FACS
Forensic Analytical Consulting Services

April 18, 2017

# Mold Investigation Report
## Findings of Initial Assessment

**City of Manzanita**
**City Hall**
**543 Laneda Avenue**
**Manzanita, OR 97130**

Prepared for:

**Kristin Grasseth**
**City of Manzanita**
PO Box 129
Manzanita, OR 97130
503-368-5343 | kgrasseth@ci.manzanita.or.us

Prepared By:

**Robin Sharpe-Yablonka**
**Forensic Analytical Consulting Services**
17400 SW Upper Boones Ferry Road,
Suite 245
Portland, OR 97224
503-595-1001 | rsharpe@forensicanalytical.com

FACS Project #PJ33256

# Contents

## Executive Summary

Forensic Analytical Consulting Services Inc. (FACS) performed an initial assessment for mold growth and water damage at the City Hall building located in Manzanita, Oregon. During the assessment mold growth and water damage were identified in the city manager's office, the NE storage room, and the building department office, requiring corrective actions. Surface and air contamination and occupant exposure is suspected in the throughout the north side of the building. A more detailed discussion of findings, conclusions and recommendations is provided below.

## Introduction

FACS was retained by Kristin Grasseth of the City of Manzanita to provide an initial mold assessment of the City Hall building located at 543 Laneda Avenue in Manzanita, Oregon. Mr. Paul Woodward of FACS performed the assessment on March 31, 2017. This report contains the findings and recommendations from the investigation. The purpose of the investigation was to attempt to identify areas of water intrusion and mold growth, make recommendations regarding corrective actions, and provide information for consideration in assessing risk to occupants.

## Site Characterization

The City Hall building consists of two construction phases; the south side of the building is the original building constructed in the 1950's, and the north section of the building was added in the 1980's. The building is approximately 2,500 sq. ft. Exterior construction of the building is characterized by CMU block and brick. The building is surrounded by concrete (pad, or parking lot) on the north and east elevations, and moderate to dense vegetation on the south and west elevations. Interior walls are wood paneling, finished gypsum wallboard, or exposed CMU block. Ceilings are finished gypsum wallboard or drop in ceiling tiles. Floor materials consist of carpet, vinyl floor tiles, and vinyl sheet flooring. The building is heated by a central forced air system and wall radiant heaters.

## Site History

Based on conversations with City of Manzanita representatives, the following history relative to water intrusion and mold growth was developed.

- Employees have been recently reporting respiratory issues thought to be caused by mold growth in the building.
- Reportedly, there are regular water intrusions in the north half of the building (1980's addition) and water damage has been noted on wood paneled walls.
- March 31, 2017: FACS performed an initial mold assessment of the City Hall building.

## Scope of Work

In the course of this project, FACS conducted the following scope of work:

1. Development of a site characterization and history (see sections above).
2. Visual assessment of the interior and exterior areas of the building.
3. Representative moisture meter assessment of building materials in inspected areas.
4. Representative, real-time measurements of relative humidity (RH) throughout the inspected areas.

5. Collection of five surface tape lift samples of locations of suspect mold growth.

6. Collection of spore trap air samples in three (3) indoor locations and two (2) outdoor locations. Indoor sampling locations were selected based on the history of moisture intrusion and to be representative of the areas assessed. Outdoor sampling locations were selected to be representative of air entering the building.

Data collection methodologies are described in Appendix D. The data collected in the course of the investigation are presented in this report as follows:

- Table 1: Observations (visual observations, moisture readings, photo & sample references)
- Table 2: Mold Growth Conclusions and Repair
- Appendix A: Photographs (depicting inspection observations)
- Appendix B: Floor Plan (locations of key observations and sample locations)
- Appendix C: Sampling Results (summary tables, laboratory reports and chain of custody forms)

## Conclusions

Based on this investigation, the following conclusions are reached:

1. *Mold Growth & Remediation (General).* Mold (a.k.a., "fungal") growth can occur when organic building materials or accumulated organic debris is impacted by moisture. This may occur within 24-48 hours from the time such materials become wet, hence it is critical that materials are substantially dried within this time frame in order to minimize the potential for mold growth to develop. Mold growth has the potential to elicit negative health effects in sensitive persons. This most frequently manifests as allergic respiratory symptoms which may range from mild to severe depending on individual sensitivities. Irritant and infectious effects are possible. It is generally accepted that mold growth in buildings should be removed following appropriate precautions to protect workers involved in the clean-up and the surrounding environment. Greater precautions are taken for greater amounts of mold growth. In addition, the underlying cause of mold and moisture intrusion should be identified and corrected in order to minimize the potential for recurrent mold growth. Additional information can be found at the U.S. Environmental Protection Agency website (http://www.epa.gov/mold/).

2. *Indoor Humidity.* Relative humidity (RH) was measured throughout the building using a Q-Trak™ direct reading instrument. The relative humidity (RH) levels in the areas ranged from 49.0 – 49.5%. Sustained elevated indoor humidity (above 65%) that can provide conditions conducive to mold growth was not observed.

3. *Locations of Mold Growth.* Mold growth and water damage were identified in the city manager's office, the NE storage room, and the building department office. These conclusions are based on a combination of surface tape sampling results and visual observations. Specific locations, descriptions, conclusions and supporting reasoning are provided in Table 2.

4. *Airborne & Settled Mold Spore Contamination.* Elevated mold spore levels in the air and in settled dust on surfaces are suspected throughout the city manager's office, the NE storage room, and the building department office. This conclusion is based on the indoor air sample results in conjunction with visual observations made during the assessment. Specific locations, descriptions, conclusions and supporting reasoning are provided in Table 2.

5. *Occupant Exposure.* Elevated occupant exposure to airborne mold spores is suspected throughout the city manager's office, the NE storage room, and the building department office.

This conclusion is based on the indoor air sample results. In general, when considering the risk of occupant exposure to indoor mold growth, the following should be recognized:

a. No accepted quantitative standards currently exist by which to assess the health risks related to fungal exposure. Since fungus and airborne fungal spores are common in the natural environment, most guidelines focus on the amount and location of visible fungal growth present and comparison of indoor and outdoor spore levels.
b. Airborne fungal spore levels can vary greatly over time due to changes in environmental conditions and activity patterns. In addition, commonly employed air sampling methods exhibit variability from sample to sample and can mask differences in fungal species between indoor and outdoor environments. More definitive data can be developed by more extensive and repeated sampling over time.
c. Based on these limitations, and on the potential presence of other adverse biological agents that may develop on moisture impacted materials, mold growth and dampness in buildings should be controlled and impacted areas should be appropriately addressed in order to promote a healthful indoor environment.

