WATER DAMAGE AND MOLD CONTAMINATION EVALUATION

SMITH RESIDENCE GARAGE
514 PRECIOUS
SAN ANTONIO, TEXAS

Prepared for

SAN ANTONIO HOUSING AUTHORITY
SAN ANTONIO, TEXAS

by

ETC INFORMATION SERVICES, LLC

Donald J. Schaezler, Ph.D., P.E., CIH

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ETC INFORMATION SERVICES, LLC
19349 Old Wiederstein Road ● Cibolo, Texas 78108-1916
210/659-4747 ● 210/659-8199 fax ● donald@schaezler.net
engineering, technology, consulting

Project No. 7A-020
May 9, 2008

Mr. Lucas Oliva
San Antonio Housing Authority
1315 N. Elmendorf
San Antonio, Texas 78207

Re: Water Damage and Mold Contamination Evaluation
Smith Residence Garage, 514 Precious, San Antonio, Texas

Dear Mr. Oliva:

A copy of the report for the investigation of water damage and mold contamination for the garage of the referenced property is being forwarded to you for your information and necessary action.

The house itself has been successfully remediated. However, the Smiths have experienced health symptoms in the Garage since moving back into the house. The results of this investigation indicated that hidden sources of water damage and mold contamination may be present in the Garage.

We will be happy to answer any questions concerning this report. It has been a pleasure working with you on this important assignment. We look forward to being of continuing service to you.

Sincerely,

ETC INFORMATION SERVICES, LLC

Donald J. Schaezler, Ph.D., P.E., CIH

President

1.0 INTRODUCTION

The Garage for the subject residence has been recently inspected and sampled for evidence of water damage and mold contamination. The purpose of the inspection was to determine if there was any such evidence by visual inspection and collection of air samples. The purpose of this letter is to summarize the results of the inspection.

2.0 Background

A previous report by ETC Information Services, LLC, ("Indoor Environmental Quality Evaluation," prepared for SAHA by ETC Information Services, LLC, March 2008) documented that mold remediation for the occupied portions of the house had been completed satisfactorily.

Remediation was necessary because of visible water damage and mold around the back door and under the windows in the Living Room and Dining Room and visible water damage and mold growth in the Kitchen cabinets. Rainwater intrusion through the back door and windows was the identified cause of damage in the Living Room and Dining Room, and counter top and/or plumbing leaks were the potential causes of damage in the Kitchen. Minor damage was also noted and planned for minor remediation at the AHU Closet and the Master Bathroom.

3.0 Observations

The Garage contained typical storage items. Because of the large amount and size of some items, not all surfaces could be observed. There were no observable indications of previous or current water incursion. All moisture measurements of available building materials were within normal ranges. Air quality in the garage was satisfactory, as indicated in the table below.

Location	Temperature ºF	Relative Humidity %	Dew Point ºF	Carbon Dioxide ppmv	Carbon Monoxide ppmv
Outside – front	72.8	51	52	737	0
Outside- rear	74.1	60	58	737	0
Garage front	71.1	46	49	801	0
Garage rear	71.2	47	49	818	0

4.0 Sampling and Discussion

Four air samples were collected; two were from the Garage, and two samples were collected from outdoor air for reference. The results are summarized in the tables at the end of this report. The results and their significance are summarized below:

1. Outdoor air had low but typical levels of total fungal spores, dominated by *Cladosporium.* There were significant levels and proportions of Ascospores and Basidiospores. There were only low levels and proportions of *Penicillium/Aspergillus* type spores.

2. Indoor air in the front of the Garage had elevated levels of total fungal spores and of *Penicillium/Aspergillus* type spores specifically. This result **was not satisfactory**

In addition to fungi, other particulates in air were measured. The results are summarized in a table at the end of this report. The results and their significance are summarized below:

1. Outdoor air had no pollen and very low levels of epithelial cells, cotton fibers, and glass fiber.

2. Indoor air in the Garage had no pollen or glass fiber and moderate levels of epithelial cells and cotton fibers.

5.0 Conclusions

1. Indoor air quality inside the Garage was not satisfactory and indicated there were probably hidden sources of mold contamination, either in contents or on Garage surfaces.

2. The specific causes of the apparent mold contamination have not been identified.

6.0 Recommendations

1. Contents should be moved from the Garage to allow detailed inspection of those contents and of Garage surfaces.

TABLE 1 - BIOAEROSOL SAMPLING RESULTS MAJOR GENERA/TYPES – APRIL 30, 2008

Ref. No.	Description-Air Samples	Concentration, Counts/M^3 (%)							
		Alt	Asc	Bas	Cl	Pn/As	Sm/Myx	Total Fungal Spores	HyF
Outside									
1	Outdoor air – front	27 (1)	560 (15)	653 (18)	2,000 (54)	253 (7)	133 (9)	3,719	160
2	Outdoor air - rear	53 (3)	347 (20)	200 (12)	920 (54)	13 (1)	120 (7)	1,693	13
Indoor Average		40 (2)	454 (17)	427 (15)	1,460 (54)	133 (3)	127 (8)	2706	87
Inside									
3	Garage – front	280 (3)	293 (3)	200 (3)	373 (4)	7,200 (83)	120 (1)	8,639	160
4	Garage - rear	147 (6)	240 (9)	240 (9)	1,430 (55)	213 (8)	133 (5)	2,602	387
Indoor Average		214 (4)	267 (6)	220 (6)	902 (45)	3,707 ()	127 (3)	5,621	274
See Table 3 for abbreviations.									

TABLE 2 – OTHER PARTICLES - SAMPLING RESULTS – APRIL 30, 2008

Ref. No.	Description – Air Samples	Concentration, Counts/M^3			
		Pollen	Cotton Fibers	Skin Cells	Glass Fiber
Outside					
1	Outside – front	0	107	93	27
2	Outside – rear	0	27	0	13
Average		0	67	47	20
Garage					
3	Garage- front	0	1,410	4,850	0
4	Garage – rear	0	1,170	2,360	0
Average		0	1,290	3,605	0

TABLE 3 - ABBREVIATIONS FOR GENERA, SPECIES, AND TYPES OF FUNGI

Abbreviation	Description
Acremonium	*Acremonium* sp.
Al	*Alternaria* sp.
An	*Aspergillus niger*
As	*Aspergillus* sp.
Asc	Ascocarps or Ascospores, the fruiting bodies of Ascomycetes
Aur	*Aureobasidium* sp.
Bas	Basidiospores
Bi/Dr	*Bipolaris* sp. and/or *Drechslera* sp.
Bo	*Botrytis* sp.
Chae	*Chaetomium* sp.
Cl	*Cladosporium* sp.
Cur	*Curvularia* sp.
Epicoccum	*Epicoccum* sp.
Fusarium	*Fusarium* sp.
HyF	Hyphal fragments
Mem	*Memnoniella* sp.
Muc	*Mucor* sp.
Nig	*Nigrospora* sp.
NSF	Non-sporulating fungi
Pn	*Penicillium* sp.
Phia	*Phialophora* sp.
Pi/Ulo	*Pithomyces* sp. and/or *Ulocladium* sp.
Pn/As	*Penicillium/Aspergillus* type spores
Sm/Myx	Smuts, Myxomycetes, or *Periconia* spores
Spo	*Sporotrichum* sp.
Sta	*Stachybotrys* sp.
Syn	*Syncephalastrum* sp.
Tri	*Trichoderma* sp.
UC	Unclassified conidia
Y	Yeast