LIMITED INDOOR AIR ASSESSMENT REPORT

FORT MOORE
911 LENAHAN STREET
FORT MOORE, GEORGIA 31905

Prepared For:

VentorLux, LLC
1210 43rd Street
Phenix City, Alabama 36867

Prepared by:

ERRM, LLC
7972 Hampton Cove Drive
Ooltewah, Tennessee 37363

December 29, 2023

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SECTION 1.0 – LIMITED INDOOR AIR ASSESSMENT

1.1 INTRODUCTION

ERRM, LLC was contracted by VentorLux, LLC to collect indoor air samples to determine the effectiveness of its Soulis air cleaner. The Soulis air cleaner is a proprietary unit developed with quiet operation and using ultra-violet radiation that kills bacteria (including virus causing agents), pathogens, and mold. The Indoor Air Assessment (IAA) was limited to three (3) locations mutually agreed upon by the City of Hope), ERRM, LLC, and VentorLux, LLC. The facility is located at 911 Lenahan Street, in Fort Moore, Georgia 31905. The sample locations and description are as follows:

1. The showers are located on the third floor and centrally within the building. This area, at the time of the IAA observed mold growth on the showers and shower entrances.

The IAA parameters included in the testing conducted at this facility included the following:

- Culturable Air Fungi - The method employs an Anderson impinger that directs air flow onto a petri dish (Malt Extract Agar plate) that is cultured at the lab. This media allows isolation of pathogenic fungi that are “viable.” It will grow a wide variety of fungi that can then be identified at the laboratory. This report and lab data will refer to this as “MEA.”

1.2 FIELD ACTIVITIES

ERRM, LLC performed the following field activities specifically to determine the Soulis unit's effectiveness. The locations for the testing were determined by Fort Moore representatives and agreed to by VentorLux, LLC and ERRM, LLC. The building was not occupied during the assessment. Therefore, to simulate normal shower activity, a few of the showers were turned on for about 5 minutes prior to sampling activity and Soulis units being turned on.

IAA Sampling

- On November 30, 2023, ERRM, LLC (Mr. Michael Kendall) was on-site to perform the IAA. The equipment was set up (one rotary vane pump field calibrated to 28.1 liters per minute (LPM) for MEA Agar plates. Five (5) samples were collected over a four (4) hour period. Five (5) minute sample intervals were used to collect samples at the testing location as follows:

1. One (1) Background air sample, using the MEA media was performed to collect the air-borne species prior to turning on the Soulis unit. The sample was collected over a 5-minute interval to provide the volume needed for the analytical method.

2. Four (4) samples (sample pumps turned on while the Soulis Unit was running) were collected using the MEA media to collect the air-borne species. The samples were collected over a minimum 5-minute interval to provide the volume needed for each analytical method. These samples were collected after 30, 60, 180, and 240 minutes (about 4 hours) of Soulis' operation. Note: The Soulis unit once turned on continued to run throughout the entire sampling period for these four (4) samples. Just before the 180-minute sample, the showers were turned on again to stir up mold and simulate personnel activity while the Soulis operated.

2.0 RESULTS

The laboratory data has been prepared in the summary table below. The data table includes all detected species. The full laboratory report is attached in Appendix B. The results are presented in the following table.

TABLE 1

Epicoccum sp.		7			
Chrysoporium sp.				7	
Cladosporium cladosporioides	112	28	7	84	14
Cladosporium sphaerospermum	105	21			
Curvularia sp.	7				
Pithomyces sp.	7				
Rhodotorula sp.	21				
Sterile(dark)	7				
Sterile(white)	7	7	21	7	
Fusarium sp.				7	
Time - minutes	0	30	60	180	240

Table 1 data shows that the Soulis Unit is effective at cleaning the air and killing viable mold species. This data reveals that the Soulis unit effectively killed 90% of the species overall, irrespective of people and activity (2-6 people moving in and out of the sampling area). An important note is that the species identified in the time 180 sample (after the showers were turned on the second time, while the Soulis continued to operate) were again reduced to all but one species within one hour.

3.0 CONCLUSIONS

Based upon the results presented above, ERRM, LLC concludes that the Soulis Unit is effective in killing mold spores encountered at a rate of 100% for most species in an area of active mold growth. The data supports the continued use of Solis units to kill spores thereby providing a safer workplace and also killing opportunistic bacteria. Opportunistic bacteria are defined by the World Health Organization. The following table from the U.S. National Institute of Health provides a sample of common sources of airborne infectious diseases, that during other Soulis studies conducted by ERRM, LLC have been shown to be also killed by the Soulis unit(s).