6. *Causal Conditions.* Conditions resulting in moisture impact upon organic building materials should be determined and corrected in order to prevent the development of additional mold growth. Preliminary FACS findings related to potential causes of moisture intrusion are provided in Table 2. These findings should be reviewed and verified by an appropriately qualified construction professional in order to ensure accurate identification and correction of the causes of moisture intrusion issues.

## Recommendations

Based on this investigation, the following recommendations are made:

1. All mold cleaning, removal and drying activities should be conducted in accordance with commonly accepted guidelines for mold remediation and water damage restoration as summarized in the FACS General Mold Remediation Guidelines provided in Appendix E and as further specified below.

    a. Prior to and during the removal of building materials, consider the potential for disturbance of materials containing asbestos, lead or other hazardous substances and take appropriate measures in accordance with applicable federal, state and local regulations.

    b. Inspect for hidden mold growth using appropriate precautions as called for in Table 2 and the FACS General Mold Remediation Guidelines referenced therein.

    c. Remove identified areas of mold growth following appropriate guidelines to protect workers and control contamination as called for in Table 2 and the FACS General Mold Remediation Guidelines referenced therein.

    d. Clean areas of identified airborne and settled mold spore contamination following appropriate guidelines to protect workers and control contamination as called for in Table 2 and the FACS General Mold Remediation Guidelines referenced therein.

    e. Dry out any discovered wet organic building materials following appropriate guidelines as identified in the FACS General Mold Remediation Guidelines referenced therein.

    f. Following completion of mold remediation activities, conduct a post-remediation assessment to confirm that the recommended mold cleaning and removal activities have been completed appropriately. Specific post-remediation assessment recommendations are provided in the FACS General Mold Remediation Guidelines as referenced in Table 2.

2. Concurrent with mold remediation efforts, determine and address the causes of moisture intrusion in consultation with an appropriately qualified construction professional in order to prevent additional mold growth from occurring.

## Limitations

This investigation is limited to the conditions and practices observed and information made available to FACS. The methods, conclusions and recommendations provided are based on FACS' judgment, expertise and the standard of practice for professional service. They are subject to the limitations and variability inherent in the methodology employed. As with all environmental investigations, this investigation is limited to the defined scope and does not purport to set forth all hazards, nor indicate that other hazards do not exist.

Please do not hesitate to contact our offices at 503-595-1001 with any questions or concerns. Thank you for the opportunity to assist the City of Manzanita in promoting a more healthful environment.

Respectfully,
FORENSIC ANALYTICAL

Robin Sharpe-Yablonka
Senior Project Manager

Reviewed by,
FORENSIC ANALYTICAL

Michael S. Andrew, MS, CIH, CSP, LEED AP

# Table 1: Observations

| Table 1: Observations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Ref #** | **Functional Area/Location** | **Observations/History** | **Area of Mold[a]** | **Area of Moisture[b]** | **Moisture Readings[c]** | **Photo #[d]** | **Sample #[d]** |
| A | Building Department Office | ⟩ Visible mold growth and elevated moisture were observed on wood wall paneling behind baseboards on the north and east walls in the northeast corner.<br>⟩ Visible mold growth and water damage were observed on the east window frame. Water staining was observed on the east window sill.<br>⟩ Water staining was observed on the vinyl floor tiles along the east side of the floor.<br>⟩ Water staining was observed on cardboard contents.<br>⟩ Water staining was observed on the wood surrounding a skylight above the ceiling tiles. | 17 ft.$^2$ Moderate to Heavy | 20 ft.$^2$ | 10.4 – 26.4% wood | 1-6 | **IA2**<br>**TL-01**<br>**TL-02**<br>**TL-03** |
| B | City Manager's Office | ⟩ Visible mold growth and elevated moisture were observed on gypsum wallboard behind baseboards on the north and west walls.<br>⟩ Water staining was observed on the carpet along the west side of the floor. | 15 ft.$^2$ Moderate to Heavy | 50 ft.$^2$ | ≤3.4% gyp | 7-9 | **IA3**<br>**TL-04**<br>**TL-05** |
| C | NE Storage | ⟩ Visible mold growth was observed on gypsum wallboard behind baseboards on the north and west walls in the northwest corner.<br>⟩ Water staining was observed on the sheet vinyl along the west side of the floor. | 2 ft.$^2$ Moderate to Heavy | 2 ft.$^2$ | ≤0.2% gyp | 10-11 | \ |
| D | Throughout South Side of Building | ⟩ Minor water staining on wood window sills. | \ | 2 ft.$^2$ | ≤0.3% gyp<br>≤10.1% wood | \ | IA2 |

| Table 1: Observations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Ref #** | **Functional Area/Location** | **Observations/History** | **Area of Mold[a]** | **Area of Moisture[b]** | **Moisture Readings[c]** | **Photo #[d]** | **Sample #[d]** |
| E | Exterior/Outdoors | ) Sealant applied to the CMU block at the north and west sides of the building.<br>) Water staining and efflorescence observed on the CMU block on the west side of the building. | \ | \ | \ | 12 | OA1<br>OA2 |

**Notes:**
[a] Estimated total surface area of mold growth actually observed and mold growth intensity (light, moderate or heavy).
[b] Estimated total cross-sectional area of moisture impact actually observed (i.e., staining/damage, elevated moisture meter readings, visible moisture).
[c] Moisture meter readings and substrate.
[d] Refer to photo and laboratory report appendices.

