

**MOLD REMEDIATION
POST - REMEDIATION VERIFICATION (CLEARANCE) REPORT**

**OLIVARES RESIDENCE
458 PRECIOUS STREET, VILLAS AT FORTUNA
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
May 26, 2007

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

**Re: Post - Remediation Verification (Clearance) Report
Olivares Residence, 458 Precious Street, 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 with Mold Remediation Protocol was prepared for this residence on April 30, 2007. The report and Protocol should be consulted for a full review of the scope of remediation work.

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 inspections 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 inspections and to document the successful repair of causes of the water damage and successful remediation of the mold problems.

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) included a Remediation Protocol for the residence. This Remediation Protocol was the basis for the remediation conducted by Blackmon-Mooring of San Antonio, Texas.

Remediation was necessary because of visible water damage and mold in the Master Closet and high levels of *Aspergillus/Penicillium*-like spores in the air in the Master Bedroom. There was also a trace level of *Stachybotrys* in the air sample. Past plumbing leaks were the identified causes of the damage and contamination. The leaks had been repaired, but the impacted materials had not been properly cleaned.

3.0 Observations

3.1 May 15, 2007

1. Containment was in general accordance with the Remediation Protocol. The full containment arrangement created effective isolation of the area and included a negative air blower, an air scrubber, a dehumidifier, and a two, two-stage decontamination units with quadruple flap doors.
2. Surfaces were visibly clean and free of debris, except as noted below.
3. The framing under the Bathroom 2 tub had been isolated separately. When the barrier was cut open for inspection, mold growth was observed.
4. The moisture contents of materials in the remediated area were satisfactory.
5. Indoor air quality in the residence was as indicated in the table below.

Location	Temperature °F	Relative Humidity %	Dew Point °F	Carbon Dioxide ppmv	Carbon Monoxide ppmv
Outside - front	85.5	46	61.5	442	0
Inside	85.2	58	68	463	0

The data indicated satisfactory conditions, except that the dew point inside was somewhat high.

3.2 May 21, 2007

1. The weather was clear, but rain had occurred earlier in the day. Winds were generally out of the southeast.
2. Containment was in place as it was previously.
3. The moisture contents of materials in all remediated areas were satisfactory.
4. Surfaces were visibly clean except as noted below.
5. Several square inches on a stud adjacent to the Bathroom 2 tub had minor staining.
6. Indoor air quality in the residence was as indicated in the table below.

Location	Temperature °F	Relative Humidity %	Dew Point °F	Carbon Dioxide ppmv	Carbon Monoxide ppmv
Outside - front	68.8	87	64.5	455	0
Kitchen	72.7	68	61	508	0
Master Bedroom	79.9	54	61	568	0

The data indicated satisfactory conditions.

4.0 Sampling and Discussion

4.1 May 21, 2007

4.1.1 Air Samples

Six air samples were collected. With the containment arrangement, makeup air to the remediation area is from the interior of the house. The house then draws air from outside or from the Attic to satisfy the negative air pressurization requirements. Therefore, the primary comparison is of air inside of containment to air outside of

containment. The results are summarized in the tables at the end of this memo. The results and their significance are summarized below:

1. Outdoor air had high but typical levels of total fungal spores, dominated by Ascospores and with significant proportions of *Cladosporium*. There were only low levels of *Aspergillus/Penicillium*-like spores.
2. Indoor air, outside of containment, had low levels of total fungal spores and mycelial fragments. There was a significant proportion of *Aspergillus/Penicillium*-like spores and trace levels of *Chaetomium* and *Stachybotrys*.
3. Indoor air, inside of containment, had lower levels of total fungal spores, with a distribution similar to that outside of containment.
4. There were trace levels of *Chaetomium* and *Stachybotrys* both outside of containment and inside of containment. These levels do not reflect on the remediation area or on the success of remediation. They apparently represent trace levels of contamination still in the house from conditions prior to remediation.
5. The results for the remediation area **indicated successful remediation**.

4.1.2 Surface Samples

Four 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. Three of the four samples non-detectable levels of total fungal spores and mycelial fragments. The results **were satisfactory**.
2. The sample from the stud adjacent to the tub in Bathroom 2 had low levels of total fungal spores and a trace level of mycelial fragments. Although the spore counts were higher than desired, the spore types were unidentifiable, the area is small, and the staining can easily be removed by vigorous wiping with a cleaning agent. Therefore the results are deemed to be **satisfactory**.

