



EXPANDED FUNGAL REPORT TM

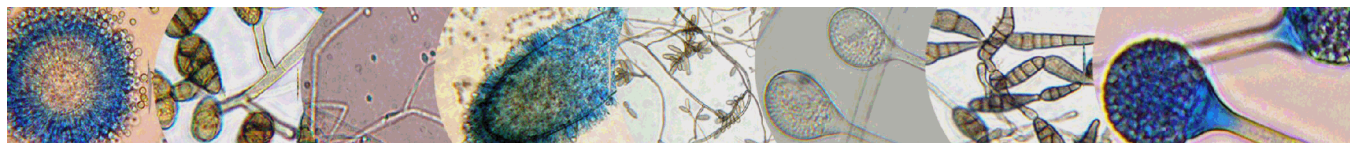
Prepared Exclusively For

Thor Global, LLC
10343 Federal Blvd J255
Westminster, CO 80260
Phone:720-333-4166

Report Date: 3/18/2016
Project: Fox
EMSL Order: 221601586



AIHA-LAP, LLC--EMLAP Accredited
#189946



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EMSL Order: 221601586
Customer ID: DREX25
Collected:
Received: 3/17/2016
Analyzed: 3/18/2016

Proj: Fox

1. Description of Analysis

Analytical Laboratory

EMSL Analytical, Inc. (EMSL) is a nationwide, full service, analytical testing laboratory network providing Asbestos, Mold, Indoor Air Quality, Microbiological, Environmental, Chemical, Forensic, Materials, Industrial Hygiene and Mechanical Testing services since 1981. Ranked as the premier independently owned environmental testing laboratory in the nation, EMSL puts analytical quality as its top priority. This quality is recognized by many well-respected federal, state and private accrediting agencies, such as AIHA's EMLAP and EMPAT programs, and assured by our high quality personnel, including many Ph.D. microbiologists and mycologists.

EMSL is an independent laboratory that performed the analysis of these samples. EMSL did not conduct the sampling or site investigation for this report. The samples referenced herein were analyzed under strict quality control procedures using state-of-the-art microbiological methods. The analytical methods used and the data presented are scientifically and legally defensible.

The laboratory data is provided in compliance with AIHA policy modules and ISO 17025 guidelines for the particular test(s) requested, including any associated limitations for the methods employed. These data are intended for use by professionals having knowledge of the testing methods necessary to interpret them accurately.



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Air Samples - Spore traps:

Spore traps are commercially available sampling devices that capture airborne particles on an adhesive slide. Air is pulled through the device using a vacuum pump. Spores, as well as other airborne particles, are impacted on the collection adhesive. Using spore trap collection methods has inherent limitations. These collection methods are biased towards larger spore sizes.

The analysis for total spore counts is a direct microscopic examination and does not include culturing or growing the fungi. Therefore, the results include both viable and non-viable spores. Some fungal groups produce similar spore types that cannot be distinguished by direct microscopic examination alone (i.e., *Aspergillus/Penicillium*, and others). Other spore types may lack distinguishing features that aid in their identification. These types are grouped into larger categories such as Ascospores or Basidiospores.

Fungal spores are identified and grouped by morphological characteristics including color, shape, septation, ornamentation, and fruiting structures (if present) which are compared to published mycological identification keys and texts. EMSL reports provide spore counts per cubic meter of air to three significant figures. Please note that each spore category is reported to three significant figures. Due to rounding and the application of three significant figures the sum of the individual spore numbers may not equal the total spore count on the report. EMSL does not maintain responsibility for final volume concentrations (counts/m³) since this volume is provided by the field collector and can not be verified by EMSL.

EMSL analyzes spore traps using phase contrast microscopy. There is a wide choice of collection devices (Air-O-Cell, Micro-5, Burkhard, etc.) on the market. Differences in analytical method may exist between spore trap devices.

Spore trap results are reported in spores per cubic meter of air. Due to the other airborne particles collected with the spores, EMSL reports a background particle density. Background density is an indication of overall particulate matter present on the sample (i.e. dust in the air). High background concentrations may obscure spores such as the *Penicillium/Aspergillus* group. The rating system is from 1-5 with 1 = 1 - 25% of the background obscured by material, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76% - 99%, 5 = 100% or overloaded. A background rating of 4 or higher should be regarded as a minimum count since the actual concentrations may be higher than those reported. EMSL will not be held responsible for overloading of samples. Sample volumes are left to the discretion of the company or persons conducting the fieldwork.

Skin fragment density is the percentage of skin cells making up the total background material, 1 = 1 - 25%, 2 = 26 - 50%, 3 = 51 - 75%, 4 = 76-100%. Skin fragment density is considered an indication of the general cleanliness in the area sampled. It has been

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estimated that up to 90% of household dust consists of dead skin cells.

2. Analytical Results

See attached data reports and charts.



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Spore Trap ASSESSMENT Report™ Air-O-Cell(™) Analysis of Fungal Spores & Particulates (Methods EMSL 05-TP-003, ASTM D7391)

	Particle Identification	Raw Count	(Count/m ³)	% of Total	Interpretation Guideline
221601586-0001	Alternaria	-	-	-	
	Ascospores	1	40	8.3	Acceptable
Client Sample ID	Aspergillus/Penicillium	3	100	20.8	Slightly Elevated
21659917	Basidiospores	3	100	20.8	Slightly Elevated
	Bipolaris++	-	-	-	
	Chaetomium	-	-	-	
Location	Cladosporium	4	200	41.7	Acceptable
Bedroom	Curvularia	-	-	-	
	Epicoccum	-	-	-	
Sample Volume (L)	Fusarium	-	-	-	
	Ganoderma	-	-	-	
75	Myxomycetes++	1	40	8.3	Slightly Elevated
	Pithomyces	-	-	-	
Sample Type	Rust	-	-	-	
Inside	Scopulariopsis	-	-	-	
	Stachybotrys	-	-	-	
Comments	Torula	-	-	-	
	Ulocladium	-	-	-	
	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Total Fungi	12	480	100	Acceptable
	Hyphal Fragment	-	-	-	
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