# Table 2: Mold Growth Conclusions & Repair Recommendations

| Table 2: Mold Growth Conclusions & Repair Recommendations | | | | | |
|---|---|---|---|---|---|
| **#** | **Mold Growth Location, Description & Reasoning** | **Mold Growth[a]** | **Repair Level[b]** | **Repair Detail** | **Preliminary Cause[c]** |
| 1 | **Building Department Office**<br><br>Mold growth is present on wood wall paneling behind baseboards on the north and east walls in the northeast corner.<br><br>Mold growth is present on the east window frame.<br><br>Water staining is present on the vinyl floor tiles along the east side of the floor.<br><br>Water staining is present on cardboard contents.<br><br>Water staining is present on the wood surrounding a skylight above the ceiling tiles.<br><br>There is the potential for additional mold growth behind cabinets and furnishings along the north and east walls.<br><br>There is the potential for additional mold growth inside the north and east wall cavities.<br><br>These conclusions are supported by visual observations and results of fungal tape lift sampling. | **Suspected Potential**<br>17 ft.$^2$<br>Moderate to Heavy | M2/MT | ) Discard cardboard contents exhibiting water damage.<br>) Abrasively clean the metal window frame.<br>) Consider removal of the water damaged floor tile.<br>) Move cabinets and furnishings away from the north and east walls and inspect for additional mold growth and/or water damage.<br>) Remove the wood paneling from the length of the north wall and the north side of the east wall.<br>) Following removal of the north and east walls, inspect the wall cavities for additional mold growth.<br>) If additional mold growth is identified during removal, continue removal and cleaning to at least 18 in. past mold growth.<br>) Following removal, HEPA vacuum and wet wipe all horizontal and vertical surfaces in and around the work area. | Suspected water intrusion through exterior |

| Table 2: Mold Growth Conclusions & Repair Recommendations | | | | | |
|---|---|---|---|---|---|
| **#** | **Mold Growth Location, Description & Reasoning** | **Mold Growth[a]** | **Repair Level[b]** | **Repair Detail** | **Preliminary Cause[c]** |
| 2 | **City Manager's Office**<br><br>Mold growth is present on gypsum wallboard behind baseboards on the north and west walls.<br><br>Water staining is present on the carpet along the west side of the floor.<br><br>There is the potential for additional mold growth behind cabinets and furnishings along the north and west walls.<br><br>There is the potential for additional mold growth inside the north and west wall cavities.<br><br>These conclusions are supported by visual observations and results of fungal tape lift sampling. | **Suspected Potential**<br>15 ft.$^2$<br>Moderate to Heavy | M2/MT | ) Consider removal of the water damaged carpet.<br>) Move cabinets and furnishings away from the north and east walls and inspect for additional mold growth and/or water damage.<br>) Remove the gypsum wallboard from the length of the north and west walls, to a height of approximately 2 ft.<br>) Following removal of the north and west walls, inspect the wall cavities for additional mold growth.<br>) If additional mold growth is identified during removal, continue removal and cleaning to at least 18 in. past mold growth.<br>) Following removal, HEPA vacuum and wet wipe all horizontal and vertical surfaces in and around the work area. | Suspected water intrusion through exterior |

| Table 2: Mold Growth Conclusions & Repair Recommendations | | | | | |
|---|---|---|---|---|---|
| **#** | **Mold Growth Location, Description & Reasoning** | **Mold Growth[a]** | **Repair Level[b]** | **Repair Detail** | **Preliminary Cause[c]** |
| 3 | **NE Storage**<br><br>Mold growth is present on gypsum wallboard behind baseboards on the north and west walls.<br><br>Water staining is present on the sheet vinyl along the west side of the floor.<br><br>There is the potential for additional mold growth behind cabinets and furnishings along the north and west walls.<br><br>There is the potential for additional mold growth inside the north and west wall cavities.<br><br>These conclusions are supported by visual observations and results of fungal tape lift sampling. | **Suspected Potential** 15 ft.$^2$ Moderate to Heavy | M2/MT | ) Consider removal of the water damaged sheet vinyl.<br>) Remove the gypsum wallboard from the length of the north and west walls in the northwest corner, to a height of approximately 2 ft.<br>) Following removal of the north and west walls, inspect the wall cavities for additional mold growth.<br>) If additional mold growth is identified during removal, continue removal and cleaning to at least 18 in. past mold growth.<br>) Following removal, HEPA vacuum and wet wipe all horizontal and vertical surfaces in and around the work area. | Suspected water intrusion through exterior |
| 4 | **General surfaces and air.**<br><br>Contamination of surfaces and air throughout the north side of the building (1980's addition) is suspected.<br><br>This conclusion is based on the results of spore trap air samples in conjunction with visual observations. | **Suspected** | MC | ) Clean horizontal and vertical surfaces in place.<br>) Wet-wipe hard, non-porous surfaces.<br>) HEPA vacuum soft, porous surfaces.<br>) Launder or dry-clean textiles.<br>) Consider the use of HEPA filtered negative air machines to additionally scrub the air in the area. | Mold growth |

**Notes:**
[a] Conclusion regarding presence of mold growth/contamination (**Suspected**, **Potential**, **Not Suspected**), total surface area of mold growth anticipated (visible and hidden) and anticipated mold growth intensity (light, moderate, heavy).
[b] Refer to appendix containing FACS General Mold Remediation Guidelines for description of work practices and guidance documents.
[c] Preliminary cause of moisture intrusion and mold growth based upon general observations. Construction related causal factors should be confirmed by an appropriately qualified building professional.

# Appendix A
## Photographs

Photo #1: Building Department Office – Mold growth on wood wall paneling.

Photo #2: Building Department Office – Mold growth on window frame.

Photo #3: Building Department Office – Water staining/damage on vinyl floor tile.

Photo #4: Building Department Office – Water staining/damage on vinyl floor tile.

Photo #5: Building Department Office – Water staining/damage on cardboard contents.

Photo #6: Building Department Office – Water staining on wood around skylight above ceiling tile.

Photo #7: City Manager's Office – Mold growth on gypsum wallboard

Photo #8: City Manager's Office – Water staining on carpet.

