



**Astex Environmental Services, Inc.**  
123 Catalpa · San Antonio, TX 78209  
Phone: (210) 828-9800 · Fax: (210) 829-4927

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May 18, 2007

Mr. Lucas Oliva  
Design Manager Real Estate Services  
San Antonio Housing Authority  
818 S. Flores  
San Antonio, Texas 78204  
Phone: (210) 477-6004  
Email: lucas\_oliva@saha.org

RE: Limited Mold Inspection, 111 Villa Grande, San Antonio, Texas  
Astex Project #AES-07-C-4195

Dear Mr. Oliva,

Pursuant to your request, on May 7, 2007, Mr. Ron Greenberg of Astex Environmental Services, Inc. (AES), Texas Department of State Health Services (TDSHS) Mold Assessment Consultant MAC 0509 conducted a Limited Mold Inspection within the unoccupied home at 111 Villa Grande, San Antonio, Texas to investigate the general microbial conditions in the home.

It should be noted that Astex inspected three residences within this two-block development and the two outside comparison/control samples were taken in front of 127 Villa Grande and in front of 1619 NW 26<sup>th</sup> St. and both samples are shown on all three reports since both are used as control levels for all three properties.

***Scope of Work***

The scope of work for this limited inspection included the collection of the following samples:

- Air samples (Allergenco brand cassettes) were collected in the following locations for the analysis of Total Bioaerosols:

1. inside – at the return air intake - 1 sample
  2. inside – in child’s bedroom - 1 sample
  3. outside - comparison/control samples - 2 samples (see opening statement)
- Culturable fungi samples
    1. inside – at the return air intake - 1 sample (side-by-side with AOC)
    2. inside – in child’s bedroom - 1 sample (side-by-side with AOC)
    3. outside - comparison/control samples - 2 samples (see opening statement)

Note: These samples were delivered to the contract lab, Aerotech P&K, 1501 W. Knudsen Drive, Phoenix, AZ 85027, for analyses in accordance with the American Industrial Hygiene Association (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP) as well as following the Food and Drug Administration (FDA) Good Laboratory Practice Guidelines.

#### ***Visual and Moisture Inspection Results***

No visible mold and/or evidence of water intrusion were observed within the house and no indication of moisture within the wall materials was noted. Windowsills were inspected and no signs of water (condensation) staining were noted. Finally the HVAC unit was observed to be clean and free of visible mold and/or significant deterioration on the visible ducts.

#### ***Temperature and Humidity Levels***

Temperature readings within the house ranged from 83.6 to 83.8 degrees Fahrenheit (no air conditioning was on prior to the inspection) and humidity was noted to be between 66.3 to 67.3 percent

Indoor temperatures and relative humidity should be kept at levels that will prevent or retard fungal growth. The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) Standard 55-1992R, Thermal Environmental Conditions establishes the generally accepted guidelines for indoor temperature and relative humidity *for Human Occupancy*. ASHRAE Standard 55-1992R presents guidelines that are intended to achieve thermal conditions that at least 80% of the occupants would find acceptable or comfortable. ASHRAE Standard 55-1992R recommends a temperature range between 73°F - 79°F for summer and 68°F – 74.5°F for winter, and a relative humidity range between 25% and 60%. An indoor relative humidity level exceeding 60% is conducive for mold growth.

#### ***Analytical Results***

The Air-O-Cell Samples were collected by Astex personnel on the afternoon of May 7, 2007 and were delivered to the contract lab for analysis of total bioaerosols with the results being made a part of this report. The data generated in this report is based on the samples and accompanying information provided and represents concentrations at a point in time under the conditions sampled. Keep in mind, sample values fluctuate widely and single point-in-time samples can be highly variable.

Currently, there are no regulations, federal or state, establishing action limits for mold spores and mold particulates in indoor air. Also, there are no species of molds identified to be hazards to public health. Current practice is to compare interior to exterior samples, noting the species present and the contrasting levels of spores and particle.

During this limited investigation, the following observations were noted:

Fungal Spores (Air-O-Cells):

- Outdoor air had typical levels of total fungal spores, dominated by *Cladosporium* and *Basidiospores* and there were only very low levels of *Aspergillus/Penicillium*-like spores present.
- Indoor air in general had very low levels of total fungal spores (693 to 707 count/M<sup>3</sup>) compared to outdoor air (2,427 to 2,587 count/M<sup>3</sup>) and although the distribution of spores was typical of the outdoor air with no dominant types, both sample locations reported slightly elevated levels of *Aspergillus/Penicillium* like spores (227 count/M<sup>3</sup> in the child's bedroom and 333 count/M<sup>3</sup>) compared to outdoor air (27 to 200 count/M<sup>3</sup>).