Analytical Sensitivity 600x: 42 counts/cubic meter
Analytical Sensitivity 300x *: 13* counts/cubic meter

Skin Fragments: 2 1 to 4 (low to high)
Fibrous Particulate: 1 1 to 4 (low to high)
Background: 3 1 to 4 (low to high); 5 (overloaded)

- Acceptable** Concentration at or below background
- Slightly Elevated** Concentration above background
- ELEVATED** Concentration 10X or more above background

- Not commonly found growing indoors, spores likely come from outside.
- Spores reported to be able to cause allergies in individuals.
- Potential for mycotoxin production exists with these fungi.
- These fungi are considered water damage indicators.

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

Brendon Rawlings, Laboratory Manager
or Other Approved Signatory

Initial report from: 03/18/2016 14:29:47

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.

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Particle Identification	Raw Count	(Count/m ³)	% of Total	Interpretation Guideline	
221601586-0002	Alternaria	1	40	2.3	Slightly Elevated
	Ascospores	6	300	17.4	Acceptable
Client Sample ID	Aspergillus/Penicillium	9	400	23.3	ELEVATED
21659940	Basidiospores	7	300	17.4	Slightly Elevated
	Bipolaris++	-	-	-	
	Chaetomium	-	-	-	
Location	Cladosporium	7	300	17.4	Slightly Elevated
Upstairs Bathroom	Curvularia	-	-	-	
	Epicoccum	1	40	2.3	Slightly Elevated
Sample Volume (L)	Fusarium	-	-	-	
75	Ganoderma	-	-	-	
	Myxomycetes++	6	300	17.4	Slightly Elevated
	Pithomyces	-	-	-	
Sample Type	Rust	1	40	2.3	Slightly Elevated
Inside	Scopulariopsis	-	-	-	
	Stachybotrys	-	-	-	
Comments	Torula	-	-	-	
	Ulocladium	-	-	-	
	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Total Fungi	38	1720	100	Slightly Elevated
	Hyphal Fragment	-	-	-	
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

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Analytical Sensitivity 300x *: 13* counts/cubic meter

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Slightly Elevated Concentration above background

ELEVATED Concentration 10X or more above background

Not commonly found growing indoors, spores likely come from outside.

Spores reported to be able to cause allergies in individuals.

Potential for mycotoxin production exists with these fungi.

These fungi are considered water damage indicators.

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

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Particle Identification	Raw Count	(Count/m ³)	% of Total	Interpretation Guideline	
221601586-0003	Alternaria	1	40	3	Slightly Elevated
	Ascospores	1	40	3	Acceptable
Client Sample ID 21659916	Aspergillus/Penicillium	2	80	6.1	Slightly Elevated
	Basidiospores	9	400	30.3	ELEVATED
	Bipolaris++	-	-	-	
Location Kitchen	Chaetomium	-	-	-	
	Cladosporium	11	460	34.8	Slightly Elevated
	Curvularia	-	-	-	
Sample Volume (L) 75	Epicoccum	-	-	-	
	Fusarium	-	-	-	
	Ganoderma	-	-	-	
Sample Type Inside	Myxomycetes++	7	300	22.7	Slightly Elevated
	Pithomyces	-	-	-	
	Rust	-	-	-	
Comments	Scopulariopsis	-	-	-	
	Stachybotrys	-	-	-	
	Torula	-	-	-	
	Ulocladium	-	-	-	
	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Total Fungi	31	1320	100	Slightly Elevated
	Hyphal Fragment	-	-	-	
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

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221601586-0004	Alternaria	-	-	-	
	Ascospores	10	420	60	
Client Sample ID	Aspergillus/Penicillium	1	40	5.7	
21659865	Basidiospores	1	40	5.7	
	Bipolaris++	-	-	-	
	Chaetomium	-	-	-	
Location	Cladosporium	4	200	28.6	
Exterior Control	Curvularia	-	-	-	
	Epicoccum	-	-	-	
Sample Volume (L)	Fusarium	-	-	-	
75	Ganoderma	-	-	-	
	Myxomycetes++	-	-	-	
	Pithomyces	-	-	-	
Sample Type	Rust	-	-	-	
Background	Scopulariopsis	-	-	-	
	Stachybotrys	-	-	-	
Comments	Torula	-	-	-	
	Ulocladium	-	-	-	
	Unidentifiable Spores	-	-	-	
	Zygomycetes	-	-	-	
	Total Fungi	16	700	100	
	Hyphal Fragment	-	-	-	
	Insect Fragment	-	-	-	
	Pollen	-	-	-	