Droplet or airborne microorganisms released from various activities for infectious bacteria		
Activity	**Approximate particle count**	**Units**
Sneezing	40,000	Per sneeze
Bowel evacuation	20,000	Per event
Vomiting	1,000	Per event
Coughing	710	Per cough
Talking	36	Per 100 words

The following is an interpretation/extrapolation of these results for COVID-19 (SARS-CoV-2)

The International Ultra-Violet Association states the following:

"Because the COVID-19 virus (SARS-CoV-2) is so new, the scientific community does not yet have a specific deactivation dosage. However, we know the dosage values for comparable viruses in the same SARS virus family are 10-20 mJ/cm^2 using direct UV-C light at a wavelength of 254nm; this dosage will achieve 99.9% disinfection (i.e., inactivation) under controlled lab conditions."

Also, Boston University has published results validating that UV-C will deactivate coronavirus.

"The university's National Emerging Infectious Diseases Laboratories (NEIDL) exposed materials containing the virus to a UV-C tube lamp from Signify. It found that a dose of 5 mJ/cm^2 resulted in a reduction of the SARS-CoV-2 virus of 99% in 6 seconds (SARS-CoV-2 is the more scientific name for the novel coronavirus)." The NEIDL team extrapolated that a stronger dose of 22 mJ/cm^2 would result in a reduction of 99.9999% in 25 seconds.

Soulis Conclusion

The Soulis unit provides 1,300,000 mJ/cm^2; with that dose being over 59,000 times (for 99.9999% kill rate) more powerful than the NEIDL dose needed. Concluding that the Soulis unit is effective against the COVID-19/SARS virus and variants and opportunistic bacteria.

APPENDIX A

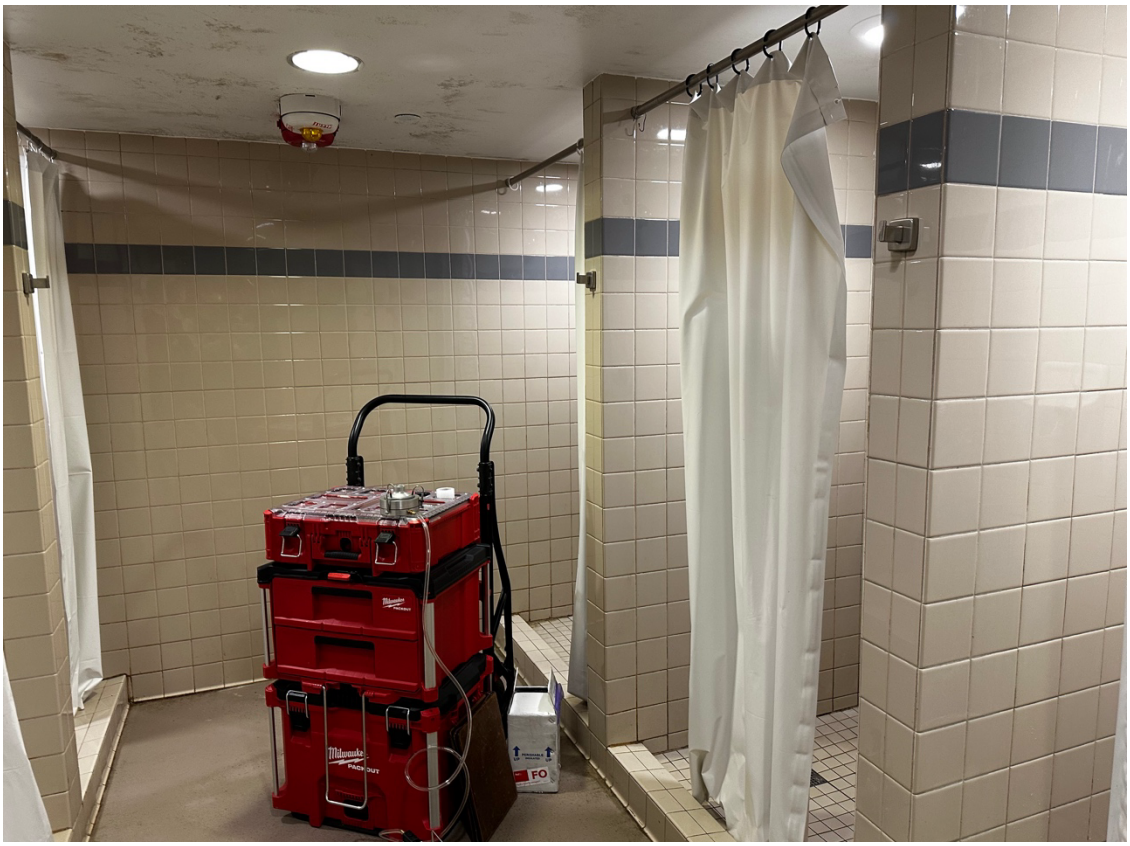
Photo Log

View of 911 Lenahan building from the southwest side looking northeast

View of mold growth within the showers and shower entrance area

Closeup view in a shower stall

Closeup view in a shower stall



View of testing area – silver unit on top of the hand truck cases is an Anderson Impactor sampler for agar plates.

