

**MOLD REMEDIATION  
POST - REMEDIATION VERIFICATION (CLEARANCE) REPORT  
REVISION 1  
SMITH RESIDENCE  
514 PRECIOUS  
SAN ANTONIO, TEXAS**

Prepared for

**SAN ANTONIO HOUSING AUTHORITY  
SAN ANTONIO, TEXAS**

by

**ETC INFORMATION SERVICES, LLC**

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Project No. 7A-020  
November 11, 2007

Mr. Timothy Alcott  
San Antonio Housing Authority  
1315 N. Elmendorf  
San Antonio, Texas 78207

**Re: Post - Remediation Verification (Clearance) Report – Revision 1  
Smith Residence, 514 Precious, San Antonio, Texas**

Dear Mr. Alcott:

A copy of the report for the Post - Remediation Verification (Clearance) investigation of the referenced property is being forwarded to you for your information and necessary action. An Indoor Environmental Quality Evaluation was prepared for this residence May 15, 2007, and a Mold Remediation Protocol was prepared on June 1, 2007. The report and Protocol should be consulted for a full review of the scope of remediation work.

The sources of water intrusion in this house appear to have been corrected, or will be when reconstruction is completed. The results of this investigation indicated that remediation was conditionally successful. Recleaning of the Master Bathroom is necessary.

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 subject residence has been recently inspected and sampled for remediation of water damage and mold contamination. The purpose of the inspection was to determine the status of remediation by visual inspection, measurement of moisture content in building materials, and collection of air and surface samples. The purpose of this letter is to summarize the results of the inspection and to document that the remediation has been successfully completed.

## **2.0 Background**

A previous report by ETC Information Services, LLC, (“Indoor Environmental Quality Evaluation,” prepared for SAHA by ETC Information Services, LLC, May 2007) recommended remediation by a licensed contractor. A Remediation Protocol was subsequently prepared June 1, 2007, and was the basis for the remediation conducted by Blackmon-Mooring of San Antonio, Texas.

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**

### **3.1 October 23, 2007**

1. Containment was in place for the Kitchen. The cabinets at the front wall had been removed, and the framing under the front window had been exposed. Exposed areas were visibly clean.
2. Containment was in place for the left rear half of the Living Room/Dining Room. Carpeting had been removed, and the lower framing had been exposed. The back door had been removed, and there was a plywood sheet fastened over the doorway as closure. The plywood was not completely sealed, and some water impacts were visible at framing for the doorway. There were some water stains on tackboards.

3. Containment was in place for the Master Bathroom. A small area of framing next to the head of the tub had been exposed.
4. No windows had been addressed from inside the house.
5. All carpeting in the house had been removed.
6. There were water stains on the subfloor in all upstairs bedrooms, as if from water intrusion through open or uninstalled windows. There was slight staining on tackboards, especially in the center rear bedroom.
7. In the Kitchen, the refrigerator was still in place and operating. The motor compartment had not been cleaned, and there was moldy food inside.
8. Water leaks appeared to have been repaired in the Kitchen.
9. Many contents were present inside the house, outside of the containments.
10. In the hot water heater closet, the drip pan had been removed, and some cleaning had been performed. There was no drip pan or overflow protection from the AHU or water heater.
11. The return air filter was missing, and the coils had not been cleaned. The AHU section of the closet had excess debris. The secondary condensate line was not in working condition.
12. The coils had been cleaned, apparently in place. The coil and filter compartments still had some dust and debris present.
13. Exposed framing, subfloor, and slab had normal moisture content in all exposed areas.
14. Indoor air quality in the residence was as indicated in the table below.

<b>Location</b>	<b>Temperature °F</b>	<b>Relative Humidity %</b>	<b>Dew Point °F</b>	<b>Carbon Dioxide ppmv</b>	<b>Carbon Monoxide ppmv</b>
Outside – front	63.0	35	34	399	0
Kitchen	76.3	32	43	665	0
Outside Containment	78.5	27	41	665	0
Upstairs, outside containment	79.9	26	46	532	0
Living Room Containment	90.3	21	44	785	0
Outside - front	74.4	21	31	-	-

The results were satisfactory.