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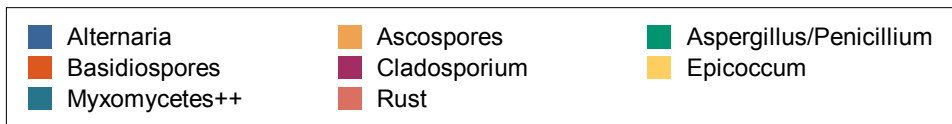
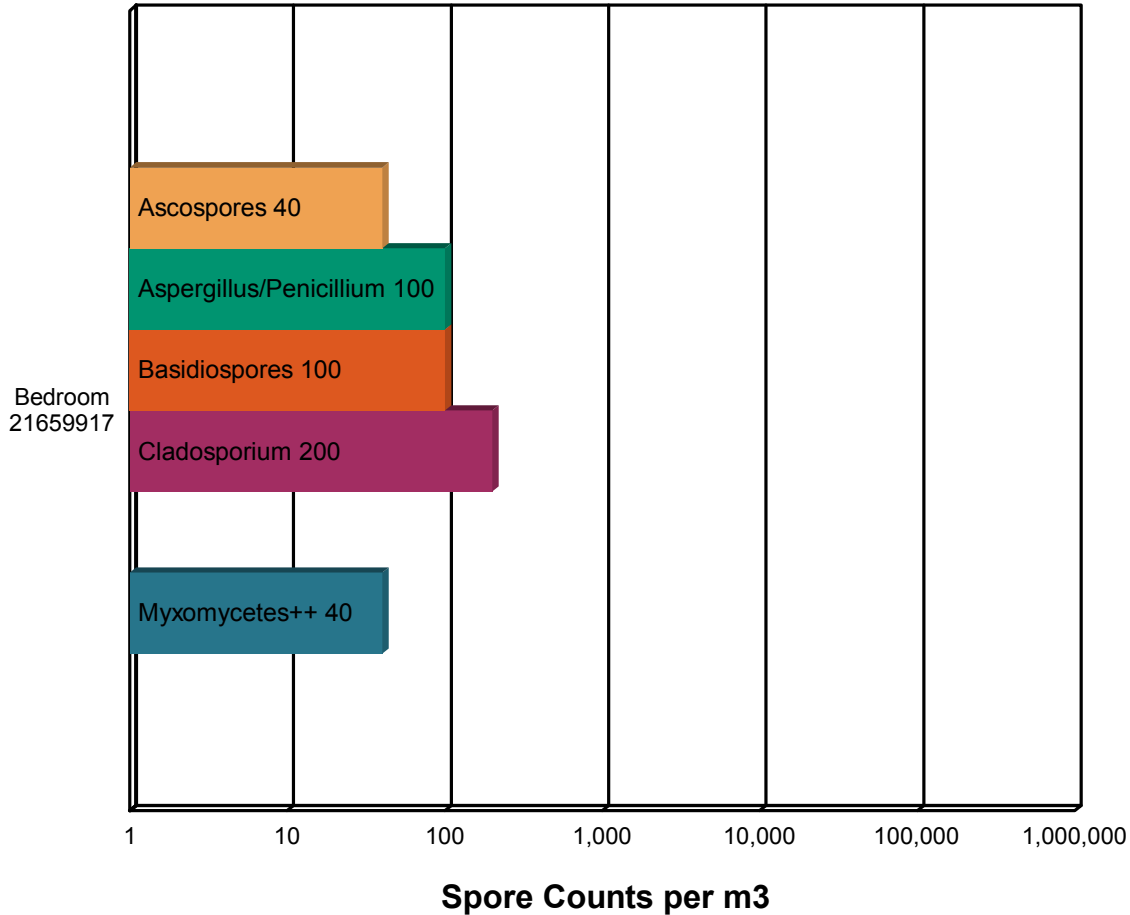
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Spore Trap Report: Total Counts



* The chart is displayed using a logarithmic scale. Bar size is not directly proportional to the number of spores.