Soulis Unit location throughout sampling activity. Note: it is not direct at the sampler nor at the ceiling.

APPENDIX B

LABORATORY DATA

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

EMSL Order:	292309227
CustomerID:	ERRM75
CustomerPO:	231247
ProjectID:	

Attn: **Michael Kendall, P.G.**
Environmental Risk & Resource Management
7972 Hampton Cove Dr
Ooltewah, TN 37363

Phone:	(615) 428-1316
Fax:	
Received:	12/1/2023 09:43 AM
Analysis Date:	12/14/2023
Collected:	11/30/2023

Project: **Fort Moore/231247/911 Lenahan St.**

Test Report: Viable Fungi Identification and Enumeration from Impactors (Including Speciation of Penicillium, Aspergillus, Cladosporium and Stachybotrys (EMSL Method MICRO-SOP-202)

Sample Description	Location	Volume (L)	Media	Incubation Temp (C)	Sensitivity (CFU/m³)	Fungal Identification	Colony Count	CFU/m³
AS-1 T0	Men's Shower 3rd Floor	141.5	MEA	25	7	*Cladosporium cladosporioides*	16	112
292309227-0001						*Cladosporium sphaerospermum*	15	105
Bacteria present.						*Curvularia sp.*	1	7
						Pithomyces sp.	1	7
						Rhodotorula sp.	3	21
						Sterile(dark)	1	7
						Sterile(white)	1	7
						Total	**38**	**266**
AS-1 T30	Men's Shower 3rd Floor	141.5	MEA	25	7	*Cladosporium cladosporioides*	4	28
292309227-0002						*Cladosporium sphaerospermum*	3	21
						Epicoccum sp.	1	7
						Sterile(white)	1	7
						Total	**9**	**63**
AS-1 T60	Men's Shower 3rd Floor	141.5	MEA	25	7	*Cladosporium cladosporioides*	1	7
292309227-0003						*Sterile(white)*	3	21
						Total	**4**	**28**
AS-1 T180	Men's Shower 3rd Floor	141.5	MEA	25	7	*Chrysoporium sp.*	1	7
292309227-0004						*Cladosporium cladosporioides*	12	84
						Fusarium sp.	1	7
						Sterile(white)	1	7
						Total	**15**	**105**
AS-1 T240	Men's Shower 3rd Floor	141.5	MEA	25	7	*Cladosporium cladosporioides*	2	14
292309227-0005						**Total**	**2**	**14**

Analyst(s)

Virginia Causey (5)

Billy Barnes, Laboratory Manager
or other approved signatory

Initial report from 12/14/2023 12:35:19

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

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

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Sample Description	Location	Volume (L)	Media	Incubation Temp (C)	Sensitivity (CFU/m³)	Fungal Identification	Colony Count	CFU/m³

No discernable blank was submitted with this group of samples.

Analyst(s)

Virginia Causey (5)

Billy Barnes, Laboratory Manager
or other approved signatory

Initial report from 12/14/2023 12:35:19

THIS IS THE LAST PAGE OF THE REPORT.

OrderID: 292309227

EMSL Analytical, Inc.

EMSL ANALYTICAL LABORATORY • PRODUCTS • TP

Client: Environmental Risk & Resour Test: M006 Viable Fungi (GS) #Samples: 5

Order: 292309227 Project: Fort Moore/231247/911 Lenahan St.

Disposition. ***Discard after 1/30/2024***

If Bill-To is the same as Report-To leave this section blank. Third-party billing requires written authorization

Customer Information		Billing Information	
Customer ID:	ERRM75	Billing ID:	ERRM75
Company Name.	Environmental Risk & Resource Management	Company Name:	Environmental Risk & Resource Management
Contact Name.	P.G. Michael Kendall	Billing Contact.	Michael Kendall, P.G.
Street Address.	7972 Hampton Cove Dr	Street Address:	7972 Hampton Cove Dr
City, State, Zip:	Ooltewah TN 37363	City, State, Zip:	Ooltewah TN 37363
Country.	US	Country:	US
Phone:	6154281316	Phone:	6154281316
Email(s) for Report:	michael@errmllc.com	Email(s) for Invoice.	same

Project Information

Project Name/No: Fort Moore / ~~231250~~ 231247 / 911 Lenahan St

Purchase Order: 231247

EMSL LIMS Project ID: (If applicable, EMSL will provide)

State Samples Collected: GA

Zip Code Samples Collected::

State of Connecticut (CT) must select project location: ☐ Commercial (Taxable) ☐ Residential (Non-taxable)

Sampled By Name: Michael Kendall

Sampled By Signature: Michael O'Kendall

No. of Samples in Shipment: 5

Sterile, Sodium Thiosulfate Preserved Bottle Used: ☐ Biocide Used in Source (specify)

Public Water Supply Samples: ☐ Note: All results may automatically be reported to DOH if required by State.