## 4.0 Sampling and Discussion

### 4.1 October 23, 2007

#### 4.1.1 Air Samples

Twelve air samples were collected. Four samples were collected inside the Living Room containment area, two samples were collected in the Kitchen Containment, and two samples were collected from the Master Bath. Four 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 low proportions of a variety of other spores, including *Penicillium/Aspergillus* type spores.
2. Outdoor air had low, typical levels of culturable fungi, dominated by *Cladosporium*. No culturable *Aspergillus* and only a trace of *Penicillium* were present.
3. The Kitchen containment area had low levels of total fungal spores. The proportion of *Penicillium/Aspergillus* type spores was somewhat higher than in outdoor air.
4. The Kitchen containment area had low levels of culturable fungi and no *Aspergillus* or *Penicillium*.
5. The Living Room/Dining Room containment area had low levels of total fungal spores. The proportion of *Penicillium/Aspergillus* type spores was somewhat higher than in outdoor air.
6. The Living Room/Dining Room containment area had low levels of culturable fungi and no *Aspergillus* or *Penicillium*.
7. The Master Bathroom containment area had low levels of total fungal spores. The level and proportion of *Penicillium/Aspergillus* type spores were somewhat higher than in outdoor air.
8. The Master Bathroom containment area had levels of culturable fungi similar to outdoor air, no *Aspergillus*, and only a trace of *Penicillium*.
9. All containment areas had similar levels and proportions of *Penicillium/Aspergillus* type spores. The levels and proportions of *Penicillium/Aspergillus* type spores were similar to those in the outdoor air sample from in front of 514 Precious (Ref. No. 18).

10. All containment areas had levels of culturable fungi similar to or less than in outdoor air, dominated by *Cladosporium*. There were no culturable *Aspergillus* and only one CFU of *Penicillium* in four samples.
11. The results for the containment areas were consistent with **successful remediation**.

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 low levels of pollen, cotton fibers, epithelial cells, and fiber glass.
2. Indoor air in the Kitchen containment had somewhat high levels of epithelial cells.
3. Indoor air in the Master Bathroom containment had high levels of epithelial cells.
4. The results indicate that additional cleaning of particulates is required in the Master Bathroom.

#### 4.1.2 Surface Samples

Two surface samples for clearance were collected. The results are summarized in the tables at the end of this memo. The results and their significance are summarized below:

1. The sample from framing at the remediation area in the Kitchen had trace levels of spores and hyphal fragments. The results **were satisfactory**.
2. The sample from the Living Room framing had trace levels of spores and hyphal fragments. The results **were satisfactory**.

## 5.0 Conclusions

1. Remediation of contaminated framing has been successfully completed in the containment areas
2. All sheetrock, trim, flooring, and cabinet materials were removed as specified. Some stained tackboard needs to be removed.
3. All surfaces tested were clean.

4. Indoor air quality inside and outside of containment, was satisfactory with respect to chemical, physical, and fungal parameters, except for levels of epithelial cells.
5. There were excessive levels of epithelial cells in the Master Bathroom containment area.
6. The AHU closet and coils have not been cleaned. The AHU is not ready for operation.
7. After recleaning of the Master Bathroom containment area, the remediation areas are ready for demobilization of containment and equipment and reconstruction.
8. The causes of the water damage and mold contamination that were identified have been remediated. There is evidence of some rainwater intrusion at the rear door, but this will be corrected during reconstruction.

## **6.0 Recommendations**

1. All surfaces in the Master Bathroom containment area should be HEPA-vacuumed.
2. The refrigerator should be moved outside and cleaned.
3. All stained tackboards should be removed.
4. The AHU closet and coil compartment must be cleaned to remove excess dust and debris. The coil should be removed and cleaned offsite.
5. The installation of the AHU should be completed with respect to the AHU, insulation of lines, and permanent closure of openings in the closet.
6. Damaged areas of the moisture barrier should be repaired.
7. The Master Bathroom containment area should be recleaned by HEPA-vacuuming. After such cleaning, containment and equipment should be demobilized from all remediation areas, and remediated areas should be reconstructed.