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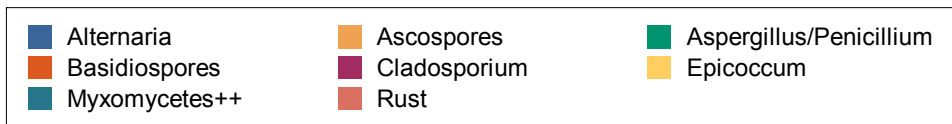
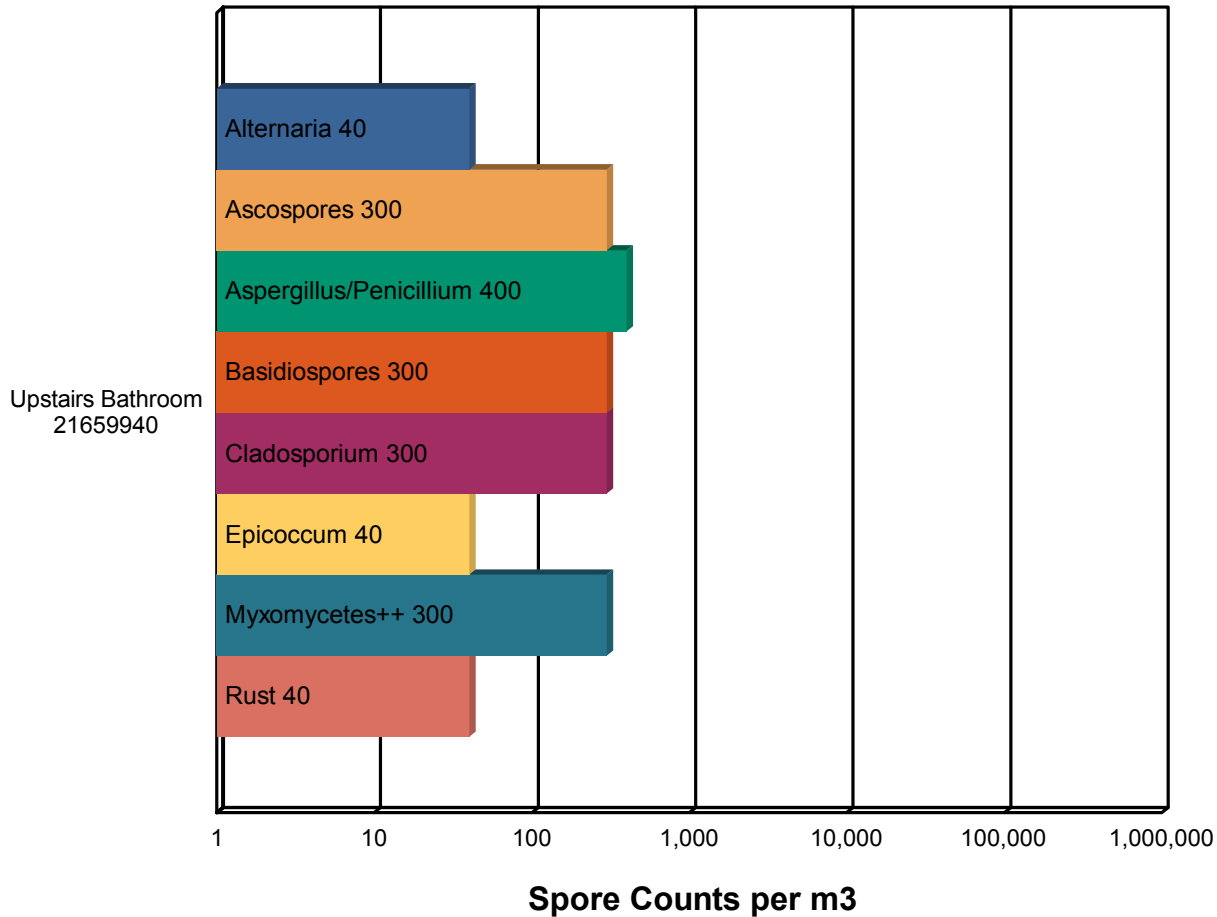
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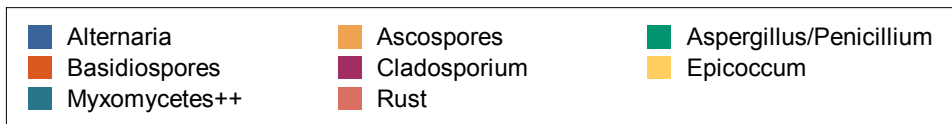
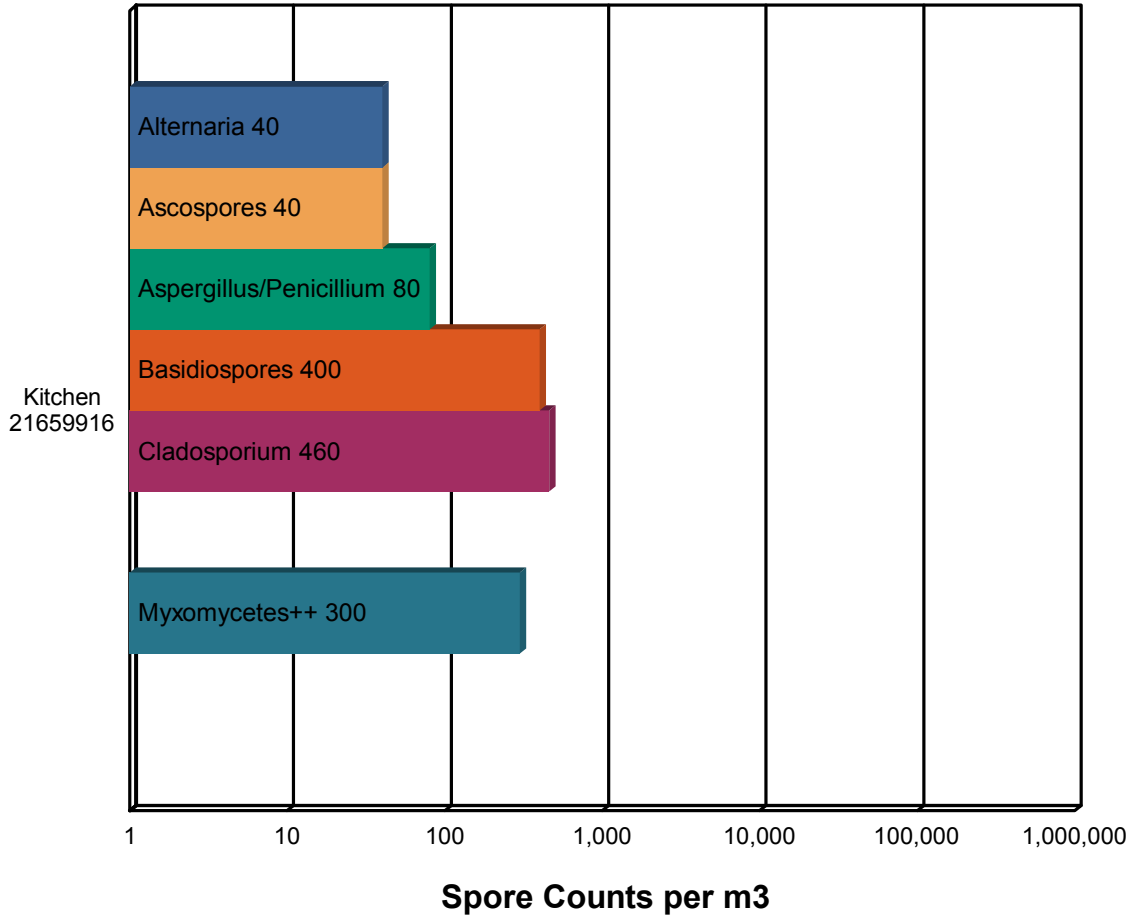
