

1818 New York Ave. NE, Ste 231, Washington, DC 20002

Telephone: (301) 595-3783 www.salutinc.com

June 7, 2019

Prince George's County Public School (PGCPS) Environmental Safety Office 13306 Old Marlboro Pike Upper Marlboro, MD 20772

Attention: Alex Baylor <u>alex.baylor@pgcps.org</u>

Subject: Indoor Air Quality Survey Cooper Lane Elementary School 3817 Cooper Lane Landover Hills, MD 20784

Mr. Baylor:

On May 14, 2019, a Soil and Land Use Technology, Inc. (SaLUT) Industrial Hygienist conducted an indoor air quality (IAQ) evaluation at Cooper Lane Elementary School, a property maintained by Prince George's County Public School (PGCPS) located at 3817 Cooper Lane, Landover Hills, MD 20784. The inspection was performed in accordance with PGPCS contract number IFB 022-19.

Methodology

The IAQ evaluation conducted by SaLUT included a visual assessment, IAQ instrumentation screening, and a collection of interior air samples for mold in representative locations throughout the building. Additionally, one building exterior environmental air sample was taken for comparison.

Air-borne fungal spore samples were collected on *Air-O-Cell* cassettes using a Buck BioAire calibrated pump. The air samples were taken between three and five feet from the ground. In tandem with collecting mold samples, real-time readings for carbon dioxide, carbon monoxide, temperature and relative humidity were collected using a Fluke 975 Air Meter in representative areas within the facility. A MiniRAE 3000photoionization detector (PID) was used to measure total volatile organic compounds (TVOC).

Respirable particulate in air (size classes PM2.5 μ and PM10 μ) was measured using the Particles Plus 8306 Handheld Particle Counter which was calibrated prior to sampling.



The fungal spore air samples were delivered to EMSL Analytical, Inc. of Beltsville, Maryland for analysis. Fungal spores and particulates in air samples were analyzed by Optical Microscopy (methods EMSL 05-TP-003 and ASTM D7391). The sample chain-of-custody and laboratory reports are attached.

Observations

The table below summarizes the main observations from the IAQ survey at Cooper Lane Elementary School, visited on May 14, 2019.

Location	Summary of Observations 5-14-2019
Classroom 6	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Unit ventilator system.
Classroom 8	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Unit ventilator system.
Teacher's Lounge	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Dusty air vents;
	Peeling paint on the ceiling of the bathroom;
	Unit ventilator system.
Classroom 11	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Dusty air vents;
	Unit ventilator system.
Classroom 16	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Mild odor during the walk through and visible growth underneath the sink;
	Dusty air vents;
	Unit ventilator system.
Classroom 22	2'x4' ceiling tiles and 1'x1' tile floor;
	No visual signs of microbial growth, and no odor;
	No visible dust on floor/other furniture surfaces;
	Unit ventilator system.

Table 1-Observations

Measurements of Indoor Environmental Quality Parameters

Table 2 depicts a summary of average measurements of comfort parameters and respirable particulates.



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Temperature

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) have published recommendations for year round acceptable temperatures in Standard 55-2010 *Thermal Environmental Conditions for Human Occupancy*. The winter comfort range is 20 to 24°C (68 to 75°F) and 23 to 26°C (73 to 79°F) is the summer comfort range. The temperature readings were within the ASHRAE recommended ranges in the representative spaces with the exception of the some readings which were lower than the ASHRAE comfort level.

Relative Humidity (RH)

RH is a key factor for mold growth. Mold has the potential of growing on suitable surfaces with humidity levels above 60%. ASHRAE Standard 62.1-2010 *Ventilation for Acceptable Indoor Air Quality* recommends a maximum indoor RH of 65% to preclude the likelihood of condensation on cool surfaces encouraging mold growth. The RH readings were within the ASHRAE recommended ranges in the representative areas.

Carbon Dioxide (CO₂)

Under conditions of maximum occupancy, ASHRAE Standard 62.1-2010, Appendix C, infers that the acceptable CO_2 upper limit is the prevailing outdoor CO_2 concentration plus 700 parts per million (ppm). On the day of the space evaluation, the outdoor (building exterior) CO_2 concentration was approximately 504 ppm therefore indoor concentrations should not exceed approximately 1,204 ppm (700 + 504). The maximum average interior CO_2 concentration detected was 1,042 ppm in the Classroom 16 area, a range within the ASHRAE recommendations, per Table 2 below.

