February 21, 2018

Clemson University
310 Klugh Avenue
Clemson, South Carolina 29634

Attn: Mr. W. Robert Newberry, IV
E-mail: wnewber@clemson.edu

Re: Limited Mold and Allergen Investigation Report
Kite Hill Recycling Facility
Clemson, South Carolina 29631
Terracon Project No. 86127158 – Task 125

Dear Mr. Newberry:

Terracon Consultants, Inc. (Terracon) conducted a limited mold and allergen investigation in the recycling facility located at Kite Hill at Clemson University in Clemson, South Carolina. Reportedly, employees working in this facility have reported respiratory irritation and other related symptoms. This service was conducted in general accordance with our Master Service Agreement with Clemson University.

PROJECT DESCRIPTION

Scope of Services

At the request of Clemson University, Terracon representative Mr. Benjamin Hestir conducted a limited mold and allergen investigation at the Kite Hill facility on Monday, January 29, 2018. The Kite Hill facility includes an approximate 4,000 square foot metal shell building on a concrete slab containing recycling equipment, offices, restrooms and a breakroom. The surrounding area consists of paved driving surfaces, recycling containers, dumpsters, wood pallets and bailed paper and cardboard materials.

On our January 29th visit, Terracon made measurements of temperature and relative humidity and conducted airborne mold sampling which consisted of collecting spore trap air samples in four locations inside the building and the collection of two additional samples outside for comparison. We also collected two composite dust samples for allergen analysis.

Standard of Care

This limited mold and allergen investigation was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. Terracon did not attempt to identify every potential exposure or hazard present in the subject building. The results, findings, conclusions and recommendations expressed in this report are based on conditions observed during our sampling. Many factors, such as weather conditions, building occupancy, ventilation patterns and seasonal variations in fungal concentrations, can affect the conditions observed. The information contained in this report should not be relied upon to represent conditions that existed prior to or after this sampling. Terracon does not warrant the services of regulatory agencies, laboratories or other third parties supplying information that may have been used in the preparation of this report.

SAMPLING CRITERIA AND METHODS

Mold and Allergen Sampling

Total mold spore trap samples were collected using Allergenco-D™ spore trap cassettes specifically designed for the collection of airborne mold spores. Air samples were collected using a calibrated Zefon Bio-Pump™ at a flow rate of 15 liters per minute (LPM) for 5 minutes at each location.

After collection, the spore trap samples were delivered by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Air samples were analyzed by direct microscopic examination and results are reported in spores per cubic meter of air (spores/m^3).

To help interpret the mold sampling results, we compared indoor air and outdoor air measurements. High variability in airborne fungal spore concentrations can exist in different geographic locations, during different seasons, and weather patterns, and over the course of a given day. As a general rule, indoor air fungal spore concentrations in a heating, ventilation and air-conditioning (HVAC)-supplied building are typically less than, but qualitatively similar to, fungal spore concentrations found in the outside environment.

No state or federal exposure limits have been established for fungal aerosols. Regulatory standards, medically based threshold limit or dose-response relationships have not been established for exposure to airborne or surface concentrations of mold spores. Terracon relies upon experience, professional judgment, current scientific literature, guidelines and recommendations made by professional organizations and experts, and statistical methods in interpreting mold sampling results.

Two composite allergen dust samples were collected from carpet, chair fabrics and furniture surfaces in the recycling facility using a high volume air sampling pump in conjunction with a 3-piece 37 millimeter dust sampling cassette preloaded with a 5.0 micrometer polyvinyl chloride (PVC) filter.

After composite dust sample collection, the allergen sample was shipped by overnight courier to EMSL in Cinnaminson, New Jersey. EMSL is accredited by the AIHA® Laboratory Accreditation Programs, LLC under the Environmental Microbiology Laboratory Accreditation Program (EMLAP), Accreditation #100194. Allergen samples were analyzed by direct microscopic examination for allergens from dust mites, mouse, rat, cat, dog, and cockroach. Allergen results are reported in micrograms per gram of dust (µg/g).