**TABLE 1 - BIOAEROSOL SAMPLING RESULTS  
MAJOR GENERA/TYPES – October 23, 2007 - Method A001**

Ref. No.	Description-Air Samples	Concentration, Counts/M <sup>3</sup> (%)							
		Ni	Bas	Sm/Myx	Cl	Cur	Pn/As	Total Fungal Spores	HyF
<b>Outside</b>									
11	Outdoor air – front at 443 Precious	13 (2)	53 (8)	40 (6)	307 (48)	13 (2)	40 (6)	639	253
18	Outdoor air - front at 514 Precious	0	147(8)	147(8)	1,270 (66)	53 (3)	120 (6)	1,937	53
<b>Outdoor Average</b>		7 (1)	100 (8)	93 (7)	787 (61)	33 (3)	80 (6)	1,287	153
<b>Inside of Kitchen Containment</b>									
20	Kitchen	40 (4)	27 (3)	67 (7)	507 (55)	0	160 (17)	920	147
<b>Inside of Living Room/Dining Room Containment</b>									
22	Living Room near rear door	27 (9)	0	67 (22)	67 (22)	13 (4)	93 (30)	306	53
24	Dining Room near window	27 (15)	27 (15)	27 (15)	40 (23)	0	27 (15)	175	53
<b>Containment Average</b>		27 (11)	13 (6)	47 (19)	53 (22)	7 (3)	60 (25)	240	53
<b>Inside of Master Bathroom Containment</b>									
26	Master Bath	40 (9)	27 (6)	67 (15)	93 (21)	40 (9)	120 (27)	441	67
See Table 5 for abbreviations.									

**TABLE 2 – CULTURABLE AIR FUNGI SAMPLING RESULTS  
MAJOR GENERA/TYPES – OCTOBER 23, 2007 - Method A003**

Ref. No.	Description – Air Samples	Concentration, CFU/M <sup>3</sup> (%)							
		Al	As sp.	Chae	Cl	Pn sp.	NSF	Sta	Total Fungi
<b>Outside</b>									
12	Outdoor air – front 1	0	0	0	471 (91)	12 (2)	24 (5)	0	519
19	Outdoor air - front 2	0	0	0	459 (89)	0	59 (11)	0	518
<b>Outdoor Average</b>		0	0	0	465 (90)	6 (1)	42 (8)	0	518
<b>Inside of Living Room Containment</b>									
23	Living Room	0	0	0	141 (75)	0	47 (25)	0	188
25	Living Room	12 ( )	0	0	59 (56)	0	35 (33)	0	106
Average		6 (4)	0	0	100 (68)	0	41 (28)	0	147
<b>Inside of Kitchen Containment</b>									
21	Kitchen	0	0	0	329 (74)	0	106 (24)	0	447
<b>Inside of Master Bathroom Containment</b>									
27	Master Bath	0	0	0	565 (92)	12 (2)	0	0	612
See Table 5 for abbreviations.									

**TABLE 3 – OTHER PARTICLES - SAMPLING RESULTS  
OCTOBER 23, 2007 - Method A002**

Ref. No.	Description – Air Samples	Concentration, Counts/M <sup>3</sup> (%)			
		Pollen Unidentified	Cotton Fibers	Skin Cells	Glass Fiber
<b>Outside</b>					
11	Outdoor air – front 1	40	107	613	0
18	Outdoor air - front 2	0	160	293	13
<b>Outdoor Average</b>		20	133	453	7
<b>Inside of Kitchen Containment</b>					
20	Kitchen	27	613	8,160	0
<b>Inside of Living Room/Dining Room Containment</b>					
22	Living Room	13	427	1,440	13
24	Living Room	13	227	1,760	13
<b>Average</b>		13	327	1,600	13
<b>Inside of Master Bathroom Containment</b>					
26	Master Bathroom	27	893	11,800	67
See Table 5 for abbreviations.					

**TABLE 4 - SURFACE SAMPLES - FUNGAL IDENTIFICATION  
MAJOR GENERA/TYPES – JULY 23, 2007 - Method S001**

Ref. No.	Description - Swab Samples	Concentration, Counts/cm <sup>2</sup> (%)						
		Asc	Bas	Chae	Cl	Pn/As	Total Fungal Spores	MyF
2	Kitchen framing at window/floor	0	0	0	0	0.4	1.2	0.2
4	Living Room at rear door- Framing & Jamb	0	0	0	0	1 (100)	1	0.2
See Table 5 for abbreviations.								

**TABLE 5 - ABBREVIATIONS FOR GENERA, SPECIES, AND TYPES OF FUNGI**

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