Carbon Monoxide (CO)

CO is a colorless and odorless gas that is produced by the incomplete combustion of carbon containing fuels. Oil, gasoline, diesel fuels, wood, coke, and coal are major sources of CO. All registered CO concentrations were below the EPA National Ambient Air Quality Standard (NAAQS) of 9 ppm, per Table 2 below.

Respirable Particulates

Direct reading particulate monitoring did not identify a condition of concern. Particulate concentrations for two mass ranges with EPA ambient air quality guidelines (PM2.5 and PM10) were below their respective NAAQS levels. On May 14, 2019, the highest average PM2.5 concentration during the monitoring period was 0.006 mg/m³ (6 μ g/m³) in Classroom 6. This is compared to the NAAQS primary standard for PM2.5 of 12 μ g/m³ annual mean. The highest average PM10 concentration during the same period was 0.087 mg/m³ (87 μ g/m³) in Classroom 6. This is compared to This is compared to NAAQS standard for PM10 of 150 μ g/m³ 24 hour average.



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Total Volatile Organic Chemicals (TVOC)

LEED's standard of 500 μ g/m³ for TVOC (ANSI/ASHRAE Standard 62.1-2010) concentrations per the instrument's level of detection for a healthy commercial building were used as the standard for TVOCs for this survey. Concentrations below this value can be considered as "background levels" and, at such low concentrations, they are extremely unlikely to cause any adverse health conditions to the occupants. Generally, values below 3000 μ g/m³ are unlikely to cause more than mild irritation or headaches, but to date no recognized industry standard has been established for TVOCs. Perfumes, colognes, and air fresheners as well as certain cleaning chemicals can all cause temporary increases in TVOC readings. TVOC readings cannot be used to establish OSHA limits on specific VOCs or be attributed to specific compounds.

Table 2: Cooper Lane Elementary School Instrumental Screening LevelsMay 14, 2019 (2:00 PM-4:30 PM)

	Temp		СО	CO ₂	PM 2.5	PM 10	TVOC
Sample Location	⁰ F	RH%	ppm	ppm	mg/m ³	mg/m ³	ppm
Standards	ASHRAE* 73 to 79°F*	ASHRAE <65%	NAAQS 9	ASHRAE 1,204	NAAQS 0.012	NAAQS 0.150	1.0
Classroom 6	70.7	57.7	0	1035	0.007	0.087	0.8
Classroom 8	69.8	56.9	0	924	0.006	0.059	0
Teacher's Lounge	70.7	45.6	0	1018	0.003	0.062	0
Classroom 11	68.0	60.5	0	1011	0.002	0.032	0
Classroom 16	68.9	56.4	0	1042	0.004	0.038	0.1
Classroom 22	70.7	51.6	0	963	0.004	0.061	0
Exterior of the building							
-Next to the entrance	59.3	49.0	0	504	0.002	0.014	0

PM – Particulate Matter size °F – Degrees Fahrenheit CO – Carbon Monoxide ppm – parts per million µg/m³ – micrograms per cubic meter RH% - % Relative Humidity CO₂ – Carbon Dioxide * - Summer Comfort Range

Mold-in-Air Samples

There are no definitive regulations or standardized guidelines for addressing airborne mold in an indoor setting. If building systems (ventilation, envelope) are functioning properly, the indoor population profile should mimic what is encountered outdoors and the concentrations should be below the outdoor (building exterior) environmental sample levels.

Tables 3 summarizes airborne mold spore sampling results and locations. On May 14, 2019, total mold counts in representative samples (spore count/m³ of air) in all the areas inspected were lower than the outdoor concentrations. Laboratory analysis follows this report (see attachment).



Table 3: Cooper Lane Elementary School - Measurements of Mold-in-Air SamplesMay 14, 2019 (2:00 PM-4:30 PM)

Spore Types	Outdoor next to the Building Entrance Area	Classroom 6	Classroom 8	Teacher's Lounge
Alternaria (Ulocladium)	-	-	-	-
Ascospores	10,400	440	300	4,300
Aspergillus/Penicillium	-	200	1,000	300
Basidiospores	2,300	300	1,300	3,100
Bipolaris++	-	-	-	-
Chaetomium	-	-	-	-
Cladosporium	90	40	100	1,200
Curvularia	-	-	10	-
Epicoccum	-	40	40	-
Fusarium	-	-	-	-
Ganoderma	-	-	-	-
Myxomycetes++	-	100	200	-
Pithomyces++	-	-	-	-
Rust	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-
Unidentifiable Spores	-	-	-	-
Zygomycetes	-	-	-	-
Polythrincium	-	-	10	-
Hyphal Fragment	40	100	570	90
Insect Fragment	-	-	-	-
Pollen	100	-	40	-
Total Fungi	12,790	1,120	2,960	8,900