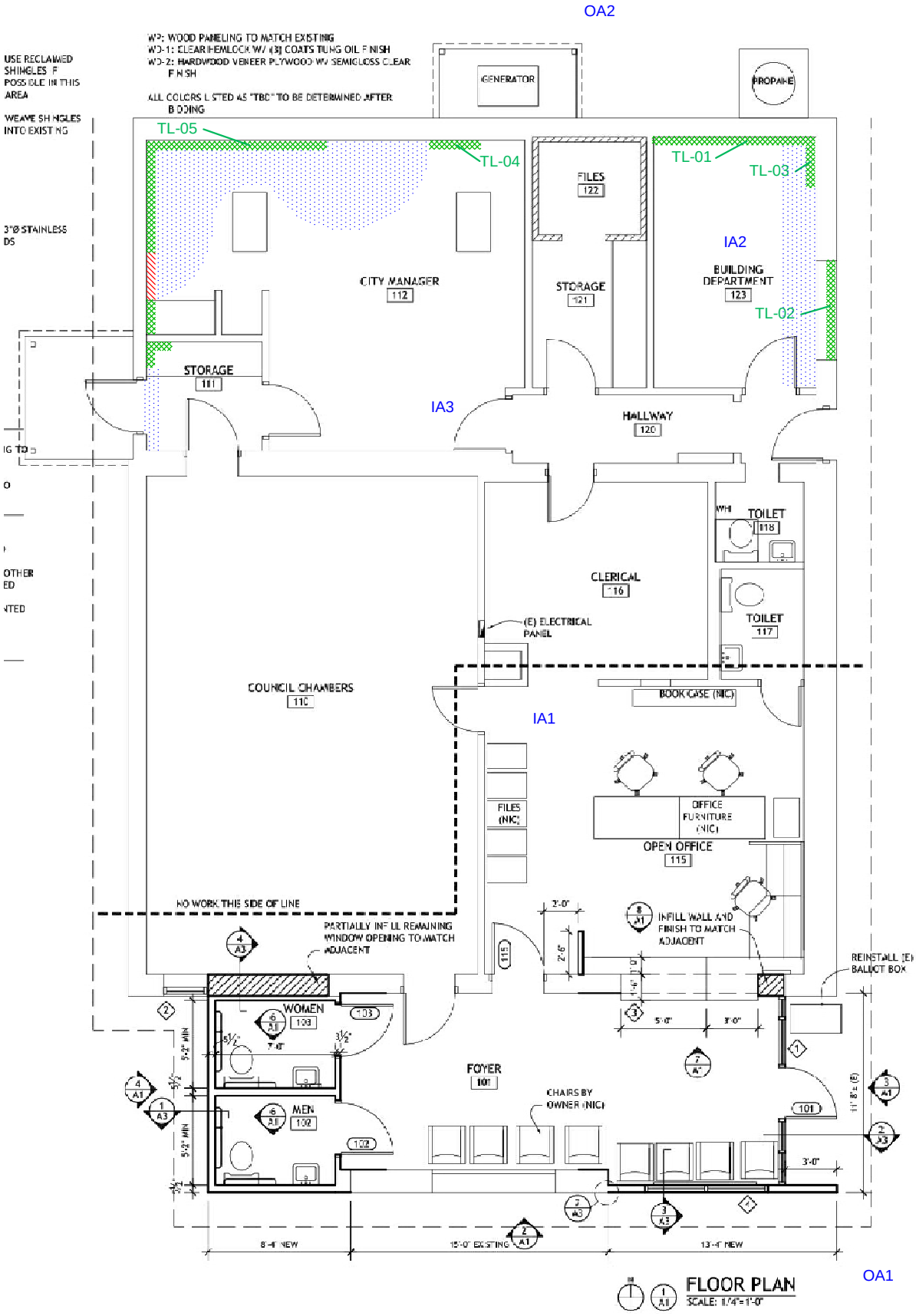
Photo #9: City Manager's Office – Water staining on carpet.

Photo #10: NE Storage – Mold growth on gypsum wallboard.

Photo #11: NE Storage – Water staining on sheet vinyl.

Photo #11: West Elevation – Efflorescence on CMU block.

# Appendix B
## Floor Plan




Visible Mold Growth and Elevated Moisture or Staining on Gypsum Wallboard

Water Damage on Gypsum Wallboard

Water Damage on Flooring (Carpet or Sheet Vinyl)

TL# Bulk Sample Locations

OA/IA# Air Sample Locations


Forensic Analytical
www. forensicanalytical.com
17400 SW Upper Boones Ferry Road, Suite 245
Durham, Oregon 97224
503.595.1001
503.595.1006


City of Manzanita
City Hall
Mold Growth &
Water Damage Locations

REVISIONS

CLIENT: City of Manzanita
PROJECT: City Hall
LOCATION: 543 Laneda Avenue
Manzanita, OR 97130

PROJECT: PJ33256

DATE: 04/18/17
DRN. BY: RASY
PAGE #: 1 of 1

# Appendix C
## Sampling Results Summary & Laboratory Reports

Sampling results are summarized in the table below. Supporting laboratory reports and chain of custody forms are attached in the pages that follow in order of laboratory report number.

| **Spore Trap Air Samples (Lab Report # F119419)** | | | |
|---|---|---|---|
| **Sample Number** | **Location** | **Summary of Comparison to Controls** | |
| | | **Types** | **Concentrations** |
| IA1 | South Side of the Building | **substantially different than (*Penicillium/Aspergillus*)** | **substantially greater than (*Penicillium/Aspergillus*)** |
| IA2 | Building Department Office | approximately the same | moderately greater than (*Penicillium/Aspergillus*) |
| IA3 | City Manager's Office | **substantially different than (*Penicillium/Aspergillus*)** | **substantially greater than (*Penicillium/Aspergillus*)** |
| OA1 | Exterior, NW elevation near entrance | control sample | control sample |
| OA2 | Exterior, south of building | control sample | control sample |
| ***Note:*** *Findings in bold considered elevated.* | | | |

| **Surface Tape Lift Samples (Lab Report # F119420)** | | | |
|---|---|---|---|
| **Sample Number** | **Location** | **Substrate** | **Summary Finding** |
| TL-01 | Building Department Office, north wall | Wood paneling | **Abundant *Ulocladium,* Hyphae** |
| TL-02 | Building Department Office, east window frame | Metal | **Abundant Hyphae** |
| TL-03 | Building Department Office, east wall | Wood paneling | **Abundant *Aureobasidium*** |
| TL-04 | City Manager's Office, northeast corner, north wall baseboard | Wood | **Abundant/Major *Penicillium/Aspergillus,* Hyphae** |
| TL-05 | City Manager's Office, northwest corner, north wall behind baseboard | Gypsum wallboard | **Abundant/Major *Penicillium/Aspergillus, Stachybotrys,* Hyphae** |
| ***Note:*** *Findings in bold considered confirmation of mold growth.* | | | |

