QuES&T

Quality Environmental Solutions & Technologies, Inc.

Limited Visual Moisture/Mold Assessment

Prepared for

Town of Cairo

P.O Box 728,

Cairo, NY 12413

At

Cairo Public Library

15 Railroad Avenue,

Cairo, NY 12413

Conducted by

Quality Environmental Solutions & Technologies, Inc.

1376 Route 9

Wappingers Falls, NY 12590

QuES&T Project # 24-6482

Report Date: January 10, 2025

Project Personnel: Zachary Timpano

Assessor License Numbers: 24-63EYB-SHMO

Date: 1/10/2025

Version: 1.0

Executive Summary

At the request of the Town of Cairo, Quality Environmental Solutions and Technologies, Inc. performed a moisture/mold assessment within the interior areas of the Public Library located at 15 Railroad Avenue, Cairo, NY. The moisture/mold assessment was performed in accordance with Article 32 of the New York State Labor Law (Article 32) to "discover mold, conditions that facilitate mold, indicia of conditions that are likely to facilitate mold or any combination thereof." The assessment of the space was conducted on January 3, 2025 and included a detailed visual inspection.

Based upon the results of the visual inspection, there were areas of visible suspected microbial growth throughout the Library. The primary impacts are installed wood door/window casings, fiberglass pipe insulation, small areas of sheetrock in the men's bathroom and kitchenette soffit, and a some books on the shelves within the main library space. Article 32 defines a mold project as "a mold remediation, mold assessment, or mold abatement, of areas greater than ten square feet, but does not include (a) routine cleaning or (b) construction, maintenance, repair or demolition of buildings, structures or fixtures undertaken for purposes other than mold remediation or abatement." Therefore, based on this definition, and the fact that the individual areas of mold growth were greater than ten (10) contiguous feet. QuES&T did identify a potential mold project within the AOCs at the time of the inspection as defined by Article 32, the facility has been impacted by mold and will require remediation.

1.0 Introduction

Quality Environmental Solutions & Technologies, Inc. was retained by the Town of Cairo to perform a moisture & mold assessment, within the Cairo Public Library located at 15 Railroad Avenue, Cairo, NY. The following report provides a detailed discussion of the assessment and includes recommendations for review and consideration by the Client. Microbial investigations and moisture assessments require the collection of information regarding factors which may have adverse effects on building occupants and/or the environment. Microbial investigations may include, but are not limited to, the following: 1) visual inspection of the building and surrounding area, 2) assessment of Heating, Ventilation and Air Conditioning (HVAC) and other building systems, 3) occupant interviews and/or questionnaires regarding building conditions, 4) collection of environmental samples, and 5) review of building usage activities. This information is carefully reviewed to evaluate the indoor environmental conditions present at the time of the assessment.

The mold assessment performed within the facility was limited to a visual inspection of the accessible interior area as indicated by the client. The visual inspection sought to identify areas of visible suspected microbial growth, water staining, discoloration, efflorescence and other conditions that might adversely impact indoor environmental quality; specifically, in accordance with Article 32 to "discover mold, conditions that facilitate mold, indicia of conditions that are likely to facilitate mold or any combination thereof."

2.0 Investigation Scope

2.1 Visual Inspection

Zachary Timpano (Cert. #24-63EYB-SHMO) of QuES&T conducted a visual inspection of the AOCs, on January 3, 2025. The visual inspection was conducted by QuES&T and included representative locations as directed by the client. The visual inspection sought to identify areas of visible suspected microbial growth, water staining, discoloration, efflorescence and other conditions that might impact indoor environmental quality.

3.0 Visual Inspection Findings

The following observations were made at the time of the inspection as presented below;

- Visible Suspected Microbial Growth (VSMG) was observed on wooden door and window casings in the community room, fiberglass pipe insulation above the ceiling in the kitchenette area as well as on the sheetrock soffit, fiberglass pipe insulation in the community room storage room, on sheetrock in the men's bathroom, as well as a few books in the main library area. Ceiling tiles throughout the space are bowing, which is a sign of prolonged elevated humidity within the space. Approximately twenty (20) square feet of VSMG was noted.