Temperature and Relative Humidity

Indoor air temperature and relative humidity are physical conditions important to the perception of comfort. The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) has published recommendations regarding thermal comfort. ASHRAE Standard 55-2013, Thermal Environmental Conditions for Human Occupancy, identifies six primary factors that affect comfort: metabolic rate (affected by the activity being performed); clothing insulation; air temperature; radiant temperature; air speed; and humidity.

Although the relationships are complex, a temperature range between 73 and 79 degrees Fahrenheit (°F) with relative humidity between roughly 20 and 60 percent (%) are recommended for persons in a conditioned setting wearing light summer clothing. Higher temperatures require lower humidity for comfort. For persons in winter clothing, temperatures can range between 68 and 75°F, with relative humidity between 20% and 60%, with preferred conditions falling between 30% and 50% for both winter and summer temperatures.

EPA recommends maintaining indoor humidity below 60%, ideally 30-50%, if possible.

Readings of temperature and relative humidity were collected with an Extech Model 445580 IAQ instrument which was calibrated by the manufacturer.

FINDINGS

General Observations

- The facility contains large overhead doors allowing trucks to drive through the facility thus we would expect the indoor air to be very similar to the outdoor air.
- Evidence of water leaks were observed in the breakroom, potentially from HVAC units mounted above the office/breakroom spaces.
- Photographs from the assessment are attached.

Mold Air Sampling

On the morning of January 29, 2018, Terracon collected four mold spore trap samples inside the recycling facility and two samples in outdoor locations for comparison. The results of the total spore count samples analyses are summarized in Table 1 below:

Table 1: Summary of Total Spore Count Analyses – January 29, 2018

Sample #	KH-1	KH-2	KH-3	KH-4	KH-5	KH-6
Location Description	**W side of compactor**	**Breakroom**	**SE corner – interior**	**SW corner – interior**	**Outside SE corner**	**Outside SW corner**
Spore Type	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**	**Spores/m³**
Ascospores	430	300	90	650	560	780
Basidiospores	47,600	59,700	47,600	59,700	119,000	119,000
Cladosporium	90	100	90	200	40	---
Epicoccum	---	10	---	---	---	---
Penicillium/ Aspergillus	200	90	650	---	---	100
Monodictys	---	10	---	---	---	---
Rusts	---	---	---	---	---	10
Smuts/*Periconia*/ Myxomycetes	40	---	---	---	---	---
Pithomyces	40	---	---	---	---	---
Stachybotrys	---	40	---	---	---	---
Unidentifiable spore	---	200	---	---	40	---
Total	**48,400**	**60,450**	**48,430**	**60,550**	**119,640**	**119,890**
Temperature (degrees F.)	57.5	62.9	58.8	57.7	57.2	---
Relative Humidity (%)	62.5	57	59.3	62.6	65.1	---

The highest outdoor total spore count was approximately two times higher than the highest total spore count inside. The predominant mold genera indoors was *Basidiospores.* The predominant mold genera outdoors was *Basidiospores*. The weather on the day we sampled was cloudy and moderate (high 50's) with a slight breeze. The laboratory analytical report is attached.

Temperature and Relative Humidity

The indoor temperature was 57ºF and the relative humidity was 62%. The outdoor temperature was 57ºF and the relative humidity was 65%.

Allergen Sampling

On the morning of January 29, 2018, Terracon collected two dust samples from the carpeting, chair fabric, and furniture in the recycling facility at Kite Hill. One sample was primarily collected from a carpet/floor mat on an elevated work surface in the warehouse and the second sample was collected from carpeting and furniture in an office. The samples were analyzed for allergens from dust mites, mouse, rat, cat, dog, and cockroach.

Allergens were identified in the samples. Table 2 below summarizes the laboratory results. The laboratory analytical report is attached and references additional information.