# Non-Viable Air Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119419
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Allergenco-D
**Analysis:** Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

| **Lab Number** | **40167130** | | | | **40167131** | | | | **40167132** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **PJ33256-033117-OA1** | | | | **PJ33256-033117-IA1** | | | | **PJ33256-033117-IA2** | | | |
| **Location** | Ext., S of building | | | | S side of bldg. ( open offices, clerical, courtroom ) | | | | NE office (building department) | | | |
| **Sample Date** | 03/31/17 | | | | 03/31/17 | | | | 03/31/17 | | | |
| **Volume** | 75.0 L | | | | 75.0 L | | | | 75.0 L | | | |
| **Organism** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** |
| Ascospores | **4** | **5** | **32** | **130** | **1** | **1.7** | **32** | **32** | **1** | **2.2** | **32** | **32** |
| Basidiospores | **76** | **95** | **32** | **2,500** | **24** | **41.4** | **32** | **780** | **40** | **86.9** | **32** | **1,300** |
| Chaetomium | ND | **-** | **-** | **ND** | ND | **-** | **-** | **ND** | ND | **-** | **-** | **ND** |
| Cladosporium | ND | **-** | **-** | **ND** | **1** | **1.7** | **32** | **32** | ND | **-** | **-** | **ND** |
| HYPHAL FRAGMENTS * | ND | **-** | **-** | **ND** | **4** | **-** | **32** | **130** | ND | **-** | **-** | **ND** |
| Penicillium / Aspergillus | ND | **-** | **-** | **ND** | **32** | **55.2** | **32** | **1,000** | **5** | **10.9** | **32** | **160** |
| **Total** | 80 | | | 2,600 | 58 | | | 1,900 | 46 | | | 1,500 |
| **Particulate Density** | **Minor** | | | | **Major** | | | | **Major** | | | |
| **Comments** | | | | | | | | | | | | |



3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

# Non-Viable Air Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119419
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Allergenco-D
**Analysis:** Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

| **Lab Number** | **40167133** | | | | **40167134** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample ID** | **PJ33256-033117-IA3** | | | | **PJ33256-033117-OA2** | | | | | | | |
| **Location** | NW offices (city manager, hallway) | | | | Ext., N of bldg. | | | | | | | |
| **Sample Date** | 03/31/17 | | | | 03/31/17 | | | | | | | |
| **Volume** | 75.0 L | | | | 75.0 L | | | | | | | |
| **Organism** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** | **Spores[+]** | **%** | **LOD** | **S/m$^3$** |
| Ascospores | **1** | **1.2** | **32** | **32** | **2** | **3.8** | **32** | **65** | | | | |
| Basidiospores | **21** | **25.6** | **32** | **680** | **49** | **93.5** | **32** | **1,600** | | | | |
| Chaetomium | ND | **-** | **-** | **ND** | **1** | **0.8** | **13** | **13** | | | | |
| Cladosporium | ND | **-** | **-** | **ND** | ND | **-** | **-** | **ND** | | | | |
| HYPHAL FRAGMENTS * | **5** | **-** | **32** | **160** | ND | **-** | **-** | **ND** | | | | |
| Penicillium / Aspergillus | **60** | **73.2** | **32** | **1,900** | **1** | **1.9** | **32** | **32** | | | | |
| **Total** | 82 | | | 2,700 | 53 | | | 1,700 | | | | |
| **Particulate Density** | **Minor** | | | | **Minor** | | | | | | | |
| **Comments** | | | | | | | | | | | | |



3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

# Non-Viable Air Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119419
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Allergenco-D
**Analysis:** Direct Microscopy; FALI Method IAQ 101; Modified ASTM D7391
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

**Explanations:**

| | |
|---|---|
| Spores$^{+}$ | Actual number of spores counted in portion of sample examined |
| % | Percent of Total |
| LOD | Limit of Detection (Units are the same as result units) |
| S/m$^{3}$ | Spores per cubic meter of air sampled |
| Spores/S | Number of spores per sample |
| * | Not included in Totals Calculations |
| ND | None Detected |
| Particulate Density | Amount of background particulate present |
| - | Not Applicable |

**Background Particulate Density Estimated As Follows:**

| | |
|---|---|
| Trace | Very little present |
| Minor | Present but not in large quantity |
| Major | Present in most of sample |
| Abundant | Covering almost entire sample |
| Overloaded | Covering entire sample |

**Guidelines For Interpretation:**

No accepted quantitative regulatory standards currently exist by which to assess the health risks related to mold exposure. Molds have been associated with a variety of health effects and sensitivity varies from person to person.

Several organizations, including: the American Conference of Governmental Industrial Hygienists (ACGIH); the American Industrial Hygiene Association (AIHA); the Indoor Air Quality Association (IAQA); the United States Environmental Protection Agency (USEPA); the Centers for Disease Control (CDC), as well as the California Department of Health Services (CADHS), have all published guidelines for assessment and interpretation of mold resulting from water intrusion in buildings.

FALI reports solely the organisms observed on the sample(s). The limit of detection is based on observing one spore/colony per area analyzed. This is not an inclusive list of the fungal types identified in the microbiology laboratory.

**Nick Hopkins, Microbiology Laboratory Supervisor, Hayward Laboratory**





3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

# FACS — MICROBIAL AIR SAMPLING C.O.C. FORM

| | | | | |
|---|---|---|---|---|
| **Sampled by:** PMW | **PM:** Robin Sharpe | **Date:** 3/31/17 | **Page:** 1 of 1 | |
| **FACS I.D./Client #:** PE21 FACS Portland | **Analysis Req.:** ☒ NVA / ☐ Other: | ☐ 1-Day | ☒ 3-Day | ☐ Other |
| | | ☐ 2-Day | ☐ 5-Day | |
| **Job #:** PJ33256 | **Client Name/Job Description:** City of Manzanita<br>City of Manzanita - City Hall Initial Mold | | | |
| **Client #:** C18050 | **Job ID/Site:** PJ33256 City of Manzanita<br>543 Laneda Avenue<br>Manzanita OR 97130 | **Calibrator & SN:** 99291 | **Lab Instructions/Notes:** E-mail results to portland@forensicanalytical.com | |

| Sample Number | Location (& Activity) | Start Flow / Stop Flow | Start Time / Stop Time | Total Time | Total Volume | Media / # / Exp. Date | Wind / Weather | HVAC / Windows |
|---|---|---|---|---|---|---|---|---|
| PJ33256- 033117- OA1 | Ext, S of Building | 15Lpm / 15Lpm | 12:02 / 12:07 | 5m | 75L | 1951457 / 01/2018 | ☒L☐M☐H / Sunny | ☐On ☐Off / ☐Open ☐Closed |
| IA1 | S side of Bldg (open office, central, entrance) | | 12:15 / 12:20 | | | 1951462 / 01/2018 | ☐L☐M☒H | ☒On ☐Off / ☐Open ☒Closed |
| IA2 | NE office (Building Department) | | 12:23 / 12:28 | | | 1951463 / 01/2018 | ☐L☐M☒H | ☒On ☐Off / ☐Open ☒Closed |
| IA3 | NW offices (City manager, Hallway) | | 12:31 / 12:36 | | | 1951464 / 01/2018 | ☐L☐M☒H | ☒On ☐Off / ☐Open ☒Closed |
| OA2 | Ext, NOT Bldg | | 13:59 / 14:04 | | | 1951465 / 01/2018 | ☒L☐M☐H / cloudy | ☐On ☐Off / ☐Open ☐Closed |
| | | | | | | | ☐L☐M☐H | ☐On ☐Off / ☐Open ☐Closed |
| | | | | | | | ☐L☐M☐H | ☐On ☐Off / ☐Open ☐Closed |
| | | | | | | | ☐L☐M☐H | ☐On ☐Off / ☐Open ☐Closed |
| | | | | | | | ☐L☐M☐H | ☐On ☐Off / ☐Open ☐Closed |
| | | | | | | | ☐L☐M☐H | ☐On ☐Off / ☐Open ☐Closed |