- Heavy dust buildup and light VSMG was noted in the men's bathroom in the diffuser and the surrounding sheetrock as well as on the floor tiles. Signs of moisture damage are present around the diffuser. Additionally, the wood trim along the sheetrock wall in the

men's bathroom had VSMG present. Similarly, the diffuser in the Women's bathroom also has a heavy dust buildup and should be cleaned.

- The issue within the Library appears to stem from elevated humidity within the space. The HVAC system is the likely culprit, and it should be thoroughly inspected to ensure it is functioning properly and scrubbing out humidity as opposed to increasing it. It appears that the community room, kitchen, and bathrooms have been impacted further than the main library space. It is likely that one of the two zones is not functioning as it should.

- Relative humidity should be maintained between 30% and 60% inside buildings, when it is above 60% the conditions are favorable for microbial growth.

- There is evidence of painted tiles visible in the community room, likely a result of ghosting. Ghosting occurs when particulates expelled from the HVAC diffusers land on the neighboring ceiling tiles/surfaces. It is typically dust; however, these are favorable conditions for microbial proliferation so if left it is likely to become a source of microbial growth.

Photo 1.0 VSMG on the sheetrock around the diffuser in the men's bathroom.

Photo 2.0 VSMG on a few books in the North East back corner of the Library.

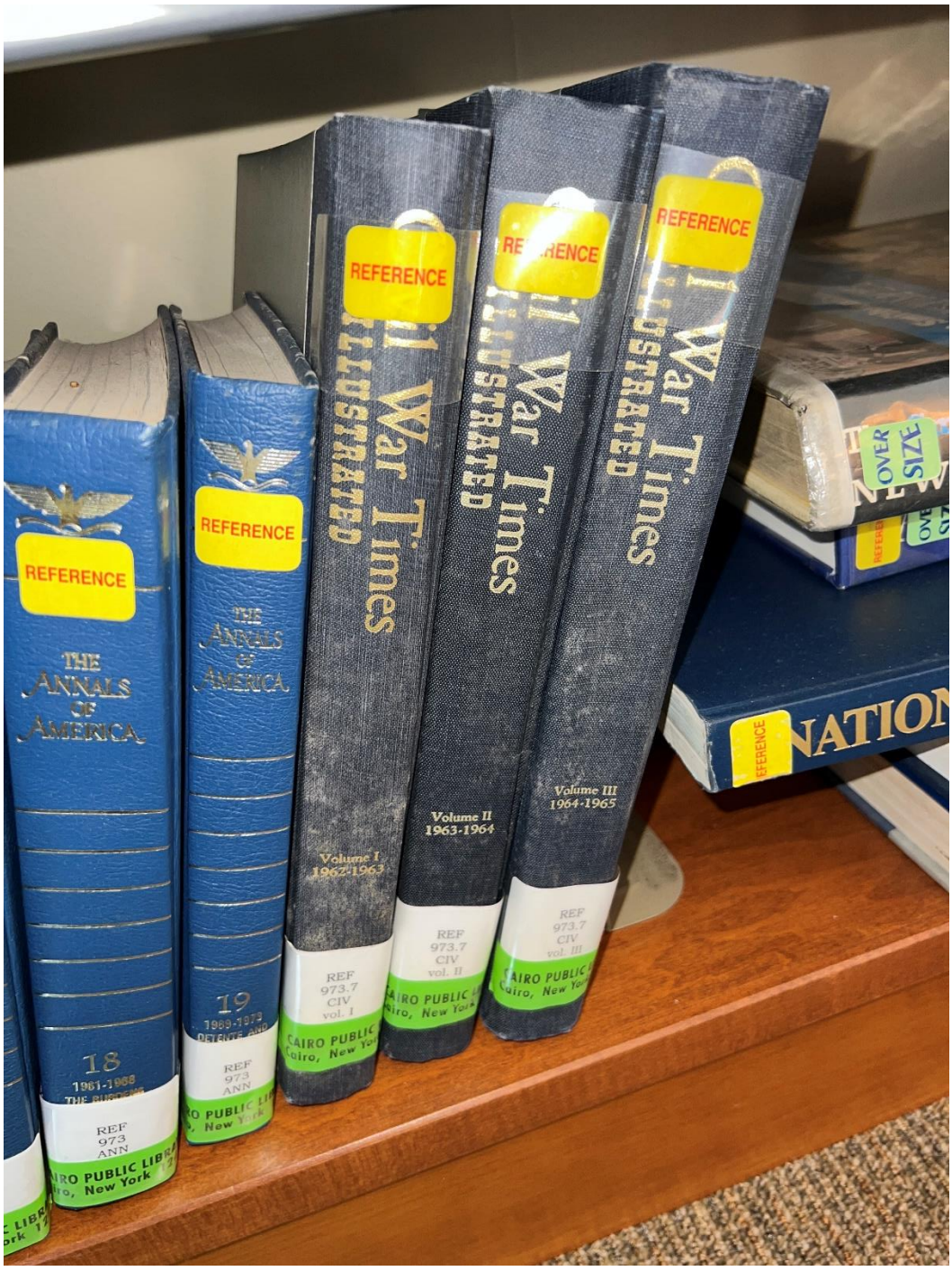

Photo 3.0 VSMG on the door casing leading from the community room into the storage/mechanical room.

Photo 4.0 VSMG on fiberglass pipe insulation above the suspended ceiling in the Kitchenette area.

Photo 5.0 Ceiling tiles are bowing throughout the community room. Evidence of painted tiles visible, likely a result of ghosting.

4.0 Conclusions

Based on the results of the visual inspection, the following conclusions can be made by QuES&T:

- Visible suspected microbial growth (VSMG) was observed on wood door and window casings, on the sheetrock ceiling in the men's bathroom, on fiberglass pipe insulation above the ceiling in the kitchenette area, and on several books in the main library area. Approximately fifty five (55) linear feet of fiberglass pipe insulation was observed, and approximately fifty (50) square feet of growth was observed throughout the Library on the above mentioned items/building materials.