Culturable Fungi:

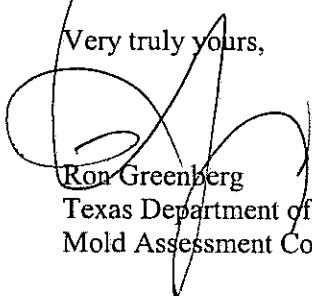
- The indoor air (viable samples) in general had very low levels (106 to 259 CFU/M<sup>3</sup>) compared to outdoor air (459 to 2,886 CFU/M<sup>3</sup>) and the distribution of spores was typical of the outdoor air with no dominant types.
- Very low levels of *Cladosporium* dominated the culturable fungi in indoor air with only a few other species present and no *Aspergillus* like spores or *Penicillium* were identified within the indoor air.

**Conclusions/Recommendations**

- **Even though the inside total fungal spore counts were well below the outside levels on the day of sampling the fact that there were elevated levels of *Aspergillus/Penicillium* like spores inside would indicate that further investigation is warranted.**

Previous or future changes in mold concentrations cannot be inferred from these sample results. Please contact me at 210-828-9800 with any questions.

Very truly yours,



Ron Greenberg  
Texas Department of State Health Services (TDSHS)  
Mold Assessment Consultant No. MAC 0509

Attachments:            Chain of Custody  
                                 Laboratory Results



An Affiliate of Sovern Trent Laboratories, Inc.

Astex Environmental Services, Inc.  
 123 Catalpa  
 San Antonio, TX 78209  
 Attn: Ron Greenberg

Lab Number: 915-705-0685  
 AIHA EMLAP No. 102297  
 Total Fungal Spore, Mycelia and Pollen Counts-Air  
 Aerotech Method: A001.7 Other

Project Name: 111 Villa Grande  
 Project Number: AES-07-C-4195  
 Date Received: 05/08/2007  
 Date Reported: 05/10/2007

Sample Number	2		3		4		
	Sample Identification	A-1-01 Inside Return	A-1-02 Inside Return	Result	DL	%	
Date Analyzed	5/10/2007	5/10/2007	5/10/2007				
Volume (M <sup>3</sup> )	0.0750	0.0750	0.0750				
Percent of Trace Analyzed	100% of Trace at 600x Magnification	100% of Trace at 600x Magnification	100% of Trace at 600x Magnification				
Debris Rating	3	3	3				
Analyte	Total Count	Count/M <sup>3</sup>		Total Count	Count/M <sup>3</sup>		%
		Result	DL		Result	DL	
Mycelial Fragments	14	13	n/a	17	13	n/a	
Pollen	3	40	n/a	1	13	n/a	
Total Fungal Spores	53	707	100	52	693	100	
Fungal Spore Identification							
<i>Alternaria</i>	1	13	2	2	27	13	4
<i>Arthrinium</i>							
Ascomycetes	3	40	6				
<i>Aspergillus/Penicillium</i> -Like	25	333	47	17	227	13	33
Basidiospores	2	27	4	1	13	13	2
<i>Bipolaris/Drechslera</i>	2	27	4	4	53	13	8
<i>Botrytis</i>							
<i>Chaetomium</i>	1	13	2				
<i>Cladosporium</i>	15	200	28	22	293	13	42
<i>Curvularia</i>							
<i>Epicoccum</i>							
<i>Fusarium</i>							
<i>Memnoniella</i>							
<i>Nigrospora</i>							
<i>Oldium/Peronospora</i>							
<i>Pitheomyces</i>							
RUSTS							
Struts/Myxomycetes/Pentconia	4	53	8	3	40	13	6
<i>Stachybotrys</i>							
<i>Stemphylium</i>							
<i>Toninia</i>							
<i>Ulocladium</i>							
Unclassified Conidia				3	40	13	6
Data Qualifier							

Laboratory Manager: *[Signature]*

Project Manager: *[Signature]*

Lab Number: 915-705-0685  
 AIHA EMLAP No. 102297  
 Culturable Fungi at 25°C-Air  
 Aerotech Method: A003