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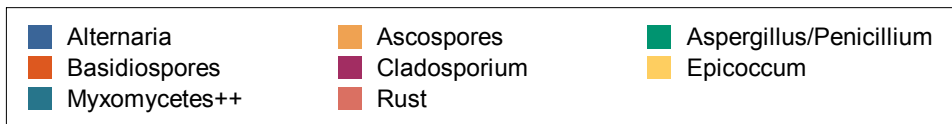
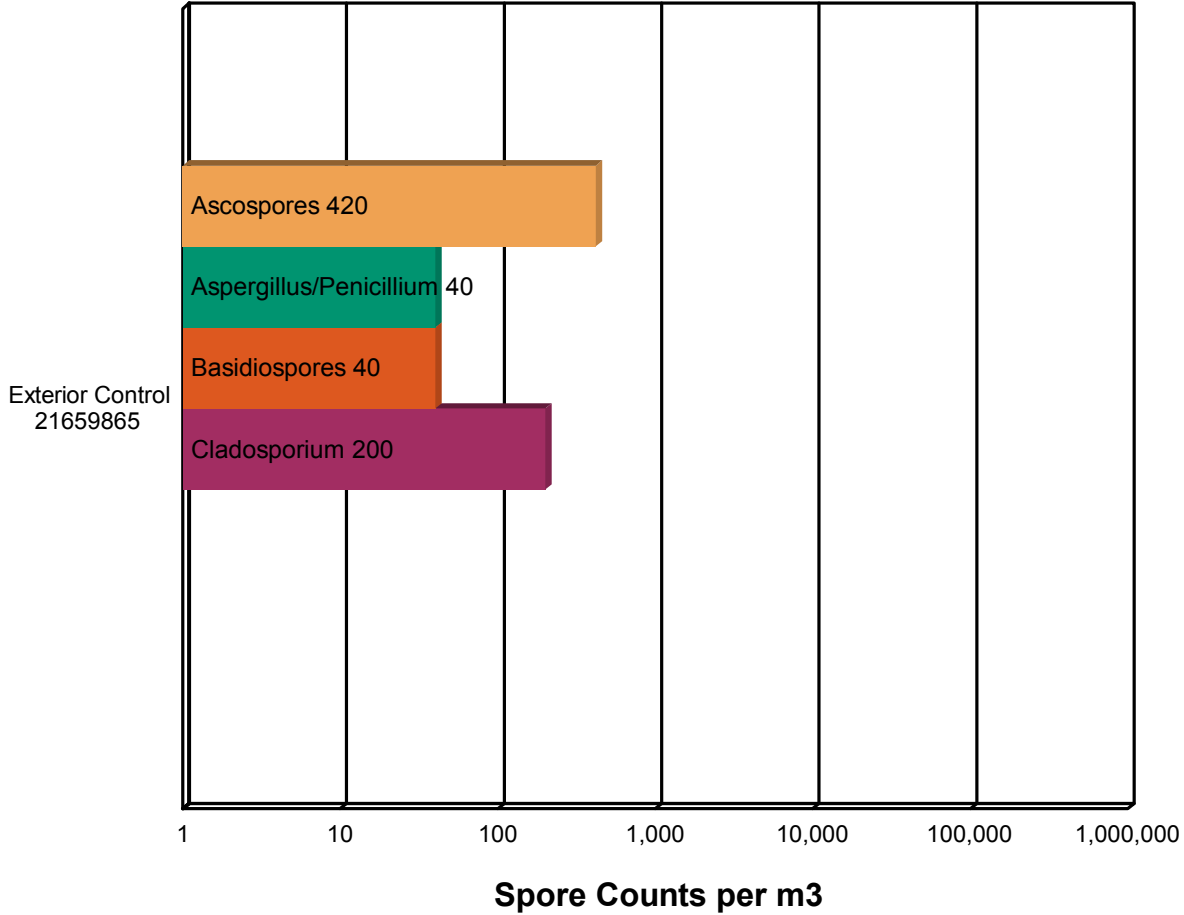
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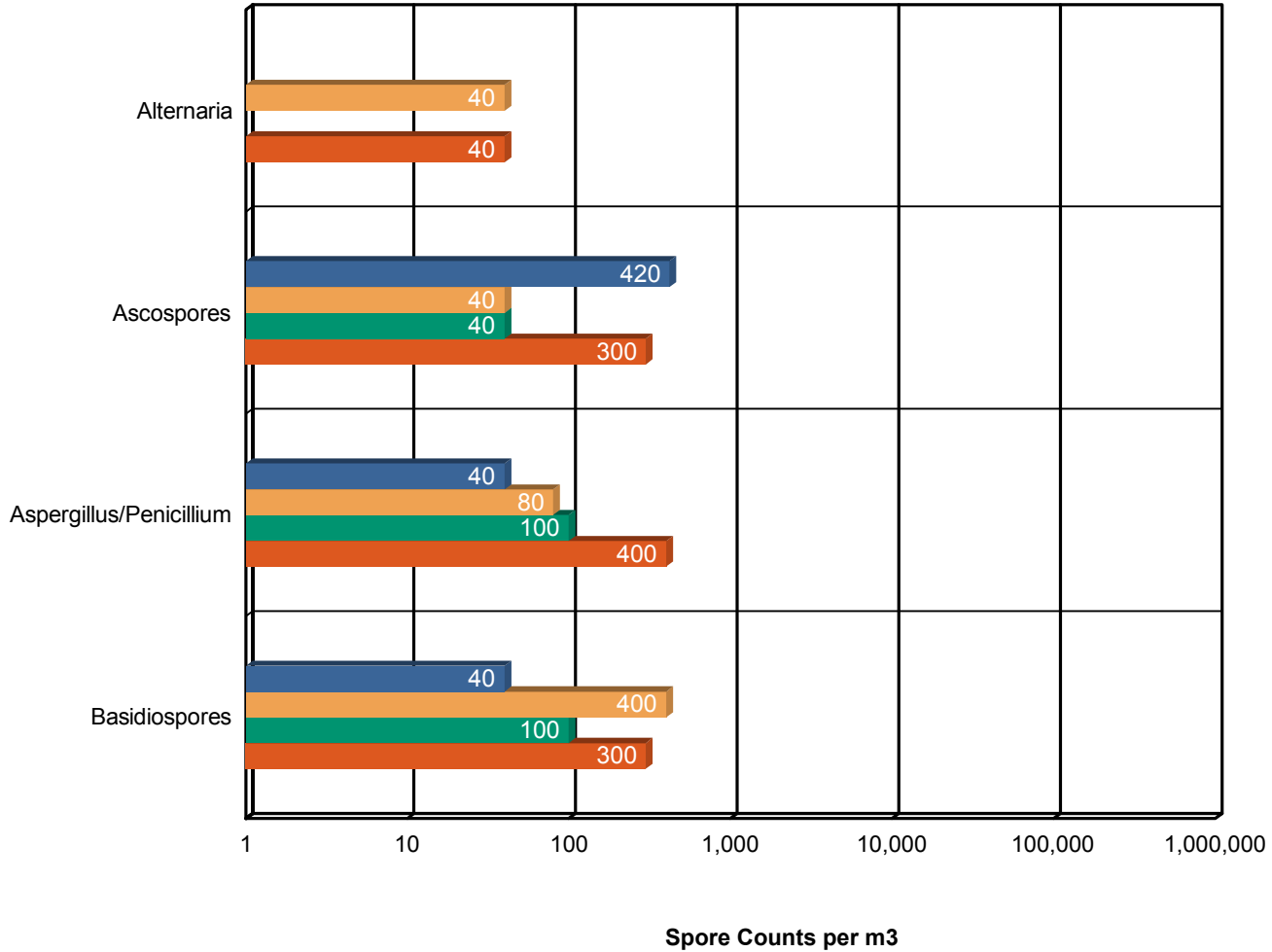
1010 Yuma Street Denver, CO 80204
Phone: (303) 740-5700 Fax: (303) 741-1400 Web: <http://www.EMSL.com> Email: denverlab@emsl.com