- It appears that the root of the issue stems from the HVAC system. The community room, kitchenette, and bathrooms have been impacted more than the main library section of the building. It is likely one zone that is the main problem. Signs of elevated relative humidity

are present throughout in the form of bowing ceiling tiles, and even delamination of wood door paneling.

- QuES&T believes the cause of this microbial growth is a ventilation issue resulting in excess condensation and relative humidity as opposed to a typical water intrusion.

- In the community room mechanical/storage room a large box of Windex was noted being ran into a PVC line going into the slab.

5.0 Recommendations

The following recommendations are presented to the Town of Cairo for review and consideration.

- Being that the amount of contiguous microbial growth exceeds the ten (10) square foot threshold, a remediation plan will be provided to address the issue.

- QuES&T recommends that the Town of Cairo brings in an HVAC specialist to assess the system and ensure that it is functioning properly. Relative humidity should be maintained between 30% and 60% if necessary supplemental dehumidification should be used. The system should be inspected as soon as possible so that further issues do not arise following remediation.

- Any water stained ceiling tiles should be removed and replaced in the back office areas as well as in the main library area.

- Remediation work techniques should conform with generally accepted industry work practices as outlined in current industry guidelines such as *The New York City Department of Health "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" and IICRC S520 "Standard and Reference Guide for Professional Mold Remediation"* a copy of which can be found below in Appendix B.

- Personnel should be advised to immediately notify building custodial or maintenance personnel upon identification of water leaks or spills affecting building materials or areas.

- Temperature and Relative Humidity should be maintained within the guidelines provided by ASHRAE E-55-2018 to the extent possible. If relative humidity cannot be maintained below 60%, supplemental dehumidification should be used.

- In the future, any water damaged building materials identified within the structure should either be thoroughly dried or removed and replaced, as applicable. The general industry guideline recommends that these actions be completed within 48 hours of the wetting incident.

