

POST REMEDIATION INDOOR AIR QUALITY SAMPLING

**Robinson Hall
Rowan University
Glassboro, NJ 08028**

PREPARED FOR:

Rowan University
201 Mullica Hill Road
Glassboro, New Jersey 08028

PREPARED BY:

Montrose Environmental, Inc.
500 Horizon Drive, Suite 540
Robbinsville, NJ 08691

MONTROSE PROJECT NO. 1200-62



September 2023

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1.0 INTRODUCTION

On September 11, 2023 Montrose Environmental, Inc. (Montrose) responded to a request by Rowan University (Rowan) to perform post-remediation indoor air quality (IAQ) sampling for room 103, 201A and 205 within Robinson Hall on the Rowan Main Campus in Glassboro, New Jersey (Site). Rooms 103, 201A, and 205 continued to have elevated mold spore counts after a building-wide cleaning, and Montrose recommended enhanced cleaning within those spaces.

The September 11, 2023 sampling was done to assess the efficacy of re-cleaning efforts done within those spaces noted above.

1.1 PROJECT OBJECTIVE

The objective of this project was to collect mold spore air samples and provide recommendations as warranted, based on the laboratory analytical report.

2.0 METHODOLOGY

The air samples were collected utilizing Air-O-Cell sampling cassettes, which are designed for collection and analysis of a wide range of airborne aerosols, including mold spores, pollen, insect parts, fibers, and other inorganic particulates.

All samples were hand delivered to EMSL Analytical, Inc. (EMSL), of Cinnaminson, New Jersey, an American Industrial Hygiene Association Environmental Microbiological Laboratory Accreditation Program (AIHA EMLAP #100194) and Industrial Hygiene Laboratory Accreditation Program (IHLAP) laboratory. All samples were submitted for a 24-hour turnaround time.



3.0 MOLD STANDARDS

Mold growth is most likely found in areas that have sufficient moisture, temperature, and nutritive sources to promote proliferation. Nutritive sources within buildings include drywall paper backing, cellulose ceiling tiles, wallpaper, wood wall framing and trim, pipe insulation wrappings, and similar materials.

As an industry guideline, interpretation of results should be based on comparison of fungi collected from indoor air and outdoor air. Outdoor results are highly variable and can vary based on seasonal conditions and the time-of-day. Additionally, the species of fungi identified in samples collected indoors may vary from those species identified in outdoor samples. Indoor results should be comparable to the types and concentration of fungi outdoors. In some instances, indoor air concentrations of total airborne culturable fungi can exceed outdoor air concentrations, in response to outdoor environmental conditions. The presence of certain indoor-associated species may be indicative of elevated moisture and/or water-damaged building materials. Moreover, the second-edition of the American Industrial Hygiene Association (AIHA) *Field Guide for the Determination of Biological Contaminants in Environmental Samples*, states that dominance in indoor-air samples by species of molds that are not predominant outdoor species, indicates that molds are growing in the building and that indoor air quality is degraded.

Montrose evaluated the mold spore results using the AIHA *Recognition, Evaluation, and Control of Indoor Mold*, 2008. Additionally, variability in sampling conditions is considered during the interpretation of laboratory analytical data.

4.0 MOLD ASSESSMENT AND MOISTURE INSPECTION ACTIVITIES

4.1 VISUAL OBSERVATIONS

On September 11, 2023, visible mold growth was no longer observed within Room 103, 201A, or 205. All carpets had been re-cleaned, and all horizontal flat surfaces were wet wiped down again by All Risk, as well as air scrubbers left in-place to filter any airborne particulates.

4.2 ANALYTICAL SAMPLING AND RESULTS

On September 11, 2023, Montrose collected a total of four Air-O-Cell samples at the Site. Samples were collected in Room 103, 201A, and 205. One additional sample was collected outside the building, for baseline purposes and to determine outdoor background levels of spore concentrations.

The laboratory data indicates that overall counts within the rooms were significantly reduced from previously observed levels, as well as the rooms are consistent with outdoor air counts. Air sample laboratory analytical reports have been included in **Appendix A**.