Astex Environmental Services, Inc.  
 123 Catalpa  
 San Antonio, TX 78209  
 Attn: Ron Greenberg

Project Name: 111 Villa Grande  
 Project Number: AES-07-C-4195  
 Date Received: 05/09/2007  
 Date Reported: 05/16/2007

Sample Number	1		3				
	C-1-01 Inside Return		C-1-02 Inside Child BR				
Date Analyzed	5/15/2007		5/15/2007				
Culture Media	Potato Dextrose (PDA)		Potato Dextrose (PDA)				
Volume(M <sup>3</sup> )	0.0849		0.0849				
Fungi	CFU	DL	CFU/M <sup>3</sup>	DL	CFU/M <sup>3</sup>	DL	%
Total	22	12	259	12	106	12	100
Acremonium							
Alternaria							
Aspergillus niger					24	12	22
Aspergillus species Var. 1							
Aspergillus species Var. 2							
Aureobasidium							
Bipolaris	2	12	24	12	1	12	11
Chaetomium							
Cladosporium	11	12	130	12	4	47	44
Curvularia							
Epilcoccum							
Fusarium							
Geotrichum							
Mucor							
Nigrospora							
Paecilomyces							
Penicillium species Var. 1	2	12	24	12			9
Penicillium species Var. 2							
Phthomyces							
Rhizopus							
Sporothrix							
Sporotrichum					1	12	11
Stachybotrys							
Sterile Hyphae	7	12	82	12	1	12	11
Syncephalastrum							
Trichoderma							
Yeast							
Data Qualifier							

Laboratory Manager: *[Signature]* Project Manager: *[Signature]*  
 A003 AM CLIENT REPORT FORM, P. 1 OF 2, REVISION 05, 12/04, LD



Thursday, May 10, 2007

Ron Greenberg  
Astex Environmental Services, Inc.  
123 Catalpa  
San Antonio, TX 78209



Re: Laboratory Number: 915-705-0685  
Date Sampled: April 07, 2007

Dear Ron Greenberg:

Aerotech Phoenix is pleased to provide the enclosed report of analyses for samples received May 08, 2007. This cover letter and accompanying pages are an integral part of this report. All analyses are performed in our AIHA EMLAP accredited laboratory under the FDA Good Laboratory Practice Guidelines and the parameters outlined in the most current version of the American Conference of Governmental Industrial Hygienists Bioaerosol Guidelines. The data generated in this report are based on the samples and accompanying information provided and represent concentrations at a point in time under the conditions sampled. Results can vary with site conditions. Aerotech Phoenix employees did not collect samples for this project, and may provide limited interpretation of this data as it relates to the overall investigation.

#### **Quality Assurance**

Aerotech Laboratories is staffed with over 200 professionals, including PhD's, chemists, and registered microbiologists with over 40 years of experience. The reliability of test results depends on many factors such as the personnel performing the tests, environmental conditions, selection and validation of test methods, equipment functioning, measurement traceability, as well as the sampling, storage and handling of test items, all of which are a reflection of the laboratories overall quality system.

Aerotech Laboratories, Inc. has modeled its quality system after ISO 17025 guidelines, one of the most stringent sets of standards in the industry, to ensure that its customers receive the high standard of accuracy, reliability, and impartiality that they have come to expect from a leader in the environmental industry. Aerotech Laboratories' adherence to the standards set forth in the ISO 17025 guidelines has been validated and formally recognized through accreditations granted by two independent outside agencies, and the American Industrial Hygiene Association (AIHA). As an additional measure to demonstrate its competency to perform the analyses it offers to its clients, Aerotech Laboratories also participates in a variety of different proficiency testing programs, including the Environmental Microbiology Proficiency Analytical Testing Program (EMPAT) sponsored by the American Industrial Hygiene Association.

As part of its continuous commitment to excellence, Aerotech Laboratories is also inspected, licensed and/or accredited by a number of governmental agencies and independent associations in addition to those already mentioned above. The scope document, accreditation certificates, and proficiency results can all be accessed at [www.aerotechlabs.com](http://www.aerotechlabs.com). Below you will find additional information regarding the specific analyses requested for this project.