Table 2: Summary of Allergen Analyses – January 29, 2018

Sample #	KH-7		KH-8	
Location Description	**Composite from carpet/mat on elevated walkway in warehouse**		**Composite from carpet squares and furniture in office with computers**	
Allergen Type/Antigen	**Concentration (ug/g)**	**Laboratory assigned risk factor**	**Concentration (ug/g)**	**Laboratory assigned risk factor**
Dust Mites / Der fl	ND	NA	ND	NA
Dust Mites / Der pl	ND	NA	ND	NA
Mouse / Mus ml	ND	NA	ND	NA
Rat / Rat nl	ND	NA	ND	NA
Cat / Fel dl	7.12	Moderate	ND	NA
Dog / Can fl	ND	NA	ND	NA
Cockroach / Bla G2	ND	NA	ND	NA

Note: ug = microgram (10^{-6} grams), NA = Not Applicable, ND = not detected

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are provided based on our assessment:

- The results of mold air sampling indicated that total airborne mold spore concentrations inside the building were below the total mold spore levels measured in the highest outdoor sample. Additionally the predominant mold spore indoors was also observed in the outdoor samples in lower concentrations. Both the indoor and outdoor spore sample results contained 98 – 99% Basidiospores. This may be considered favorable and should be expected as the building is open to the outdoors for most of the day.
- There was stained ceiling tile in the breakroom; however, there was no indication of surface mold and the source of ceiling tile staining is most likely from the HVAC system condensate overflow. It is recommend to replace the ceiling tile and monitor this location for future leaks.

- Temperature levels were below ASHRAE guideline ranges and relative humidity levels measured were above the higher range of 60%. Since this facility is largely open to the outdoor air, these guidelines are not applicable.
- A moderate level of cat allergens were detected and may be a source of allergic reactions. Employees should be notified in case they are allergic to cats.

Terracon appreciates the opportunity to provide this service to Clemson University. If you have any questions regarding this limited mold and allergen investigation report, please contact the undersigned at 864-292-2901.

Sincerely,
Terracon Consultants, Inc.

Benjamin Hestir, P.E.
Project Industrial Hygienist

Jeffrey A. Gurrie
Senior Industrial Hygienist

Attachments: Photographs
Laboratory Results

Photographs



Photo #1 View of inside facility facing east (location of air sample KH-1)



Photo #2 View of interior office and break room entrances and overhead door facing east



Photo #3 View of elevated walkway facing west (location of dust sample KH-7)



Photo #4 View of water damaged ceiling tiles in the break room



Photo #5 View of open overhead door facing west



Photo #6 View of pallets stacked outside on the SE corner of the facility (location of air sample KH-5)

Laboratory Results

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0262
http://www.EMSL.com / cinnmicrolab@emsl.com

Order ID:	371801672
Customer ID:	GTER78
Customer PO:	86127158Task125
Project ID:	

Attn: Ben Hestir
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: (864) 292-2901
Fax: (864) 292-6361
Collected: 01/29/2018
Received: 01/31/2018
Analyzed: 02/06/2018

Proj: Kite Hill Recycling

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	371801672-0001			371801672-0002			371801672-0003		
Client Sample ID:	KH-1			KH-2			KH-3		
Volume (L):	75			75			75		
Sample Location:	W Side of Compactor			Breakroom			SE Corner - Interior		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	10	430	0.9	7	300	0.5	2	90	0.2
Aspergillus/Penicillium	4	200	0.4	2	90	0.1	15	650	1.3
Basidiospores	1100	47600	98.3	1380	59700	98.8	1100	47600	98.3
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	2	90	0.2	3	100	0.2	2	90	0.2
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	1*	10*	0	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	1	40	0.1	-	-	-	-	-	-
Pithomyces	1	40	0.1	-	-	-	-	-	-
Rust	-	-	-	-	-	-	-	-	-
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	1	40	0.1	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	4	200	0.3	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Monodictys	-	-	-	1*	10*	0	-	-	-
Total Fungi	**1118**	**48400**	**100**	**1399**	**60450**	**100**	**1119**	**48430**	**100**
Hyphal Fragment	-	-	-	2*	30*	-	2	90	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	-	-	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	43	-	-	43	-	-	43	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	2	-	-	2	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