* Spore Counts per cubic meter of air (Counts/m³)



Table 3: Cooper Lane Elementary School - Measurements of Mold-in-Air Samples continued

Way 14, 2019 (2:00 PWI-4:50 PWI)										
Spore Types	Classroom 11	Classroom 16	Classroom 22	Field Blank						
Alternaria (Ulocladium)	-	-	-	-						
Ascospores	200	2,600	1,300	-						
Aspergillus/Penicillium	300	610	-	-						
Basidiospores	1,200	1,400	1,500	-						
Bipolaris++	-	-	-	-						
Chaetomium	-	-	-	-						
Cladosporium	-	300	300	-						
Curvularia	-	40	-	-						
Epicoccum	-	200	-	-						
Fusarium	-	-	-	-						
Ganoderma	-	-	-	-						
Myxomycetes++	-	40	-	-						
Pithomyces++	-	-	-	-						
Rust	-	-	-	-						
Scopulariopsis/Microascus	-	-	-	-						
Stachybotrys/Memnoniella	-	-	-	-						
Unidentifiable Spores	-	-	-	-						
Zygomycetes	-	-	-	-						
Botrytis	-	-	-	-						
Hyphal Fragment	90	740	40	-						
Insect Fragment	-	-	-	-						
Pollen	-	-	-	-						
Total Fungi	1,700	5,190	3,100	No Trace						

May 14, 2019 (2:00 PM-4:30 PM)

* Spore Counts per cubic meter of air (Counts/m³)

Findings and Conclusions

The comfort parameters (i.e., temperature, RH, CO₂, and CO levels) and respirable particulates in the representative areas conform to ASHRAE and/or NAAQS guidelines and the ASHRAE comfort level with the exception of some readings which were lower than the ASHRAE comfort level. On May 14, 2019, total mold counts in representative area samples (spore count/m³ of air) in all the areas inspected were lower than the outdoor concentrations, indicating no amplified mold growth.

Recommendations

Based on the observations of the IAQ survey performed at Cooper Lane Elementary School, SaLUT recommends the following measures to address the indoor air quality concerns documented:

- 1. Thoroughly clean air vents in the Teacher's Lounge area.
- 2. Thoroughly clean visible suspected microbial growth underneath the sink in



Classrooms 16, 17, and 19.

Thank you for the opportunity to provide industrial hygiene services for PGCPS. If you have any questions, please contact me at 301.595.3783.

Sincerely,

Juget Jake

Chaminda Jayatilake, PE, CIH, CSP, CHMM Certified Industrial Hygienist Soil and Land Use Technology Inc. (SaLUT)

Attachment

Attachment - Mold Spore Sample Analytical Results and Chain-of-Custody Forms

Attachment

Mold Spore Sample Analytical Results and Chain-of-Custody Forms



EMSL Analytical, Inc.

2500 Gateway Centre Blvd., Suite 600 Morrisville, NC 27560 Tel/Fax: (919) 465-3900 / (919) 465-3950 http://www.EMSL.com / raleighlab@emsl.com

EMSL Order:	291905201
Customer ID:	SALU50
Customer PO:	
Project ID:	

Attn: Indika Jayatilake SaLUT 1818 New York Avenue, NE Suite 218A Washington, DC 20002 Project: PGPCS IAQ/19-035 Cooper Lane ES