Report Limitations and Disclaimers

Microbiological organisms are ubiquitous opportunistic allergenic organisms whose concentration is greatly affected by changes in localized ambient environmental conditions. Assessment for microbiological contamination is limited to collection and evaluation of data relating to general ambient environmental conditions, detected as present, at the time of the evaluation. Demolition or disassembly of building surfaces and installed equipment are not performed as part of the evaluation. QuES&T believes this report is based on reliable current industry practices/references/sources and accurately reflects the general conditions existing in the area inspected at the time of our assessment. However, unobserved, or concealed conditions and/or variations in localized ambient environmental conditions may significantly affect reported microbiological contamination levels.

The Parties agree and understand that the presence of mold and the evolving understanding of risks which may be associated with human exposure to certain types of mold represent an area of medical, scientific and industry knowledge which is only beginning to mature and that this area of knowledge at present is, at best, incomplete. The parties agree and understand that mold is mobile; it can arise in new places and recur in areas which have been remediated due to limitations in detection or removal methods (spores are microscopic), limitations in time and cost, new and modified or previously unknown water intrusion and/or accumulation events and processes beyond the control of **QuES&T**. Accordingly, **QuES&T** is not liable for such new or recurring mold growths. Further, due to the microscopic nature of mold spores, it is agreed and understood that ***no warranty or promise that all mold has been identified or removed is made or intended by QuES&T.*** Assessments of water intrusion or accumulation risk by **QuES&T**, if any, are not to be understood as a complete list of potential ways in which water intrusion or accumulation may occur at the Site(s) subject to this Agreement. Client further recognizes the unsettled liability environment surrounding mold. Therefore, as a fundamental incentive to ***Quality Environmental Solutions & Technologies Inc. (QuES&T)*** to undertake the provision of services to Client, Client agrees that **QuES&T** will be deemed to have fully complied with any contractual standards of performance or any legal mandate of non-negligent behavior by providing **QuES&T**'s services. Limitation of Liability shall be the cost of services. Client hereby agrees to indemnify, defend and hold harmless **QuES&T** its joint ventures, affiliates, parent and subsidiary entities and the employees, officers, directors, representatives and agents of ***QuES&T***, and all of the foregoing from and against any and all claims, suits, causes of actions, liabilities, costs (including but not limited to reasonable attorney's fees) and judgments which are based in whole or in part upon (or which sound in) mold-based liability, except to the extent of the sole negligence of **QuES&T** and the other Indemnitees set out immediately preceding, but subject always to the Limitation of Liability. ***NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED HEREBY AND ANY AND ALL OTHER SUCH WARRANTIES ARE HEREBY FULLY AND COMPLETELY DISCLAIMED BY QuES&T."***

Appendix
A
Mold Remediation Plan

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Section 1.0 Introduction

This mold remediation plan has been developed for the Town of Cairo at the Cairo Public Library, located at 15 Railroad Avenue, Cairo, NY based on the results of a mold assessment conducted on January 3, 2025 by Zachary Timpano of QuES&T. The assessment was conducted at the request of the client due to concerns about a suspected microbial growth situation within the Library. A complete copy of the site assessment, including remedial recommendations accompanies this plan.

Section 2.0 Work Locations

As identified in the site assessment report Visible Suspected Microbial Growth (VSMG) was observed within the Library on wood door and window casings in the community room, fiberglass pipe insulation in the storage/mechanical room and above ceiling in the kitchenette, the sheetrock surrounding the diffuser in the men's bathroom, as well as the wood trim along the walls in the bathroom.

Section 3.0 Materials/Surfaces to be Remediated

Based upon the results of the site assessment conducted by QuES&T the following surfaces, materials, or contents within the above referenced spaces should be remediated in accordance with current industry guidelines, including but not limited to the *New York City Department of Mental Health and Hygiene publication "Guidelines on Assessment and Remediation of Fungi in Indoor Environments"* and the *Cleaning and Restoration Institutes Publications "IICRC S520 "Standard and Reference Guide for Professional Mold Remediation".*

Community Room: Door and window casings should be thoroughly cleaned, all ceiling tiles should be removed and replaced, general cleaning following.