**Sample naming:** OA=outside air, IA=inside air, WC=wall cavity. **Weather:** Sun, cloud, fog, rain, snow. **Wind:** Low (still to light breezes), Moderate (occasional gusts, some particulate suspension), High (sustained suspension of particulate & debris).

| | | | |
|---|---|---|---|
| **Relinquished by:** | **Date & Time:** 3/31/17 17:30 | **Received by:** | **Date & Time:** |
| **Relinquished by:** | **Date & Time:** | **Received by:** | **Date & Time:** |

APR 03 2017

Revised 10/11/13

MMF.06.v03

# Non-Viable Bulk Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119420
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Tape Lift
**Analysis:** Direct Microscopy - Qualitative (visual area estimation); FALI Method IAQ 102
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

| **Lab Number** | **40167135** | **40167136** | **40167137** |
|---|---|---|---|
| **Sample ID** | **PJ33256-TL-01** | **PJ33256-TL-02** | **PJ33256-TL-03** |
| **Location** | NE Offices (Building Department), N Wall, Wood Paneling | NE Offices (Building Department), E Window Frame (Metal) | NE Offices (Building Department), E Wall At Base (Wood) |
| **Sample Date** | 03/31/17 | 03/31/17 | 03/31/17 |
| **Organism** | **Relative Density** | **Relative Density** | **Relative Density** |
| Aureobasidium | ND | ND | **Abundant** |
| Basidiospores | **Minor** | ND | ND |
| Cladosporium | ND | **Minor** | ND |
| HYPHAE | **Major** | **Abundant** | **Minor** |
| Penicillium / Aspergillus | ND | ND | ND |
| Stachybotrys | ND | ND | ND |
| Ulocladium | **Abundant** | ND | ND |
| **Particulate Density** | **Minor** | **Abundant** | **Minor** |
| **Comments** | Insect parts observed. Dust mites present. | Dust mites present. Insect parts observed. | Dust mites present. Insect parts observed. |



3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

Forensic Analytical Laboratories

# Non-Viable Bulk Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119420
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Tape Lift
**Analysis:** Direct Microscopy - Qualitative (visual area estimation); FALI Method IAQ 102
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

| Lab Number | 40167138 | 40167139 | |
|---|---|---|---|
| **Sample ID** | **PJ33256-TL-04** | **PJ33256-TL-05** | |
| **Location** | NW Offices (City Manager), N Wall At NE Corner Off BB (Wood) | NW Offices (City Manager), N Wall at NW Corner, Behind BB (DW) | |
| **Sample Date** | 03/31/17 | 03/31/17 | |
| **Organism** | **Relative Density** | **Relative Density** | **Relative Density** |
| Aureobasidium | ND | ND | |
| Basidiospores | ND | ND | |
| Cladosporium | ND | ND | |
| HYPHAE | **Major** | **Major** | |
| Penicillium / Aspergillus | **Abundant** | **Abundant** | |
| Stachybotrys | **Trace** | **Abundant** | |
| Ulocladium | ND | ND | |
| **Particulate Density** | **Abundant** | **Abundant** | |
| **Comments** | Aspergillus phialides observed. | Dust mites present. Aspergillus phialides observed. | |



3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

Forensic Analytical Laboratories

# Non-Viable Bulk Fungal Analysis

Forensic Analytical Consulting Svcs
Robin Sharpe
17400 SW Upper Boones Ferry Rd
Suite 245
Durham, OR 97224

**Client ID:** PE21
**Report Number:** F119420
**FALI Job ID:** PE21
**Date Received:** 04/03/17
**Date Analyzed:** 04/06/17
**Date Printed:** 04/06/17
**First Reported:** 04/06/17

**Sample Type:** Tape Lift
**Analysis:** Direct Microscopy - Qualitative (visual area estimation); FALI Method IAQ 102
**Job ID / Site:** PJ33256; City of Manzanita, 543 Laneda Avenue, Manzanita OR 97130

**Total Samples Submitted:** 5
**Total Samples Analyzed:** 5

**Explanations:**

| | |
|---|---|
| Relative Density | Relative amount of fungi present |
| ND | None Detected |
| Particulate Density | Amount of background particulate present |
| - | Not Applicable |

**Density Estimated As Follows:**

| | |
|---|---|
| Trace | Very little present |
| Minor | Present but not in large quantity |
| Major | Present in most of sample |
| Abundant | Covering almost entire sample |
| Overloaded | Covering entire sample |

**Guidelines For Interpretation of Non-Viable Bulk Results:**

No accepted quantitative regulatory standards currently exist by which to assess the health risks related to mold exposure. Molds have been associated with a variety of health effects and sensitivity varies from person to person.

Several organizations, including: the American Conference of Governmental Industrial Hygienists (ACGIH); the American Industrial Hygiene Association (AIHA); the Indoor Air Quality Association (IAQA); the United States Environmental Protection Agency (USEPA); the Centers for Disease Control (CDC), as well as the California Department of Health Services (CADHS), have all published guidelines for assessment and interpretation of mold resulting from water intrusion in buildings.

FALI reports solely the organisms observed on the sample(s). The limit of detection is based on observing one spore/colony per area analyzed. This is not an inclusive list of the fungal types identified in the microbiology laboratory.