4.1.3 Photographs

Photographs of the remediated conditions are available.

5.0 Conclusions

1. Remediation has been successfully completed.
2. All sheetrock, trim, flooring, and cabinet 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.
5. The remediation areas are ready for demobilization of containment and equipment and reconstruction.
6. The causes of the water damage and mold contamination that were identified have been remediated. (Plumbing leaks were repaired prior to the initial investigation.)

6.0 Recommendations

1. The small area with mold staining on the stud next to the tub in Bathroom 2 should be wiped clean.
2. In the remediation area, remediation equipment should be HEPA-vacuumed and removed from the area. Containment materials should be HEPA-vacuumed, removed, and disposed. All exposed wood surfaces within wall cavities in the remediated areas should be sealed with a fungicidal primer.
3. As previously recommended, the residence should be thoroughly cleaned. HEPA-vacuuming of all surfaces and HEPA-vacuuming plus hot water extraction of upholstery and carpeting should be performed by a professional cleaning company. The cleaning will also remove some of the residual mold spores from prior conditions that were apparent during post-remediation verification air sampling. Badly soiled carpet should be replaced rather than cleaned.

**TABLE 1 - BIOAEROSOL SAMPLING RESULTS
MAJOR GENERA/TYPES – MAY 21, 2007 - Method A001**

Ref. No.	Description-Air Samples	Concentration, Counts/M ³ (%)							
		Alt	Asc	As/Pn	Chae	Cl	Sta	Total Fungal Spores	MyF
Outside									
1	Outdoor air – front 1	13 (<1)	10,733 (82)	133 (1)	0	1,507 (11)	0	13,133	<13
2	Outdoor air - front 2	0	7,560 (87)	80 (<1)	0	693 (8)	0	8,720	<13
Outdoor Average		7 (<1)	9,147 (84)	107 (1)	0	1,100 (10)	0	10,926	<13
Inside - Outside of Containment									
3	Hall	67 (21)	40 (13)	0	40 (13)	13 (4)	0	320	40
4	Kitchen	0	80 (17)	93 (19)	67 (14)	93 (19)	27 (6)	480	53
OSC Average		33 (8)	60 (15)	47 (12)	53 (13)	53 (13)	13 (3)	400	47
Inside of Containment									
5	Utility Room	0	13 (10)	13 (10)	13 (10)	53 (40)	27 (20)	133	<13
6	Master Bedroom	0	67 (33)	53 (27)	0	40 (20)	27 (13)	200	<13
Containment Average		0	40 (24)	33 (20)	7 (4)	47 (28)	27 (16)	167	<13
See Table 3 for abbreviations.									

**TABLE 2 - SURFACE SAMPLES - FUNGAL IDENTIFICATION
MAJOR GENERA/TYPES – MAY 21, 2007 - Method S001**

Ref. No.	Description - Swab Samples	Concentration, Counts/cm2 (%)					
		As/Pn	Cl	Sta	UC	Total Fungal Spores	MyF
7	Master Bath front wall – sill plate	<1	<1	<1	<1	<1	<1
8	Framing under tub in Bath 2	<1	<1	<1	<1	<1	<1
9	Master Closet front wall – sill plate	<1	<1	<1	<1	<1	<1
10	Bath 2 stud at tub	<1	<1	<1	125 (100)	125	1
See Table 3 for abbreviations.							

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

Abbreviation	Description
Acr	<i>Acremonium</i> sp.
Al	<i>Alternaria</i> sp.
An	<i>Aspergillus niger</i>
As	<i>Aspergillus</i> sp.
As/Pn	<i>Aspergillus</i> sp. and/or <i>Penicillium</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.
Epi	<i>Epicoccum</i> sp.
Fus	<i>Fusarium</i> sp.
Mem	<i>Memnoniella</i> sp.
Muc	<i>Mucor</i> sp.
MyF	Mycelial Fragments
Nig	<i>Nigrospora</i> sp.
Pn	<i>Penicillium</i> sp.
Phia	<i>Phialophora</i> sp.
Pi/Ulo	<i>Pithomyces</i> sp. and/or <i>Ulocladium</i> sp.
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