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

Vincent Iuzzolino, M.S., Laboratory Director
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. 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. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 02/07/2018 12:00:29

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

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Phone/Fax: (800) 220-3675 / (856) 786-0262
http://www.EMSL.com / cinnmicrolab@emsl.com

Order ID: 371801672
Customer ID: GTER78
Customer PO: 86127158Task125
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Phone: (864) 292-2901
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Collected: 01/29/2018
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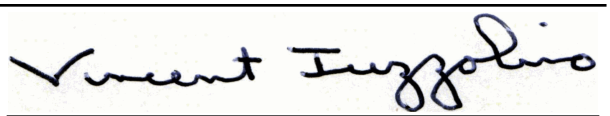
Proj: Kite Hill Recycling

Test Report: Allergenco-D(™) Analysis of Fungal Spores & Particulates by Optical Microscopy (Methods EMSL 05-TP-003, ASTM D7391)

Lab Sample Number:	371801672-0004			371801672-0005			371801672-0006		
Client Sample ID:	KH-4			KH-5			KH-6		
Volume (L):	75			75			75		
Sample Location:	SW Corner - Interior			Outside SE Corner			Outside SW Corner		
Spore Types	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**	**Raw Count**	**Count/m³**	**% of Total**
Alternaria	-	-	-	-	-	-	-	-	-
Ascospores	15	650	1.1	13	560	0.5	18	780	0.7
Aspergillus/Penicillium	-	-	-	-	-	-	3	100	0.1
Basidiospores	1380	59700	98.6	2750	119000	99.5	2750	119000	99.3
Bipolaris++	-	-	-	-	-	-	-	-	-
Chaetomium	-	-	-	-	-	-	-	-	-
Cladosporium	5	200	0.3	1	40	0	-	-	-
Curvularia	-	-	-	-	-	-	-	-	-
Epicoccum	-	-	-	-	-	-	-	-	-
Fusarium	-	-	-	-	-	-	-	-	-
Ganoderma	-	-	-	-	-	-	-	-	-
Myxomycetes++	-	-	-	-	-	-	-	-	-
Pithomyces	-	-	-	-	-	-	-	-	-
Rust	-	-	-	-	-	-	1*	10*	0
Scopulariopsis	-	-	-	-	-	-	-	-	-
Stachybotrys	-	-	-	-	-	-	-	-	-
Torula	-	-	-	-	-	-	-	-	-
Ulocladium	-	-	-	-	-	-	-	-	-
Unidentifiable Spores	-	-	-	1	40	0	-	-	-
Zygomycetes	-	-	-	-	-	-	-	-	-
Monodictys	-	-	-	-	-	-	-	-	-
Total Fungi	**1400**	**60550**	**100**	**2765**	**119640**	**100**	**2772**	**119890**	**100**
Hyphal Fragment	1*	10*	-	-	-	-	-	-	-
Insect Fragment	-	-	-	-	-	-	-	-	-
Pollen	1*	10*	-	-	-	-	-	-	-
Analyt. Sensitivity 600x	-	43	-	-	43	-	-	43	-
Analyt. Sensitivity 300x	-	13*	-	-	13*	-	-	13*	-
Skin Fragments (1-4)	-	1	-	-	1	-	-	1	-
Fibrous Particulate (1-4)	-	1	-	-	1	-	-	1	-
Background (1-5)	-	2	-	-	1	-	-	1	-

Bipolaris++ = Bipolaris/Drechslera/Exserohilum
Myxomycetes++ = Myxomycetes/Periconia/Smut

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



Vincent Iuzzolino, M.S., Laboratory Director
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. 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. Cinnaminson, NJ AIHA-LAP, LLC--EMLAP Lab 100194

Initial report from: 02/07/2018 12:00:29

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

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Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #:	**371801672**
Customer ID:	**GTER78**
Customer PO:	**86127158Task125**

Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Kite Hill Recycling**

Date Collected: **1/29/2018**
Date Received: **1/31/2018**
Date Analyzed: **2/5/2018**

Sample Summary -Indoor Allergen Analysis by MARIA®



Lab Sample Number	Client Sample ID	Sample Location	Sample Type
371801672-0007	KH-7	Elevated Walkway	Bulk
371801672-0008	KH-8	Computer Room Carpet Squares	Bulk

Report Date	Report Revision	Revision Comments
2/7/2018	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

About Us

EMSL Analytical, Inc. offers a full line of analytical solutions for over 30 years across North America. For more information about our nationally accredited locations, vast line of testing services, and our food safety solutions please visit www.EMSL.com or call



Disclaimers

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable. EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

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Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Kite Hill Recycling**

Date Collected: **1/29/2018**
Date Received: **1/31/2018**
Date Analyzed: **2/5/2018**

EMSL Sample #: **371801672-0007**
Client ID: **KH-7**
Location: **Elevated Walkway**

Sample Type: **Bulk**
Sample Size: **48**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**ND**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**7.12**	µg/g	⚠
Dog Allergen	Can f1	0.012	µg/g	**ND**	µg/g	☑
Cockroach Allergen	Bla g2	0.098	µg/g	**ND**	µg/g	☑

†Sufficient evidence is not available for risk levels.

Allergen Risk Levels:

High -Risk of acute asthmatic attack.

Moderate -Risk for sensitization and bronchial hyperactivity.

Low -Not sufficient to cause symptoms or ND (None Detected); Indicates that the amount of allergen in the sample is below the detection limits.

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable.

EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

This report has been prepared by EMSL Analytical, Inc. at the request of and for the exclusive use of the client named in this report. Completely read the important terms, conditions, and limitations that apply to this report

Report Date	**Report Revision**	**Revision Comments**
2/7/2018	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

Please visit our website at http://www.microbiologytestinglab.com/
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Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Kite Hill Recycling**

Date Collected: **1/29/2018**
Date Received: **1/31/2018**
Date Analyzed: **2/5/2018**

EMSL Sample #: **371801672-0008**
Client ID: **KH-8**
Location: **Computer Room Carpet Squares**

Sample Type: **Bulk**
Sample Size: **48**
Sample Units: **mg**

Analytical Results -Indoor Allergen Analysis by MARIA®

Test Parameter	*Antigens*	*Detection Limits*		*Concentrations*		*Allergen Risk Levels*
Dust Mites Allergen	Der f1	0.012	µg/g	**ND**	µg/g	☑
Dust Mites Allergen	Der p1	0.012	µg/g	**ND**	µg/g	☑
Mouse Allergen	Mus m1	0.002	µg/g	**ND**	µg/g	☑
Rat Allergen	Rat n1	0.004	µg/g	**ND**	µg/g	†
Cat Allergen	Fel d1	0.004	µg/g	**ND**	µg/g	☑
Dog Allergen	Can f1	0.012	µg/g	**ND**	µg/g	☑
Cockroach Allergen	Bla g2	0.012	µg/g	**ND**	µg/g	☑

†Sufficient evidence is not available for risk levels.

Allergen Risk Levels:

High -Risk of acute asthmatic attack.

Moderate -Risk for sensitization and bronchial hyperactivity.

Low -Not sufficient to cause symptoms or ND (None Detected); Indicates that the amount of allergen in the sample is below the detection limits.

All samples were collected by and all sampling data was provided by the client. The results are valid only for those samples analyzed, and only for those samples collected in accordance with the appropriate methodology as determined by the client. The results herein do not denote or represent a medical or clinical diagnosis or conclusion. In the event that sample(s) were submitted in opened, used, non-sterile or otherwise adulterated condition, EMSL shall not be responsible or liable.

EMSL Analytical (Cinnaminson, NJ) is accredited by the American Industrial Hygiene Association (AIHA) in the EMLAP accreditation program for specified Field(s) of Testing as documented on the scope of accreditation.