Attn: Charles Kaleta
Thor Global, LLC
10343 Federal Blvd J255
Westminster, CO 80260

EMSL Order: 221601586
Customer ID: DREX25
Collected:
Received: 3/17/2016
Analyzed: 3/18/2016

Proj: Fox

Background Comparison Chart



* The chart is displayed using a logarithmic scale. The bar size is not directly proportional to the number of spores.

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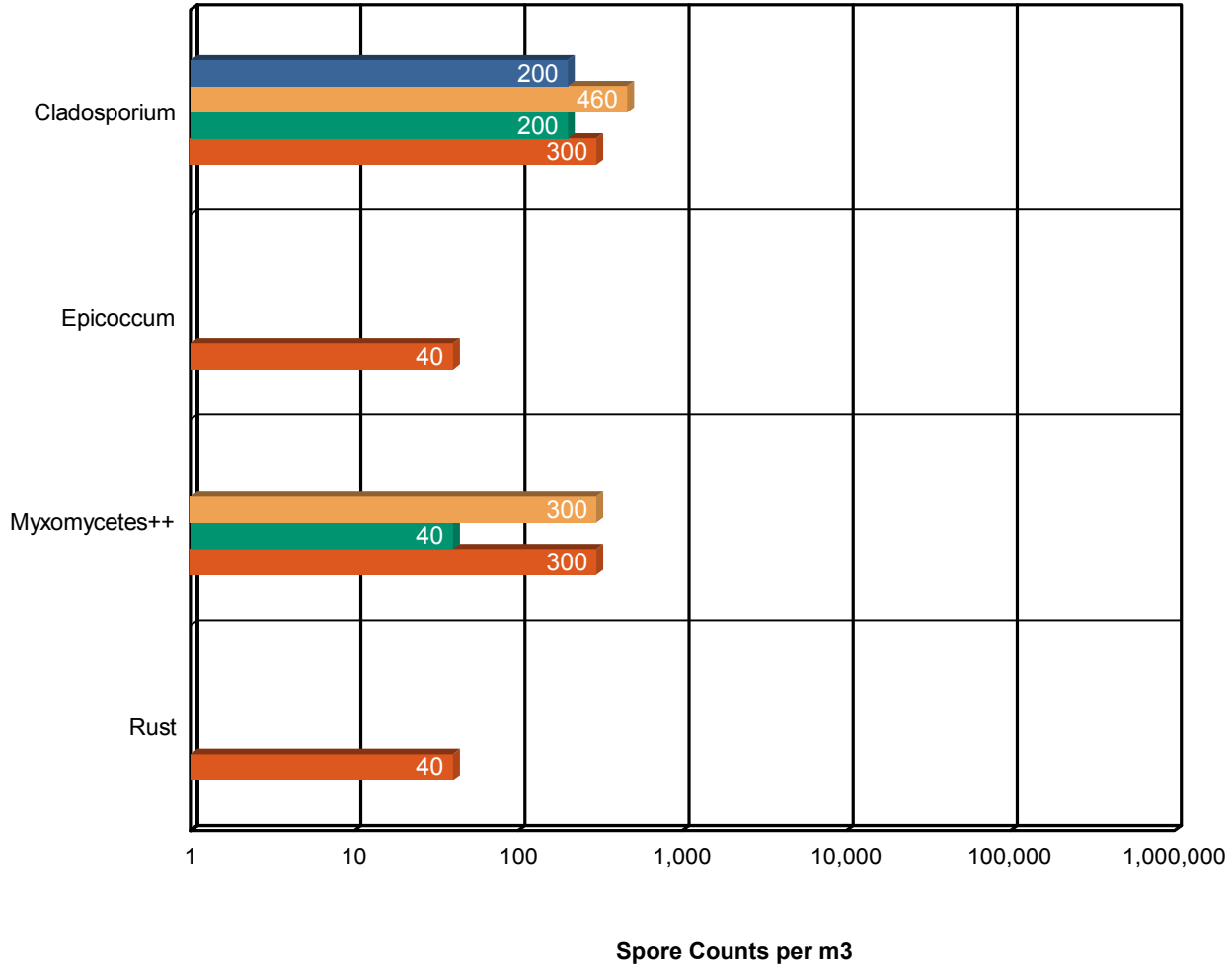
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3. Understanding the Results

EMSL Analytical, Inc. is an independent laboratory, providing unbiased and scientifically valid results. These data represent only a portion of an overall IAQ investigation. Visual information and environmental conditions measured during the site assessment (humidity, moisture readings, etc.) are crucial to any final interpretation of the results. Many factors impact the final results; therefore, result interpretation should only be conducted by qualified individuals. The American Conference of Governmental Industrial Hygienists (ACGIH) has published a good reference book covering sampling and data interpretation. It is entitled, Bioaerosols: Assessment and Control, 1999.