4.3 IDENTIFIED MOLD SPECIES

The spore types detailed below were analytically determined to be airborne in the samples collected within the Site:

Alternaria is one of the most common fungi worldwide. Its colonies are generally found in soil, dead organic debris, on food stuffs, textiles, and weakened plants with discolored leaves. Airborne spores are usually indicative of a humid environment when found indoors, but in most instances, spores found indoors originated from outdoor sources.

Ascospores are discharged during periods of high humidity or rain and are commonly found growing indoors on wet or damp substrates.

Aspergillus/Penicillium is commonly found in soil, plants, and rotting materials. Elevated concentrations are often indicative of water-damaged building materials. It can also be found in the dust at home, carpeting, heating and air conditioning ducts. This fungus commonly settles in human lungs and sinuses.

Basidiospores are released during periods of high humidity or rain and are commonly found in gardens or wooded areas. Mold growth associated with *Basidiospores* contribute to the destruction of structural building lumber. This spore is a common allergen and may contribute to symptoms associated with hay fever and asthma, and further contribute to symptoms associated with hypersensitivity pneumonitis.

Cercospora is often found in plants as a parasite. It is a fungus that causes purple, brown, or black spots on a variety of garden vegetables and shrubs, and is not commonly found indoors, unless interior plants are present.

Cladosporium is commonly found in soil, plants, and decaying plant materials. Concentrations may be found on many different substrates, including but not limited to: textiles, wood, and

window sills. *Cladosporium* is a common allergen and may contribute to symptoms associated with hay fever and asthma, and further contribute to symptoms associated with hypersensitivity pneumonitis.

Epicoccum is commonly found on a variety of household materials, including wood, drywall, fabric, carpet, mattresses and painted surfaces. This species is commonly found in plant debris and soil. Presence of this mold can trigger allergic reactions and can also cause respiratory problems.

Ganoderma is often found growing on conifers and hardwoods causing white rot, root rot, and stem rot, and is considered to be an allergen. Not often found indoors, and only usually present on rotting wood surfaces.

Myxomycetes is found usually in decaying logs, stumps, and dead leaves, particularly in forested regions. Occasionally found indoors on damp building materials such as cardboard, wallpaper, gypsum and wood, it is considered a slime-mold, and can be found world-wide. In sensitive individuals, allergic reactions may occur, including asthma, conjunctivitis, rhinitis, dermal swelling and hives.

To date, there are no threshold limits or recommendations for levels of indoor mold aeroallergens. The Occupational Safety and Health Administration (OSHA), the National Institute of Occupational Safety and Health (NIOSH), as well as other occupational health related associations, have not established permissible exposure levels (PELs), recommended exposure limits (RELs), or other compliance limit values for aeroallergens. In general, spore counts and spore types are influenced by geographic location, seasonal and diurnal cycles, as well as outdoor conditions. Therefore, it is difficult for regulatory agencies and industry groups to establish permissible exposure limits for mold and fungi exposure, and as a result, there are no regulatory quantitative exposure limits for airborne mold or fungi.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the September 11, 2023, visual inspection and sampling, All Risk has successfully cleaned Robinson Hall Rooms 201A, 205, and 103. Those rooms may be returned to general use.

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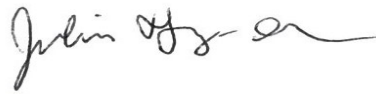
These results represent the conditions and concentrations present at the time of this survey.

Respectfully Submitted,

MONTROSE ENVIRONMENTAL, INC.