Community Room Storage Room/Mechanical Room: Remove the forty five (45) linear feet of impacted fiberglass pipe insulation, as well as the small section of impacted sheetrock wall (approx. 2 SF).

Men's Bathroom: Thorough cleaning of diffusers, removal of the sheetrock around the diffuser that has been impacted (approx. 3 SF), cleaning of the wood trim along the walls as well as the floor tiles.

Kitchenette: Remove and dispose of the impacted fiberglass pipe insulation above ceiling by the exit door (approx. 5 LF).

Main Library: Remove and dispose of any heavily impacted books. General cleaning of the space following.

Throughout: Through cleaning of the HVAC system and associated ductwork and diffusers/returns.

Section 4.0 Remediation Methods

Cairo Public Library – HVAC:

The following methods of remediation are recommended for this area;

- The interior of the ductwork and associated diffusers and returns should be thoroughly cleaned, all visible portions of the ductwork were exterior lined and no VSMG was noted on the insulation. Cleaning should be done via a whip style agitator or like methods and HEPA vacuuming to dislodge any potential dust/VSMG within the ductwork itself that is not accessible. Following cleaning of the ducts, the system itself should be treated with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.) and given proper time to dry. The diffusers and returns may be cleaned via HEPA vacuuming and wet wiping with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.) and given proper time to dry.

Cairo Public Library – Community Room:

The following methods of remediation are recommended for this area;

- The wood door and window casings throughout should be cleaned via HEPA vacuuming, wet wiping with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.) and a wire brush or similar abrasive method, followed by one final HEPA vacuuming. If VSMG cannot be removed, the wood casing should be removed and replaced.
- All ceiling tiles shall be removed and replaced, following removal of the tiles the suspended ceiling track shall be cleaned by wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).
- Non-porous items may be cleaned by HEPA vacuuming and wet wiping with a mild cleaning solution (Simple Green, Benefect, etc.).
- Following the removal of impacted materials and cleaning, the community room should be given a general cleaning via HEPA vacuuming and wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).

Cairo Public Library – Community Room Storage/Mechanical Room:

The following methods of remediation are recommended for this area;

- The impacted fiberglass pipe insulation should be removed and replaced (approximately 45 linear feet) following removal of the insulation, the pipes should be wet wiped with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.,) and wire brush or similar abrasive method.
- The small spot of sheetrock should be removed and replaced, continuing a minimum of one (1) foot in all directions. Prior to replacement, the area should be thoroughly HEPA vacuumed.

- The chairs in the space should be at minimum thoroughly cleaned via HEPA vacuuming, wet wiping the non-porous framing with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.) and lastly deep cleaning the cloth seats via steam extraction or like deep cleaning methods. Chairs may be discarded instead of cleaned if desired.
- Non-porous items may be cleaned by HEPA vacuuming and wet wiping with a mild cleaning solution (Simple Green, Benefect, etc.).
- Following the removal of impacted materials and cleaning, the community room should be given a general cleaning via HEPA vacuuming and wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).

Cairo Public Library – Men's Bathroom:

The following methods of remediation are recommended for this area;

- The impacted sheetrock around the diffuser should be removed and replaced, continuing a minimum of one (1) foot in all directions. Following removal of the sheetrock the area should be HEPA vacuumed.
- The wood trim along the wall should be HEPA vacuumed, followed by a wet wiping with a mild disinfecting solution (e.g., Simple green, Benefect, etc.,) and a wire brush or similar abrasive method. If the VSMG is not able to be removed, the trim should be taken off and replaced.
- The floor tile, specifically around the urinal and below the diffuser in question, should be thoroughly cleaned via wet wiping with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.,) followed by a HEPA vacuuming and then given proper time to dry.
- Following the removal of impacted materials and cleaning, the bathroom should be given a general cleaning via HEPA vacuuming and wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).