Fungal spores are found everywhere. Whether or not symptoms develop in people exposed to fungi depends on the nature of the fungal material (e.g., allergenic, toxic, or infectious), the exposure level, and the susceptibility of exposed persons. Susceptibility varies with the genetic predisposition (e.g., allergic reactions do not always occur in all individuals), age, pre-existing medical conditions (e.g., diabetes, cancer, or chronic lung conditions), use of immunosuppressive drugs, and concurrent exposures. These reasons make it difficult to identify dose/response relationships that are required to establish "safe" or "unsafe" levels (i.e., permissible exposure limits).

It is generally accepted in the industry that indoor fungal growth is undesirable and inappropriate, necessitating removal or other appropriate remedial actions. The New York City guidelines and EPA guidelines for mold remediation in schools and commercial buildings define the conditions warranting mold remediation. Always remember that water is the key. Preventing water damage or water condensation will prevent mold growth.

This report is not intended to provide medical advice or advice concerning the relative safety of an occupied space. Always consult an occupational or environmental health physician who has experience addressing indoor air contaminants if you have any questions.



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4. Glossary of Fungi

ALTERNARIA	
Allergic Potential	Type I allergies (hay fever, asthma), Type III (hypersensitivity pneumonitis)
Industrial Uses	Biocontrol of weed plants ·Biocontrol fungal plant pathogens.
Mode of Dissemination	Wind
Natural Habitat	Common saprobe and pathogen of plants. Typically found on plant tissue, decaying wood, and foods. Soil . Air outdoors.
Other Comments	Alternaria spores are one of the most common and potent indoor and outdoor airborne allergens. Additionally, Alternaria sensitization has been determined to be one of the most important factors in the onset of childhood asthma. Synergy with Cladosporium or Ulocladium may increase the severity of symptoms
Potential or Opportunistic Pathogens	Phaeohyphomycosis {causing cystic granulomas in the skin and subcutaneous tissue}. In immunocompetent patients, Alternaria colonizes the paranasal sinuses, leading to chronic hypertrophic sinusitis
Potential Toxins Produced	Alternariol (AOH) . Alternariol monomethylether (AME). Tenuazonic acid (TeA). Altenuene (ALT). Altertoxins (ATX)
Suitable Substrates in the Indoor Environment	Indoors near condensation (window frames, showers), House dust (in carpets, and air). Also colonizes building supplies, computer disks, cosmetics, leather, optical instruments, paper, sewage, stone monuments, textiles, wood pulp, and jet fuel
Water Activity	Aw =0.85-0.88

ASCOSPORES	
Allergic Potential	Depends on genus and species.
Industrial Uses	
Mode of Dissemination	Forcible ejection or passive release and dissemination by wind or insects.
Natural Habitat	Everywhere in nature.
Other Comments	Ascospores are the result of sexual reproduction and produced in a saclike structure called an ascus. All ascospores belong to members of the Phylum Ascomycota, which encompasses a plethora of genera worldwide.
Potential or Opportunistic Pathogens	Depends on genus and species.
Potential Toxins Produced	
Suitable Substrates in the Indoor Environment	
Water Activity	

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ASPERGILLUS/PENICILLIUM	
Allergic Potential	Type I (hay fever, asthma) · Type III (hypersensitivity)
Industrial Uses	Many depending on the species
Mode of Dissemination	Wind · Insects
Natural Habitat	· Plant debris · Seed · Cereal crops
Other Comments	Spores of Aspergillus and Penicillium (including others such as Acremonium and Paecilomyces) are small and spherical with few distinguishing characteristics. They cannot be differentiated or speciated by non-viable impaction sampling methods. Some species with very small spores may be undercounted in samples with high background debris.
Potential or Opportunistic Pathogens	Possible depending on the species.
Potential Toxins Produced	
Suitable Substrates in the Indoor Environment	Grows on a wide range of substrates indoors · Prevalent in water damaged buildings · Foods (blue mold on cereals, fruits, vegetables, dried foods) · House dust · Fabrics · Leather · Wallpaper · Wallpaper glue
Water Activity	Aw=0.75-0.94

BASIDIOSPORES	
Allergic Potential	Type I allergies (hay fever, asthma) · Type III (hypersensitivity pneumonitis)
Industrial Uses	Edible mushrooms are used in the food industry.
Mode of Dissemination	Forcible ejection. Wind currents.
Natural Habitat	Forest floors. Lawns · Plants (saprobes or pathogens depending on genus)
Other Comments	Basidiospores are the result of sexual reproduction and formed on a structure called the basidium. Basidiospores belong to the members of the Phylum Basidiomycota, which includes mushrooms, shelf fungi, rusts, and smuts.
Potential or Opportunistic Pathogens	Depends on genus.
Potential Toxins Produced	Amanitins. monomethyl-hydrazine. muscarine. ibotenic acid. psilocybin.
Suitable Substrates in the Indoor Environment	Depends on genus. Wood products
Water Activity	Unknown.

