		Aria Environmental, Inc.	
Field Contact	Julie Barth	Collected By/Date:	04/05/16
Reporting Address	PO Box 286, Woodbine, MD 21797	Relinquished By/Date:	04/06/16
Billing Address	SAME	Received By/Date:	4/7/16 PJ
Phone/Fax	410-549-5774/410-549-4488	Sampler Type	Andersen SAS
Reporting Email (s)	jbarth@ariaenviro.com	Sample Aire	AeroTrap
Routine	<input checked="" type="radio"/> 24 Hour <input type="radio"/> Same Day <input type="radio"/> 4 Hou <input type="radio"/> 2 Hou <input type="radio"/> 5 Day (Asbestos Only)	PO#/Job#:	J15-876 GMS
SAMPLING LOCATION ZIP CODE		21738	
CC Info:		Project Name: Glenwood MS	
Notes:			

Sample No.	Test Code	Sample Location	Total Volume/Area
1 GM-03	1054	Classroom 3	150 L
2 GM-04	1054	Room 4	150 L
3 GM-12	1054	Classroom 12	150 L
4 GM-13	1054	Classroom 13	150 L
5 GM-29	1054	Classroom 29	150 L
6 GM-30	1054	Room 30	150 L
7 GM-34	1054	Classroom 34	150 L
8 GM-35	1054	FACS Classroom 35	150 L
9 GM-60	1054	Portable Classroom 60	150 L
10 GM-61	1054	Portable Classroom 61	150 L
11 Out 1	1054	Outside near PCR 60	150 L
12 Out 2 CY	1054	Outside Courtyard	150 L
13			
14			

1054	Direct, Non-viable Spore Trap	1015	Culture - WATER Legionella
1051	Direct, Qualitative- Swab/Tape	1017	Culture - SWAB Legionella
1050	Direct, Qualitative- Bulk	1010	WATER - Potable - E. coli/total coliforms
1005	AIR Culture - Bacterial Count w/ ID's	1012	SWAB - E. coli/total coliforms
1030	AIR Culture - Fungal Count w/ ID's	1028	Sewage Screen (E. coli/Enterococcus/fecal coliforms)
1006	SWAB Culture - Bacterial Count w/ ID's	2056	Heterotrophic Plate Count
1031	SWAB Culture - Fungal Count w/ ID's	3001	ASBESTOS - Point count
1008	BULK Culture - Bacterial Count w/ ID's	3002	ASBESTOS - PLM Analysis
1033	BULK Culture - Fungal Count w/ ID's	3003	ASBESTOS - Particle characterization
1007	WATER Culture - Bacterial Count w/ID's	3004	ASBESTOS - PCM Analysis