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Report Date	**Report Revision**	**Revision Comments**
2/7/2018	R0	Initial Report

Vincent Iuzzolino, M.S., Laboratory Director
or approved EMSL Analytical, Inc. signatory

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EMSL Analytical, Inc.
200 Route 130 North, Cinnaminson, NJ 08077
Phone/Fax: (800)220-3675 / (856)786-0262
http://www.EMSL.com cinnmicrolab@emsl.com

EMSL Order #: **371801672**
Customer ID: **GTER78**
Customer PO: **86127158Task125**

Attn: **Ben Hestir**
Terracon Consultants, Inc.
72 Pointe Circle
Greenville, SC 29615

Phone: **864-292-2901**
Fax: **864-292-6361**

Project: **Kite Hill Recycling**

Date Collected: **1/29/2018**
Date Received: **1/31/2018**
Date Analyzed: **2/5/2018**



Guidelines to Interpretation

µg/g

Allergens	<DL	<1	1	2	3	4	5	6	7	8	9	>10
Fel d1	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High
Can f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der p1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Der f1	ND	Low	Low	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	High
Mus m1	ND	Low	Mod	Mod	Mod	High	High	High	High	High	High	High

µg/m3

Rat n1	ND	<0.7 µg /m3 = Not associated with increased risk of asthma

µg/g

	<DL	<0.08	0.08	0.09	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Bla g2 †	ND	Low	Mod	Mod	Mod	Mod	Mod	Mod	High	High	High	High

† *Suggested levels. Not officially established.*

Note: *This report and guidelines furnish information only. Whether an individual suffers allergic symptoms or not depends on his/her medical history and previous exposure.*

References

Journal of Allergy and Clinical Immunology 1989; 83:416-427
Journal of Allergy and Clinical Immunology 1995; 96:449-456
The American review of respiratory disease 1990; 141:361-367
The American review of respiratory disease 1993; 147:573-578
Environmental Health Perspectives 2002; 110:419-425
Clinical and Experimental Allergy 1998; 28(5):537-44
Pediatric allergy-principles and practice. Mosby Inc 2003: 261-268.

Terminology

ELISA	Enzyme-linked Immunosorbent Assay
MARIA®	Multiplex Array for Indoor Allergens
Allergen	A substance which reacts with the body's immune system to produce an allergic reaction.
Antigen	A substance, foreign to the body, which stimulates the production of antibodies by the immune system.
Bla g2	*Blattella germanica* (Cockroach) allergen 2
Can f1	*Canis familiaris* (Dog) allergen 1
Der f1	*Dermatophagoides farinae* (Dust Mites) allergen 1
Der p1	*Dermatophagoides pteronyssinus* (Dust Mites) allergen 1
Detection Limits	DL is the smallest amount of a substance, in this case antigens, which can be measured.
Fel d1	*Felis domesticus* (Cat) allergen 1
Mus m1	*Mus musculus* (Mouse) allergen 1
ND	None detected, if any allergens are present they are below the detection limits.
Rat n1	*Rattus norvegicus* (Rat) allergen 1

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Project: **Kite Hill Recycling**

Date Collected: **1/29/2018**
Date Received: **1/31/2018**
Date Analyzed: **2/5/2018**

Important Terms, Conditions, and Limitations

A. Sample Retention
Samples analyzed by EMSL will be retained for 60 days after analysis date. Storage beyond this period is available for a fee with written request prior to the initial 30 day period. Samples containing hazardous/toxic substances which require special handling will be returned to the client immediately. EMSL reserves the right to charge a sample disposal fee or return samples to the client.

B. Change Orders and Cancellation
All changes in the scope of work or turnaround time requested by the client after sample acceptance must be made in writing and confirmed in writing by EMSL. If requested changes result in a change in cost the client must accept payment responsibility. In the event work is cancelled by a client, EMSL will complete work in progress and invoice for work completed to the point of cancellation notice. EMSL is not responsible for holding times that are exceeded due to such changes.