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CLADOSPORIUM	
Allergic Potential	Type I (asthma and hay fever).
Industrial Uses	Produces 10 antigens.
Mode of Dissemination	Air
Natural Habitat	Dead plant matter. Straw. Soil. Woody plants
Potential or Opportunistic Pathogens	Edema. keratitis. onychomycosis. pulmonary infections. Sinusitis.
Potential Toxins Produced	Cladospurin and Emodin.
Suitable Substrates in the Indoor Environment	Fiberglass duct liner. Paint. Textiles. Found in high concentration in water-damaged building materials.
Water Activity	Aw 0.84-0.88

EPICOCCUM	
Allergic Potential	Hay fever, asthma
Mode of Dissemination	Wind
Natural Habitat	A worldwide saprophytic fungi, being isolated from dead plant material and soil.
Potential or Opportunistic Pathogens	Unknown
Suitable Substrates in the Indoor Environment	Paper, textiles
Water Activity	0.86-0.90

MYXOMYCETES++	
Allergic Potential	Type I
Free moisture required for mold growth	Unknown
Industrial Uses	
Mode of Dissemination	Insects, Water, Wind
Natural Habitat	Decaying logs, Dead leaves , Dung , Lawns , Mulched flower beds, Lawns
Potential or Opportunistic Pathogens	Unknown
Suitable Substrates in the Indoor Environment	Rotting lumber

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5. References and Informational Links

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Books

- Bioaerosols: Assessment and Control. Janet Macher, Ed., American Conference of Governmental Industrial Hygienists, Cincinnati, OH 1999.
- Exposure Guidelines for Residential Indoor Air Quality. Environmental Health Directorate, Health Protection Branch, Health Canada, Ottawa, Ontario, 1989.
- Fungal Contamination in Public Buildings: Health Effects and Investigation Methods. Health Canada, Ottawa, Ontario, 2004.
- IICRC: S500 Standard and Reference Guide for Professional Water Damage Restoration. 3rd Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2006

IICRC: S520 Standard and Reference Guide for Professional Mold Remediation. 1st Edition, Institute of Inspection, Cleaning, and Restoration Certification, Vancouver, WA, 2004

- Field Guide for the Determination of Biological Contaminants in Environmental Samples. 2nd Edition, American Industrial Hygiene Association, 2005.

Consumer Links

Read the full text of AIHA's "The Facts About Mold" consumer brochure.

<http://www.aiha.org/get-involved/VolunteerGroups/Documents/Biosafety/VG-FactsAbout%20MoldDecember2011.pdf>

The Occupational Safety and Health Administration (OSHA)

<http://www.osha.gov/SLTC/molds/index.html>

CDC Mold Facts

<http://www.cdc.gov/mold/faqs.htm>

CDC Stachybotrys - Questions and answers on Stachybotrys chartarum and other molds

<http://www.cdc.gov/mold/stachy.htm>

IOM, NAS: Clearing the Air: Asthma and Indoor Air Exposures

<http://www.iom.edu/Reports/2000/Clearing-the-Air-Asthma-and-Indoor-Air-Exposures.aspx>

National Library of Medicine-Mold website

<http://www.nlm.nih.gov/medlineplus/molds.html>

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California Department of Health Services (CADOHS)

<http://www.cal-iaq.org/separator/mold-and-dampness/about-mold>

Minnesota Department of Health

<http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html>

New York City Department of Health and Mental Hygiene

<http://conyers.house.gov/index.cfm/issues?p=toxic-mold>

H.R.: The United States Toxic Mold Safety and Protection Act

<http://conyers.house.gov/index.cfm/issues?p=toxic-mold>

EPA

"Should You Have the Air Ducts in Your Home Cleaned?"

<http://www.epa.gov/iaq/pubs/airduct.html>

General information about molds and actions that can be taken to clean up or prevent a mold problem.

<http://www.epa.gov/asthma/molds.html>

"A Brief Guide to Mold, Moisture, and Your Home" - Includes basic information on mold, cleanup guidelines, and moisture and mold prevention

<http://www.epa.gov/mold/moldguide.html>

"Mold Remediation in Schools and Commercial Buildings" - Information on remediation in schools and commercial property, references for potential mold and moisture remediators.

http://www.epa.gov/mold/mold_remediation.html

FEMA

"Homes That Were Flooded May Harbor Mold Problems" - Information and tips for cleaning mold.

<http://www.fema.gov/news-release/homes-were-flooded-may-harbor-mold-problems>

"Dealing With Mold & Mildew in Your Flood Damaged Home.

http://www.fema.gov/pdf/rebuild/recover/fema_mold_brochure_english.pdf

"Prompt Flood Cleanup Can Help Prevent Health Problems" - How to clean up in-house mold problems (not large or serious exposures).

<http://www.fema.gov/news-release/prompt-flood-cleanup-can-help-prevent-health-problems>

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6. 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.

D. Limits of Liability

In no event shall EMSL be liable for indirect, special, consequential, or incidental damages, including, but not limited to, damages for loss of profit or goodwill regardless of the negligence (either sole or concurrent) of EMSL and whether EMSL has been informed of the possibility of such damages, arising out of or in connection with EMSL's services thereunder or the delivery, use, reliance upon or interpretation of test results by client or any third party. We accept no legal responsibility for the purposes for which the client uses the test results. EMSL will not be held responsible for the improper selection of sampling devices even if we supply the device to the user. The user of the sampling device has the sole responsibility to select the proper sampler and sampling conditions to insure that a valid sample is taken for analysis. Any resampling performed will be at the sole discretion of EMSL, the cost of which shall be limited to the reasonable value of the original sample delivery group (SDG).

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samples. In no event shall EMSL be liable to a client or any third party, whether based upon theories of tort, contract or any other legal or equitable theory, in excess of the amount paid to EMSL by client thereunder.

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 services, the test result data or its use by client