**Spore Trap Device**

Spore traps are a unique sampling device designed for the rapid collection and analysis of a wide range of airborne particles, including fungal spores. Samples are analyzed via light microscopy at 600X magnification, with the entire slide (100% of the sample) being analyzed. The results are reported as **total**, meaning they include both viable and non-viable fungal spores. This technique does not allow for the differentiation between *Aspergillus* and *Penicillium* spores. Specific genera of greater than 500 spores per slide are difficult to count accurately due to overcrowding and are therefore estimations. Similarly, excessive non-microbial particulates can mask the presence of fungal spores, thereby reducing counting accuracies. All slides are graded with the following debris scale for data qualification.

**Debris Rating Scale**

Non-Microbial Particulate Debris Rating	Description	Interpretation
0	No particles detected in impaction line area.	No particulates on slide in impaction line area. The absence of particulates could indicate improper sampling or a blank sample, as most air samples typically contain some particulates.
1	Minimal non-microbial debris present.	Reported values are not affected by debris.
2	Up to 25% of the trace occluded with non-microbial particulates.	Non-microbial particulates can mask the presence of fungal spores. As a result, actual values could be higher than the numbers reported. Higher debris ratings increase the probability of this bias.
3	26% to 75% of the trace occluded with non-microbial particulates.	
4	76% to 90% of the trace occluded with non-microbial particulates.	
5	Greater than 90% of the trace occluded with non-microbial particulates.	<p>*Air-O-Cell or LARO Cassettes - Sample could not be read due to excessive debris. Reported concentrations are estimations calculated from the number of spores observed on the perimeter of debris. The sample should be collected at shorter time interval, or other measures taken to reduce the collection of non-microbial debris.</p> <p>*Other Cassettes - Sample could not be read due to excessive debris. The sample should be collected at shorter time interval, or other measures taken to reduce the collection of non-microbial debris.</p>

**Culture Analyses for Fungi and Bacteria**

Cultureable microorganisms are those that are viable when media is inoculated, and will grow on the selected media and at the selected temperature. This technique has certain limitations when analyzing for certain types of fungi, specifically *Stachybotrys*. Some reports indicate that the recovery efficiency of *Stachybotrys* spores can be as low as 10% when compared to total spore techniques.

The type of media and incubation temperature can vary depending on the scope of the survey. Isolates are identified to the service level requested. Typical analysis includes identification of most fungi to the genus level. *Aspergillus* and *Penicillium* species are differentiated based on morphology with each variant reported separately. Morphological variants are identified by colony color/shape and may or may not be the same throughout the project. Identification to the species level can be performed if requested in advance. General incubation parameters are summarized below. Incubation times can vary depending on specific growth characteristics. Samples submitted for culture analysis using Cornmeal Agar (CMA) or Cellulose Agar are cultured for 14 days.

Test	Incubation Temperature (° C)	Minimum Incubation Time
Environmental Bacteria	28	48 hours
Total Fungi	20-25	7-10 days
Thermophilic fungi	37	7-10 days
Thermophilic Actinomycetes	50	48 hours

**Common Culture Media**

Acronym	Name
BAP	Tryptic Soy Agar with 5% Sheep Blood
PCA	Plate Count Agar
BCYE	Buffered Charcoal Yeast Extract Agar
PDA	Potato Dextrose Agar
MEA	Malt Extract Agar
DG-18	Dichloran Glycerol Agar
SAB	Sabauroud's Dextrose Agar
RBA	Rose Bengal Agar

### Data Qualifiers

The *Data Qualifiers* identify issues or events that are relevant to your analytical results. A data qualifier includes information about the validity, the source of the data whether calculated, entered or estimated, and the value of an observation. In each case the data qualifiers provide significant information vital to the interpretation of the laboratory data.

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For additional information, or if you have any questions regarding this report, please do not hesitate to call.

Sincerely,



Lori Litwiller  
Project Manager  
Aerotech Phoenix  
800-651-4802

### Analytical References

1. Medically Important Fungi: A Guide to Identification, 3rd ed., ASM, 1995.
2. Standard Methods for the Examination of Water and Wastewater, 19th ed., APHA, 1995.
3. Sampling and Identifying Allergenic Pollens and Molds, Blewstone, 1990.
4. Identifying Filamentous Fungi: A Clinical Laboratory Handbook, Star, 1996.
5. Manual of Clinical Microbiology, 7th ed., ASM, 1999.
6. A Laboratory Guide to Common *Aspergillus* Species and their Teleomorphs, CSIRO, 1994.
7. Bioaerosols: Assessment and Control, ACGIH, 1999.