Jessica Perrini
Project Health & Safety Specialist



Julian Fernandez-Obregon
Director, Health & Safety Division

APPENDIX A

Laboratory Analytical Reports



EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077

Tel/Fax: (800) 220-3675 / (856) 786-0262

<http://www.EMSL.com> / xxxxxxxxxxx@xxxx.xxx

EMSL Order: 372314341

Customer ID: PARS51

Customer PO: 1200-62

Project ID: Rowan University

Attention: Julian Fernandez-Obregon
Montrose Environmental Solutions
500 Horizon Drive
Suite 540
Robbinsville, NJ 08691

Phone: (609) 890-7277

Fax: (609) 890-9116

Collected Date: 09/11/2023

Received Date: 09/11/2023 02:20 PM

Analyzed Date: 09/12/2023

Project: Rowan - Robbins Hall (Rowan University)

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	372314341-0001			372314341-0002			372314341-0003		
Client Sample ID:	RRU-1			RRU-2			RRU-3		
Volume (L):	150			150			150		
Sample Location:	RM-201A			RM-205			RM-103		
Spore Types	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total	Raw Count	Count/m³	% of Total
Alternaria (Ulocladium)	-	-	-	-	-	-	1	20	22.2
Ascospores	-	-	-	-	-	-	-	-	-
Aspergillus/Penicillium	12	270	100	16	350	100	-	-	-
Basidiospores	-	-	-	-	-	-	-	-	-
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium++	-	-	-	-	-	-	-	-	-
Cladosporium	-	-	-	-	-	-	3	70	77.8
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium++	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces++	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis/Microascus	-	-	-	-	-	-	-	-	-
Stachybotrys/Memnoniella	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	-	-	-	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Cercospora++	-	-	-	-	-	-	-	-	-
Nigrospora	-	-	-	-	-	-	-	-	-
Total Fungi	12	270	100	16	350	100	4	90	100
Hyphal Fragment	-	-	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	22	-	-	22	-	-	22	-
Analyt. Sensitivity 300x	-	7*	-	-	7*	-	-	7*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-	-	1	-

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

Vincent Iuzzolino, M.S., Laboratory Manager
or other Approved Signatory

No discernable field blank was submitted with this group of samples.

Skin Fragment and Fibrous Particulate ratings are based on the percent of non-fungal material they represent: 1 (1-25%), 2 (26-50%), 3 (51-75%), or 4 (76-100%). Background ratings are based on the total area covered by non-fungal particles: 1 (1-25%), 2 (26-50%), 3 (51-75%), 4 (76-99%), or 5 (100%; overloaded, prohibiting accurate detection and quantification). High levels of background will obscure spores and other particulates, leading to underestimation. 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. Interpretation and use of test results are the responsibility of the client. 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. The report reflects the samples as received. When the information supplied by the customer can affect the validity of the result, it will be noted on the report.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ AIHA LAP, LLC-EMLAP Accredited #100194

Initial report from: 09/12/2023 02:29 PM

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



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Analyzed Date: 09/12/2023

Test Report: Air-O-Cell™ Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods MICRO-SOP-201, ASTM D7391)

Lab Sample Number:	372314341-0004				
Client Sample ID:	RRU-4				
Volume (L):	150				
Sample Location:	Outside				
Spore Types	Raw Count	Count/m³	% of Total		
Alternaria (Ulocladium)	1*	7*	0.1		
Ascospores	29	640	7.3		
Aspergillus/Penicillium	8	200	2.3		
Basidiospores	347	7670	87.1		
Bipolaris++	-	-	-		
Chaetomium++	-	-	-		
Cladosporium	7	200	2.3		
Curvularia	-	-	-		
Epicoccum	1*	7*	0.1		
Fusarium++	-	-	-		
Ganoderma	2	40	0.5		
Myxomycetes++	1	20	0.2		
Pithomyces++	-	-	-		
Rust	-	-	-		
Scopulariopsis/Microascus	-	-	-		
Stachybotrys/Memnoniella	-	-	-		
Unidentifiable Spores	-	-	-		
Zygomycetes	-	-	-		
Cercospora++	1*	7*	0.1		
Nigrospora	1	20	0.2		
Total Fungi	398	8811	100		
Hyphal Fragment	1*	7*	-		
Insect Fragment	-	-	-		
Pollen	-	-	-		
Analyt. Sensitivity 600x	-	22	-		
Analyt. Sensitivity 300x	-	7*	-		
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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