

**MOLD REMEDIATION  
POST - REMEDIATION VERIFICATION (CLEARANCE) REPORT  
REVISION 1  
CABRERA RESIDENCE  
443 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  
Cabrera Residence, 443 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 March 30, 2007, and a Mold Remediation Protocol was prepared on July 9, 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 corrected when reconstruction has been completed. The results of this investigation indicated that remediation was conditionally successful. Badly decayed wood must be removed near the back door, and two areas need recleaning because of high epithelial cells in indoor air.

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, subject to some additional work and to complete reconstruction.

## **2.0 Background**

A previous report by ETC Information Services, LLC, (“Indoor Environmental Quality Evaluation,” prepared for SAHA by ETC Information Services, LLC, April 2007) recommended remediation by a licensed contractor. A Remediation Protocol was subsequently prepared July 9, 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, especially in the Master Bedroom and Bedroom 2. There was also visible mold growth at the ceiling/wall juncture over the Master Shower. Rainwater intrusion through the door and rainwater intrusion or condensation at the windows were the identified causes of damage.

## **3.0 Observations**

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

1. There were mini-containments, from floor to ceiling, at each window, except at the Kitchen window. The lower framing was exposed beneath each window.
2. There was a small containment area that included the back door and the Kitchen window. Sheetrock had been removed on each side of the back door and under the window.
3. There was containment at the Master Bathroom, including a barrier at the ceiling where sheetrock had been removed above the tub. Sheetrock had also been removed above the shower surround.
4. In some locations within containment areas, the moisture barrier had been damaged by deconstruction.

5. Tile flooring had been installed throughout the house.
6. Many contents were present inside the house, outside of the containments.
7. The return air plenum and AHU closet had been cleaned but there was still some debris present.
8. The coils had been cleaned, apparently in place. The coil and filter compartments still had some dust and debris present.
9. Exposed framing had normal moisture content in all exposed areas.
10. There was significant water damage and fungal decay at the back door, to the right front sill plate and first stud.
11. There were traces of a termite tunnel near the back door, on a stud to the rear of the doorway. The tunnel appeared to be inactive. It reached to the ceiling and perhaps into the attic.
12. The back doorway was not sealed from the exterior environment. A plywood covering was in place, but there were gaps at each lower corner. There was some physical damage to the exterior gyprock sheathing.
13. The condensate line was not insulated.
14. A new pleated filter, Purafill 2000 was in place.
15. There appeared to be new supply air registers.
16. 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
Living Room Outside Containment	74.4	35	44	485	0
Back Door Containment	67.3	38	40	608	0
Master Bathroom Containment	74.1	46	51	615	0
Outside - front	74.4	21	31	-	-

The results indicate satisfactory conditions.

## 4.0 Sampling and Discussion

### 4.1 October 23, 2007

#### 4.1.1 Air Samples

Nine air samples were collected. Five samples were collected inside of three containment areas. 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. There were low but typical levels of culturable fungi, dominated by *Cladosporium*. No culturable *Aspergillus* and only a trace of *Penicillium* were present.
3. Indoor air, inside of the Kitchen containment, had low levels of total fungal spores with a wide diversity of spore types. There were slightly elevated proportions of Smuts/*Periconia*/Myxomycetes group spores and *Nigrospora*, which were not significant in outdoor air. *Penicillium/Aspergillus* type spores were present at a significant proportion, but the levels were not significantly different than those in outdoor air.
4. Air inside the Kitchen containment had low levels of culturable fungi, dominated by *Cladosporium*. There was a low level and low proportion of *Penicillium*. This low level may reflect the decayed framing still in place at the back door. Other surfaces in the containment were clean.
5. Air inside the Living Room containment had low levels of total fungal spores and *Penicillium/Aspergillus* type spores. The diversity was similar to outdoor air. There were also low levels of culturable fungi and only a trace level of *Penicillium*.
6. Air inside the Master Bathroom containment had low levels of total fungal spores and *Penicillium/Aspergillus* type spores. The diversity was similar to outdoor air.
7. The results for the three remediation 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 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 these two areas.

#### 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 non-detectable spores and hyphal fragments. The results **were satisfactory**.
2. The sample from the Master Bathroom window sill and jamb had trace or non-detectable levels of spores and hyphal fragments. The results were deemed to be **satisfactory**.

## 5.0 Conclusions

1. Remediation of contaminated framing has been successfully completed in the containment areas, with the exception that badly decayed framing members at the back door should be removed and replaced.
2. All sheetrock, trim, and flooring materials were removed as specified.
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 Kitchen and Master Bathroom containment areas.
6. The AHU closet and coils have been marginally cleaned. The AHU is not ready for operation.

7. The causes of the water damage and mold contamination that were identified have been remediated, with the exception of the back door. The deficiencies at the back door can be corrected during reconstruction.

## **6.0 Recommendations**

1. All surfaces in the Master Bathroom containment area should be HEPA-vacuumed.
2. Badly decayed framing in the Kitchen containment area should be removed and replaced. Then all surfaces in that containment area should be HEPA-vacuumed.
3. The framing for the back door must be rebuilt, as indicated above, and a new door must be installed. The landing outside the back door should be removed and replaced with a landing that is several inches below the floor elevation.
4. The AHU closet and coil compartment should be recleaned to remove residual dust and debris.
5. The installation of the AHU should be completed with respect to insulation of lines and closure of openings in the closet.
6. Damaged areas of the moisture barrier and gyprock sheathing should be repaired.
7. Following removal and replacement of decayed framing and recleaning of the Master Bathroom and Kitchen containment areas, 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 A002**

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 1	13 (2)	53 (8)	40 (6)	307 (48)	13 (2)	40 (6)	639	253
18	Outdoor air - front 2	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>									
15	Kitchen near sink 1	40 (5)	53 (7)	173 (22)	333 (43)	0	67 (9)	772	53
<b>Inside of Living Room/Dining Room Containment</b>									
13	Living Room	13 (4)	67 (20)	27 (8)	147 (44)	27 (8)	27 (8)	334	53
<b>Inside of Master Bathroom Containment</b>									
17	Master Bath	13 (2)	13 (2)	13 (2)	307 (55)	27 (5)	107 (19)	560	93
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 Kitchen Containment</b>									
16	Kitchen near sink 1	0	0	0	753 (77)	71 (7)	118 (12)	0	978
<b>Inside of Living Room/Dining Room Containment</b>									
14	Living Room	0	0	0	329 (74)	0	106 (24)	0	447
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>					
15	Kitchen	27	880	17,100	53
<b>Inside of Living Room/Dining Room Containment</b>					
13	Living Room	27	480	3,360	67
<b>Inside of Master Bathroom Containment</b>					
17	Master Bathroom	80	907	10,500	53
See Table 5 for abbreviations.					

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

Ref. No.	Description - Swab Samples	Concentration, Counts/cm2 (%)							
		Bas	Chae	Cl	Pn/As	Sm/Myx	Sta	Total Fungal Spores	HyF
1	Master Bedroom Right Front Sill & Jamb	0	0	0	0	0	0	<0.4	0.4
2	Back Door – right rear stud at door	0	0	0	0	0	0	<0.02	0.02

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