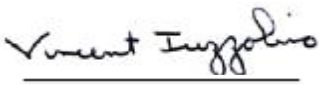
C. Warranty
EMSL warrants to its clients that all services provided hereunder shall be performed in accordance with established and recognized analytical testing procedures and with reasonable care in accordance with applicable federal, state and local laws. The foregoing express warranty is exclusive and is given in lieu of all other warranties, expressed or implied. EMSL disclaims any other warranties, express or implied, including a warranty of fitness for particular purpose and warranty of merchantability.

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E. Indemnification
Client shall indemnify EMSL and its officers, directors and employees and hold each of them harmless for any liability, expense or cost, including reasonable attorney's fees, incurred by reason of any third party claim in connection with EMSL's services, the test result data or its use by client.

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Report Date	Report Revision	Revision Comments
2/7/2018	R0	Initial Report



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EMSL ANALYTICAL, INC.
LABORATORY • PRODUCTS • TRAINING

Industrial Hygiene Chain of Custody

EMSL Order Number (Lab Use Only): 371801672

EMSL ANALYTICAL, INC.
200 ROUTE 130 NORTH
CINNAMINSON, NJ 08077
PHONE: (800) 220-3675
FAX: (856) 858-3502

Report To Contact Name: Ben Hestir		**Bill To Company:** Terracon (GTER78)	**Client ID #:**
Company Name: Terracon Consultants, Inc.		**Attention To:**	
Street: 72 Pointe Circle		**Street:**	
City: Greenville	**State/Province:** SC **Zip/Postal Code:** 29615	**City:**	**State/Province:** **Zip/Postal Code:**
Phone : 864-293-7348 **Fax :**		**Phone:**	**Fax:**
Project Name: Kite Hill Recycling	fdf 1/30/18	**Email Results To:** ben.hestir@terracon.com	**U.S. State where Samples Collected:** SC
# Samples in Shipment: 8	**Date of Shipment:** ~~1/29/18~~	**Purchase Order:** 86127158 - Task 125	**Sampled By (Signature):** Ben Hestir

Turnaround Time (TAT) – Please Check: If No Selection Made, Standard 2 Week TAT Will Apply

☐ 2 Week ☑ 1 Week ☐ 4 Day ☐ 3 Day ☐ 2 Day ☐ 1 Day ☐ Other (Call Lab)

Media Type:

Manufacturer/Part #: **Lot #:**

Client Sample ID	Location/Description	Analyte / Method	Media	Flow (lpm)	Sample Time On	Sample Time Off	Volume / Area	Sample Type	Sample Date	Comments
KH-1	W side of compactor	M032	Allergenc	15	0836	0841	75 L	☑ Area ☐ Personal	1/29/18	
KH-2	Breakroom	M032	Allergenc	15	0844	0849	75 L	☑ Area ☐ Personal	1/29/18	
KH-3	SE corner - interior	M032	Allergenc	15	0853	0858	75 L	☑ Area ☐ Personal	1/29/18	
KH-4	SW corner - interior	M032	Allergenc	15	0902	0907	75 L	☑ Area ☐ Personal	1/29/18	
KH-5	Outside SE corner	M032	Allergenc	15	0910	0915	75 L	☑ Area ☐ Personal	1/29/18	
KH-6	Outside SW corner	M032	Allergenc	15	0918	0923	75 L	☑ Area ☐ Personal	1/29/18	
KH-7	Elevated walkway	M038, M039, M044	Dust cas		0934	0939		☑ Area ☐ Personal	1/29/18	
KH-8	Computer room carpet squares	M038, M039, M044	Dust cas		0944	0939		☑ Area ☐ Personal	1/29/18	

RECEIVED EMSL CINNAMINSON, N.J. 2018 JAN 31 A 10:50

Note: Most NIOSH and OSHA methods require field blanks. It is the IH field sampler's responsibility to submit the proper number of field blanks and duplicates.

Released By	Date	Received By	Date
Ben Hestir	Jan 30, 2018	ORM Fx	1/31/18 10:50

Comments:

OrderID: 371801672