**Nick Hopkins, Microbiology Laboratory Supervisor, Hayward Laboratory**





3777 Depot Road, Suite 409, Hayward, CA 94545 / Telephone: (510) 887-8828 (800) 827-FASI / Fax: (510) 887-4218

**FACS**

# MICROBIAL SURFACE/BULK C.O.C FORM



| | | | |
|---|---|---|---|
| Client: | **PE21 FACS Portland**<br>**City of Manzanita** | Sampled by: PMW | PM: **Robin Sharpe** Date: 3/31/17 |
| Contact: | **Robin Sharpe** Phone: **(503) 595-1001** | Analysis Req.: ☐ MEA ☐ DG-18 ☒ NVB ☐ 1-Day ☒ 3-Day ☐ Other<br>☐ CMA ☐ TSA ☐ ☐ 2-Day ☐ 5-Day | |
| Site: | **City of Manzanita**<br>**543 Laneda Avenue**<br>**Manzanita OR 97130** | Calibration & SN: | Lab Instructions/Notes: E-mail results to portland@forensicanalytical.com |
| Client No.: | **C18050** | **FACS Job #:** **PJ33256** | |

| Sample Number | Location (& Substrate) | Start Flow / Stop Flow | Start Time / Stop Time | Total Time | Total Area | Media / # Expiration Date | Accum. Activity | House Keeping |
|---|---|---|---|---|---|---|---|---|
| PJ33256- TL-01 | NE offices (Building Department), N wall, wood paneling (wood) | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| TL-02 | " " ( " " ), E window frame (metal) | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| TL-03 | " " ( " " ), E wall at door (wood) | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| TL-04 | NW offices (City Manager), N wall at NE corner, Ob BB (wood) | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| TL-05 | " " ( " " ), N wall at NW corner, behind BB (Dw) | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| | | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| | | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| | | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| | | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |
| | | | | | | | ☐H ☐L ☐H ☐L | ☐G ☐F ☐P |

**Sampling Naming:** T=Tape Lift, S=Swab, M=Microvac, B=Bulk. **Accumulation & Activity:** High or Low. **Housekeeping:** Good (no visible loading, light loading on surface wipe). Fair (minor visible loading, loading on surface wipe). Poor (heavy loading)

| | | | |
|---|---|---|---|
| *Relinquished by:* | *Date & Time:* 3/31/17 17:30 | *Received by:* | *Date & Time:* |
| *Relinquished by:* | *Date & Time:* | *Received by:* | *Date & Time:* |

RECEIVED APR 03 2017

# Appendix D
## FACS Data Collection Methodology

*Non-Viable Air Sampling*. Air samples are collected using an Allergenco D spore trap sampling cassette and portable high volume sampling pump. The sampling train is calibrated in the field to approximately 15 liters per minute with a target collection sample volume between 75 liters and 150 liters depending on the anticipated concentration of fungal spores or particulate matter in the air. The air samples are labeled with unique samples numbers and information recorded on field chain of custody forms.

*Tape Lift Surface Sampling*. Transparent adhesive tape is pressed onto a surface with suspected fungal growth or contamination. The tape is gently lifted off of the surface and affixed to a clean microscope slide. The surface samples are labeled with unique samples numbers and information recorded on field chain of custody forms.

All collected samples were shipped to Forensic Analytical Laboratories, Inc. for analysis, following appropriate chain of custody procedures. The laboratory is accredited by the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC in the Environmental Microbiology LAP (EMLAP).

*Moisture Meter Readings*. The moisture content of various building substrates was evaluated using a direct reading instrument. Forensic Analytical routinely uses a Delmhorst BD 2100 moisture meter. The BD 2100 is capable of measuring the moisture content of wood, concrete/plaster and wallboard using preset factory scales.

*Q-Trak.* Indoor air comfort parameters are collected using a direct-reading, portable, indoor air quality monitor (TSI® Q-Trak™). Measurements of relative humidity (rH%) and temperature, were taken in survey mode and recorded manually.

# Appendix E
## FACS General Mold Remediation Guidelines

# FACS General Mold Remediation Guidelines

*Rev. 3/14/16*

**CONTENTS**



## GLOBAL MOLD REMEDIATION GUIDELINES

1. *General Practices*. All work, which may result in the disturbance of mold growth or contamination, should be performed using work practices that minimize the disturbance of affected materials and dispersion of mold spores. Measures should also be taken to protect the health and safety of individuals performing remediation activities. At a minimum, work should be performed in accordance with the following guidelines addressing mold/water intrusion remediation:

   - Environmental Protection Agency. (September 2008). *Mold Remediation in Schools and Commercial Buildings*. EPA 402-K-01-001**.**
   - New York City Department of Health. (November 2008). *Guidelines on Assessment and Remediation of Fungi in Indoor Environments.*
   - U.S. Department of Labor Occupational Safety and Health Administration (November 8, 2013). Safety *and Health Information Bulletin: A Brief Guide to Mold in the Workplace*. SHIB 03-10-10.
   - American Industrial Hygiene Association. (2008*). Recognition, Evaluation and Control of Indoor Mold.* IMOM08-679*.*
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC 500 Standard and Reference Guide for Professional Water Damage Restoration.* Fourth edition.
   - Institute of Inspection, Cleaning and Restoration Contractors*. (2015). IICRC S520 Standard and Reference Guide for Professional Mold Remediation.* Third edition.

2. *Material Removal*. In the course of removing building materials, bulk quantities of visible mold growth shall be removed from all wood structural members or other materials. Materials should be cleaned or removed 18 inches past visible mold growth unless otherwise specified.

3. *Regulated Materials*. Prior to commencing remediation activities, building materials that may be disturbed should be assessed for asbestos and lead-based paint hazards per applicable regulations.

4. *Sources of Moisture*. Mold growth is most frequently caused by a failure to adequately control moisture. Thus, whenever mold remediation is performed, measures should be taken to correct the conditions resulting in excess moisture and mold growth.

## GENERAL PROCEDURES

### M0: General Procedures for De Minimus Mold Remediation

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≤1 ft.$^2$ of mold growth.
  - Surface cleaning of areas with light or minimal mold spore deposition/contamination.
  - Typical housekeeping activities.
- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - None required.
- ***Work Practices***
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Visual confirmation of removal of growth.

### M1: General Procedures for Small Scale Mold Remediation

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of >1 to <10 ft.$^2$ of mold growth.
  - Aggressive removal of materials with ≤1 ft.$^2$ of dense mold growth, or <10 ft.$^2$ of sparse mold growth.
  - General construction dust control for removal of building materials.
- ***Personal Protective Equipment***
  - N-95 disposable respirator, gloves and eye protection.
- ***Containment Provisions***
  - Cover the immediate work area with plastic sheeting.
  - A floor to ceiling plastic barrier should be erected to further isolate the work area if greater than approximately 5 ft. of material is being aggressively removed (e.g., removal of drywall).
  - Ensure ventilation provisions in the area are turned off.
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth and for general dust suppression (e.g., HEPA vacuum positioned at the point of operation/removal and misting).
  - If removal cannot be accomplished without significant disturbance of mold growth or more extensive mold growth is encountered, then work should stop and medium or large scale remediation procedures should be implemented.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area and immediately adjacent surfaces using a HEPA vacuum or wet-wiping.

- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

**M2: General Procedures for Medium Scale Mold Remediation**

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of 10 to <100 ft.$^2$ of mold growth.
  - Aggressive removal of materials with >1 to <10 ft.$^2$ of dense mold growth, or 10 to <100 ft.$^2$ of sparse mold growth.
- ***Personal Protective Equipment***
  - ½-face respirator with HEPA filters, gloves, disposable coveralls and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 1 layer of plastic sheeting configured with a slit entry and covering flap.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust out of the work area with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

**M3: General Procedures for Large Scale Mold Remediation**

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Surface cleaning and non-aggressive removal of ≥100 ft.$^2$ of mold growth.

  - Aggressive removal of materials with ≥100 ft.$^2$ of dense or sparse mold growth.
- ***Personal Protective Equipment***
  - Full-face respirator with HEPA filters, gloves, disposable coveralls with head and foot coverings and goggles. Consider the use of HEPA/organic vapor combination cartridges if strong musty odors are present.
- ***Containment Provisions***
  - Isolate the work area from the surrounding environment using 2 layers of plastic sheeting configured with a decontamination area between two slit entries with covering flaps.
  - Seal all penetrations to surrounding areas using plastic and tape (e.g., outlets, light switches, ventilation grills).
  - Negatively pressurize the work area and exhaust to the outdoor environment with HEPA filtration.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean surfaces using a HEPA vacuum or dust suppression methods (e.g., misting).
  - Remove materials using methods to minimize the disturbance of growth to the extent feasible.
  - All contaminated materials should be removed from the work area in a sealed plastic bag.
  - Following removal of mold growth, clean the work area, immediately surrounding area, and worker egress pathways using a HEPA vacuum or wet-wiping.
  - Mist surface and wet-wipe in a manner that minimizes disturbance of growth.
- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.
  - Containment provisions remain in place until the work areas has passed the assessment criteria.

**MC: General Procedures for Removal of Mold Spore Contamination/Deposition**

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Removal of secondary mold spore deposition from surfaces and contents resulting from the presence of mold growth reservoirs in the shared environment.
  - Note: Areas of light or minimal contamination may be cleaned in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of contamination.
- ***Containment Provisions***
  - Not generally required, however conditions of severe contamination may necessitate containment provisions depending on conditions in surrounding environments.
- ***Work Practices***
  - Remediation performed by professional mold remediation contractors with appropriate training and experience in mold remediation practices.
  - Clean horizontal and vertical surfaces in place.

- Wet-wipe hard, non-porous surfaces.
- HEPA vacuum soft, porous surfaces. Disposal of porous materials exhibiting growth may be necessary.
- Launder or dry-clean textiles.
- Consider use of HEPA filtered negative air machines to purge or scrub the air in the area.

- ***Post-Remediation Assessment***
  - Assessment performed by a professional mold consultant with appropriate training and experience.
  - Visual confirmation of removal of growth and absence of contamination and debris.
  - Collection and evaluation of air and surface samples as appropriate to support visual inspection.

**ME: General Procedures for Exterior Mold Remediation**

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Cleaning of ≥10 ft.$^2$ of mold growth from exterior surfaces.
  - General construction dust control for the exterior removal of building materials.
  - Note: Cleaning of <10 ft.$^2$ of exterior mold growth may be conducted in accordance with procedure M0.
- ***Personal Protective Equipment***
  - Minimum of N-95 disposable respirator, gloves and eye protection. More extensive protective equipment may be appropriate depending on the severity of growth or intensity of removal activities.
- ***Containment Provisions***
  - Prior to commencing work, close all windows and doors in or adjacent to the work area and seal interior window and door penetrations with tape (easy release or painters tape).
  - If removal of exterior building materials is to occur, seal all wall penetrations (i.e., electrical outlets and light switches) and base of wall on the associated interior wall being repaired with tape (easy release or painters tape).
- ***Work Practices***
  - Remediation performed by maintenance/construction personnel with awareness training regarding proper clean up methods, personal protection, and potential health hazards associated with mold. The use of a professional mold remediation contractor may be appropriate depending on the severity of mold growth.
  - Proceed with exterior cleaning or building material removal using dust control methods (e.g., misting).
  - Inspect the back of exposed interior wall systems for evidence of mold growth. If mold growth is observed, proceed with cleaning or removal in accordance with procedures M0-M3 as appropriate.
  - Use a HEPA vacuum to remove excess debris from the wall cavity prior to reconstruction.
- ***Post-Remediation Assessment***
  - Assessment by a designated individual familiar with these procedures and with mold awareness training.
  - Visual confirmation of removal of growth and absence of contamination and debris prior to removal of containment provisions.
  - Materials should be dried and causes of moisture impact controlled to prevent future growth.

## MT: General Procedures for Invasive Inspection for Mold

*The following procedures are provided for general guidance and may be modified as appropriate to address specific conditions on a case-by-case basis. All work should be performed in accordance the aforementioned guideline publications.*

- ***Example Applications***
  - Removal of building materials in areas where there is the potential for mold growth (i.e., the presence of mold growth has not been confirmed).

- ***Personal Protective Equipment***
  - May include the use of an N-95 disposable respirator, gloves and eye protection as appropriate for general construction activities.
- ***Containment Provisions***
  - Follow practices for general construction dust control (see M1 above). No special provisions for controlling mold growth are required.
- ***Work Practices***
  - Remove a small area of building material from the area in question to facilitate visual inspection (e.g., <1ft.$^2$).
  - In the course of removal, proceed in a manner that minimizes disturbance of potential concealed mold growth reservoirs. For example, cut around and gently remove a section of drywall as a single piece rather than demolishing the area with a hammer. A HEPA vacuum nozzle placed at the point of removal may further control potential releases.
  - Continue removal of materials in a stepwise fashion in order to perform desired construction repairs or to determine if any hidden mold growth exists.
  - If mold growth is encountered in the course of removal, immediately stop and proceed in accordance with mold remediation procedures as appropriate (see M0-M3 above).
- ***Post-Remediation Assessment***
  - No assessment is necessary if no mold growth is encountered. If mold growth is encountered, follow the appropriate post-remediation assessment guidelines as discussed in M0-M3 above.

**Right People**

**Right Perspective**

**Right Now**

**www.forensicanalytical.com**