Phone: (301) 595-3783 (301) 595-3787 Fax: Collected: 05/14/2019 Received: 05/15/2019 Analyzed: 05/17/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)											
Lab Sample Number: Client Sample ID: Volume (L): Sample Location	291905201-0001 27953658 75 Inside the Classroom 6 Area		291905201-0002 27953639 75 Inside the Classroom 8 Area			291905201-0003 27953695 75 Inside the Teacher's Lounge Area					
Spore Types	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total		
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-		
Ascospores	10	440	39.3	8	300	10.1	99	4300	48.3		
Aspergillus/Penicillium	5	200	17.9	23	1000	33.8	6	300	3.4		
Basidiospores	6	300	26.8	29	1300	43.9	70	3100	34.8		
Bipolaris++	-	-	-	-	-	-	-	-	-		
Chaetomium	-	-	-	-	-	-	-	-	-		
Cladosporium	1	40	3.6	3	100	3.4	28	1200	13.5		
Curvularia	-	-	-	1*	10*	0.3	-	-	-		
Epicoccum	1	40	3.6	1	40	1.4	-	-	-		
Fusarium	-	-	-	-	-	-	-	-	-		
Ganoderma	-	-	-	-	-	-	-	-	-		
Myxomycetes++	3	100	8.9	4	200	6.8	-	-	-		
Pithomyces++	-	-	-	-	-	-	-	-	-		
Rust	-	-	-	-	-	-	-	-	-		
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-		
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-		
Unidentifiable Spores	-	-	-	-	-	-	-	-	-		
Zygomycetes	-	-	-	-	-	-	-	-	-		
Polythrincium	-	-	-	1*	10*	0.3	-	-	-		
Total Fungi	26	1120	100	70	2960	100	203	8900	100		
Hyphal Fragment	3	100	-	13	570	-	2	90	-		
Insect Fragment	-	-	-	-	-	-	-	-	-		
Pollen	-	-	-	1	40	-	-	-	-		
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-		
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-		
Skin Fragments (1-4)	-	4	-	-	4	-	-	3	-		
Fibrous Particulate (1-4)	-	3	-	-	2	-	-	2	-		
Background (1-5)	-	4	-	-	4	-	-	3	-		

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Alan Goldstein, Ph.D., Laboratory Manager or other approved signatory

High levels of background particulate can obscure spores and other particulates leading to underestimation. Background levels of 5 indicate an overloading of background particulates, prohibiting accurate detection and quantification. Present = Spores detected on overloaded samples. Results are not blank corrected unless otherwise noted. The detection limit is equal to one fungal spore, structure, pollen, fiber particle or insect fragment. *** Denotes particles found at 300X. "-" Denotes not detected. Due to method stopping rules, raw counts in excess of 100 are extrapolated based on the percentage analyzed. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Analytical, Inc. Morrisville, NC AIHA-LAP, LLC--EMLAP Lab 173741

Initial report from: 05/22/2019 14:50:45

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com MIC_M001_0002_0001 1.71 Printed: 05/22/2019 14:50 PM



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 05/14/2019

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 Analyzed:
 05/17/2019

Test Report: Air-O-Cell(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)											
Lab Sample Number: Client Sample ID: Volume (L): Sample Location	291905201-0004 27953713 75 Inside the Classroom 16 Area			291905201-0005 26418154 75 Inside the Classroom 22 Area			291905201-0006 27953731 75 Inside the Classroom 11 Area				
Spore Types	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total		
Alternaria (Ulocladium)	-	-	-	-	-	-	-	-	-		
Ascospores	59	2600	50.1	30	1300	41.9	5	200	11.8		
Aspergillus/Penicillium	14	610	11.8	-	-	-	8	300	17.6		
Basidiospores	32	1400	27	34	1500	48.4	27	1200	70.6		
Bipolaris++	-	-	-	-	-	-	-	-	-		
Chaetomium	-	-	-	-	-	-	-	-	-		
Cladosporium	7	300	5.8	6	300	9.7	-	-	-		
Curvularia	1	40	0.8	-	-	-	-	-	-		
Epicoccum	4	200	3.9	-	-	-	-	-	-		
Fusarium	-	-	-	-	-	-	-	-	-		
Ganoderma	-	-	-	-	-	-	-	-	-		
Myxomycetes++	1	40	0.8	-	-	-	-	-	-		
Pithomyces++	-	-	-	-	-	-	-	-	-		
Rust	-	-	-	-	-	-	-	-	-		
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-		
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-		
Unidentifiable Spores	-	-	-	-	-	-	-	-	-		
Zygomycetes	-	-	-	-	-	-	-	-	-		
Polythrincium	-	-	-	-	-	-	-	-	-		
Total Fungi	118	5190	100	70	3100	100	40	1700	100		
Hyphal Fragment	17	740	-	1	40	-	2	90	-		
Insect Fragment	-	-	-	-	-	-	-	-	-		
Pollen	-	-	-	-	-	-	-	-	-		
Analyt. Sensitivity 600x	-	44	-	-	44	-	-	44	-		
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-		
Skin Fragments (1-4)	-	3	-	-	2	-	-	3	-		
Fibrous Particulate (1-4)	-	2	-	-	1	-	-	2	-		
Background (1-5)	-	3	-	-	2	-	-	3	-		