Turn-Around-Time (TAT) Please call ahead for large projects and/or turnaround times 6 Hours or Less. *32 Hour TAT available for select tests only; samples must be submitted by 11:30am

☐ 3 Hour ☐ 6 Hour ☐ 24 Hour ☐ 32* Hour ☐ 48 Hour ☐ 72 Hour ☐ 96 Hour ☐ 1 Week ☑ 2 Week

MICROBIOLOGY TEST CODES

M001 Air-O-Cell	M174 MoldSnap	M012 *Pseudomonas aeruginosa* (P/A***)	M115 Sewage Screen - Water (P/A***)
M030 Micro 5	M032 Allergenco-D	M024 *Pseudomonas aeruginosa* (MFT*)	M116 Sewage Screen - Water (MPN**)
M041 Fungal Direct Examination		M015 Heterotrophic Plate Count	M117 Sewage Screen - Swab (P/A***)
M169 Pollen ID & Enumeration		M017 Total Coliform & *E. Coli* (Colilert P/A***)	M013 Sewage Screen - Swab (MFT*)
M280 Dust Characterization Level-1		M018 Total Coliform & *E. Coli* (MFT*)	M730 *Methicillin-resistant Staph, aureus* (MRSA)
M281 Dust Characterization Level-2		M114 Total Coliform & *E. Coli Enumeration (Colilert MPN**)*	M031 Rapid-growing non-TB *Mycobacteria* Detection & Enumeration
M005 Viable Fungi-Air Samples (Genus ID & Count)		M019 Fecal Coliform (MFT*)	
M006 Viable Fungi-Air Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)		M020 Fecal *Streptococcus* (MFT*)	M014 Endotoxin Analysis
M007 Culturable Fungi-Surface Samples (Genus ID & Count)		M029 *Enterococci* (MFT*)	M044 Group Allergen (Cat, Dog, Cockroach, Dust Mite)
M008 Culturable Fungi-Surface Samples (Includes *Penicillium, Aspergillus, Cladosporium, Stachybotrys* Species ID & Count)		M129 *Enterococci* (Enterolert P/A***)	M095 Bacteroides
		M180 Real Time qPCR-ERMI 36 Panel	Other - See Analytical Price Guide for Test Code
		M025 Sewage Screen - Water (MFT*)	*Legionella Analysis* Please use EMSL *Legionella* COC
M009 Bacteria Culture Gram Stain & Count		*MFT= Membrane Filtration Technique	
M010 Bacteria Count & ID - 3 Most Prominent		**MPN = Most Probable Number	
M011 Bacteria Count & ID - 5 Most Prominent		***P/A = Presence/Absence	

Sample #	Sample Location/Description	Sample Type (Matrix)	Potable / Non-Potable (Only for Water)	Test Code	Volume/Area	Date / Time Collected	Temperature (Lab Use Only)
Example: Sample 1	Kitchen	Water	Potable	M017	1,000 ml	1/1/2021 3.30pm	
AS-1 T0	Men's shower 3rd floor	Air		M006	141.5L	11/30/23 1020	
AS-1 T30	Men's shower 3rd floor	Air		M006		1050	
AS-1 T60	Men's shower 3rd floor	Air		M006		1120	
AS-1 T180	Men's shower 3rd floor	Air		M006		1320	
AS-1 T240	Men's shower 3rd floor	Air		M006	226.4L	1420	

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

BillTo: Environmental Risk & Resource Management, 7972 Hampton Cove Dr, Ooltewah, TN, 37363, US

Attention: Michael Kendall, P.G. Phone: 6154281316 Email: michael@errmllc.com Purchase Order: 231247

Method of Shipment: FED-EX		Sample Condition Upon Receipt:	
Relinquished by: Michael O'Kendall	Date/Time: 11/30/23 2000	Received by:	Date/Time 12/1/23 9:11
Relinquished by:	Date/Time:	Received by.	Date/Time

Controlled Document - COC-34 Micro R13 03/02/2021

☐ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

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