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Alan Goldstein, Ph.D., Laboratory Manager or other approved signatory

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 05/15/2019

 Analyzed:
 05/17/2019

Test Repo	ort: Air-O-Cell(™) Analysis of F	ungal Spores &	Particulates by	Optical Microso	copy (Methods N	MICRO-SOP-201	, ASTM D7391)	
Lab Sample Number: Client Sample ID: Volume (L): Sample Location		291905201-0007 27953636 75 le Exterior EV S			291905201-0008 28394048 Field Blank				
Spore Types	Raw Count	Count/m ³	% of Total	Raw Count	Count/m ³	% of Total	-	-	-
Alternaria (Ulocladium)	-	-	-	-	-	-	-		-
Ascospores	238	10400	81.3	-	-	-	-		
Aspergillus/Penicillium	-	-	-	-	-	-	-		
Basidiospores	53	2300	18	-	-	-	-		
Bipolaris++	-	-	-	-	-	-	-		
Chaetomium	-	-	-	-	-	-	-		
Cladosporium	2	90	0.7	-	-	-	-		
Curvularia	-	-	-	-	-	-	-		
Epicoccum	-	-	-	-	-	-	-		
Fusarium	-	-	-	-	-	-	-		
Ganoderma	-	-	-	-	-	-	-		
Myxomycetes++	-	-	-	-	-	-	-		
Pithomyces++	-	-	-	-	-	-	-		
Rust	-	-	-	-	-	-	-		
Scopulariopsis/Microascus	-	-	-	-	-	-	-		
Stachybotrys/Memnoniella	-	-	-	-	-	-	-		
Unidentifiable Spores	-	-	-	-	-	-	-		
Zygomycetes	-	-	-	-	-	-	-		
Polythrincium	-	-	-	-	-	-	-		
Total Fungi	293	12790	100	-	No Trace	-	-		
Hyphal Fragment	1	40	-	-	-	-	-		
Insect Fragment	-	-	-	-	-	-	-		
Pollen	3	100	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	44	-	-	0	-	-		
Analyt. Sensitivity 300x	-	13*	-	-	0*	-	-		
Skin Fragments (1-4)	-	1	-	-	-	-	-		
Fibrous Particulate (1-4)	-	1	-	-	-	-	-		
Background (1-5)	-	1	-	-	-	-	-		

++ Includes other spores with similar morphology; see EMSL's fungal glossary for each specific category.

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Initial report from: 05/22/2019 14:50:45

For information on the fungi listed in this report, please visit the Resources section at www.emsl.com

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Disposition: OBSORT after 9474201 V20.9376 Mithousianing FAX (86) 7046-0202 Company Name: Soil and Land Use Technology Inc. It Bib is different coll barrently. Street: 1818 New York Ave., Suite 231 Taid Pairy Billing regulate writen authoration from fird pary. Company Name: Soil and Land Use Technology Inc. It Bib is different coll barrently. Company Name: Soil and Land Use Technology Inc. Taid Pairy Billing regulate writen authoration from fird pary. Company Name: Soil Address: Uprovement Coll Engling regulates writen authoration from fird pary. Purchase Organ: Report To (Name): NDKA JAVATLAKE Telephone #. Purchase Organ: Project Name(Number: POPCS IAO/19-035 Cooper Lane ES Dense Provide Results: Commercicul Section Methodology regulations for the Namy Methodology. Vashydro complexition accounter with NSC: Trans and Controls footant in entration the Anylogi Price Coll. Tarrateound Time (TAT) Options *. Plasse Check 11115 Sewage Score You With 12 Vash Mitt Sectorization Level 1 28 Hour 24 Hour 128 Hour 1114 Week 12 Wook Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization Level 1 Mitt Sectorization	Client:	QUEGI			•	8		-				
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Microbiology Chain of Custody

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SaLUT PGPCS IAQ/19-035 Cooper Lane ES 5/15/2019 15:10 TAT: 1 Week M001 Air-O-Cell

Order ID: 291905201 No Samples: 8 Due: 05/22 3:10 PM Fax: 301-595-3787

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Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Air

Sample #	Sample Location/Description	Sample Type	Potable/ NonPotable	Test Code	Volume/ Area	Date/Time Collected	Temperature (°C) (Lab Use Only)
27953636	Outside exterior EV sample	Air		M001	75L	11	4
28394048	Field Blank	Air		M001	N/A	n	
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