Cairo Public Library – Kitchenette:

The following methods of remediation are recommended for this area;

- The impacted fiberglass pipe insulation should be removed and replaced above the suspended ceiling by the exit door between the two lights. Following removal of the pipe insulation, the pipe itself should be wet wiped with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.,).
- Very light growth was observed on the sheetrock soffit in the kitchenette area, the soffit should be HEPA vacuumed, followed by a wet wiping with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.,.) and wire brush or similar abrasive method. If the VSMG is unable to be removed, the sheetrock soffit should be removed continuing a minimum of one (1) foot beyond any visible growth.
- All ceiling tiles shall be removed and replaced, following removal of the tiles the suspended ceiling track shall be cleaned by wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).

- Non-porous items may be cleaned by HEPA vacuuming and wet wiping with a mild cleaning solution (Simple Green, Benefect, etc.).
- Following the removal of impacted materials and cleaning, the community room should be given a general cleaning via HEPA vacuuming and wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.).

Cairo Public Library – Main Library Area:

The following methods of remediation are recommended for this area;

- Any heavily impacted books should be removed and disposed of.
- Following removal of impacted items, the books and associated shelving should be cleaned via a quick wipe down and HEPA vacuuming. Horizontal surfaces should be wet wiped with a mild disinfecting solution (e.g., Simple Green, Benefect, etc.,) and given proper time to dry prior to replacement of items/books.
- Non-porous items may be cleaned by HEPA vacuuming and wet wiping with a mild cleaning solution (Simple Green, Benefect, etc.).
- The carpeting should be thoroughly cleaned via steam extraction or comparable deep cleaning methods.
- Following the removal of impacted materials and cleaning, the Main Library Area should be given a general cleaning via HEPA vacuuming and wet wiping with a mild cleaning solution (e.g., Simple Green, Benefect, etc.), specifically the horizontal surfaces that may collect dust.

Based on the current industry guidelines, the areas to be remediated exceeds the ten (10) square foot threshold, the areas to be remediated can be managed as either a Medium Isolated Project or a Large Isolated Project. Remediation work techniques should conform with generally accepted industry work practices as outlined in the current industry guidelines such as *The New York City Department of Health "Guidelines on Assessment and Remediation of Fungi in Indoor Environments" and IICRC S520 "Standard and Reference Guide for Professional Mold Remediation"* and include but not be limited to the following minimum work practices;

Medium-Sized Isolated Areas (10 – 100 square feet)

(a) Remediation can be conducted by trained building maintenance staff. Such persons should receive training on proper cleaning methods, personal protection, and potential health hazards associated with mold exposure. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

(b) Respiratory protection (e.g., N-95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should also be worn.

(c) The work area should be unoccupied.

(d) Cover the floor, egress pathways, and items left in the work area with plastic sheeting and seal with tape before remediation.

(e) Seal ventilation ducts/grills and other openings in the work area with plastic sheeting. The HVAC system servicing this area may need to be shut down to properly seal vents.

(f) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(g) Moldy materials that can be cleaned should be cleaned using a soap or detergent solution. Materials that cannot be cleaned should be removed from the building in sealed plastic bags. Plastic sheeting should be discarded after use. There are no special requirements for disposal of moldy materials.

(h) The work area and areas used by workers for egress should be HEPA-vacuumed and cleaned with a damp cloth and/or mop and a soap or detergent solution.

(i) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Large Areas (greater than 100 square feet in a contiguous area) – *e.g.,* on separate walls in a single room

Properly trained and equipped mold remediation workers should conduct the remediation. The presence of a trained building or environmental health professional (see ***Environmental Assessment***) to provide oversight during remediation may be helpful to ensure quality work and compliance with the work plan. The following procedures are recommended:

(a) Personnel trained in the handling of mold-damaged materials equipped with:
- i. A minimum of half-face elastomeric respirators with P-100 filters used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134)
- ii. Full body coveralls with head and foot coverings
- iii. Gloves and eye protection

(b) Containment of the affected area:
- i. The HVAC system servicing this area should be shut down during remediation.

ii. Isolation of the work area using plastic sheeting sealed with duct tape. Furnishings should be removed from the area. Ventilation ducts/grills, any other openings, and remaining fixtures/furnishings should be covered with plastic sheeting sealed with duct tape.
iii. Consider using an exhaust fan equipped with a HEPA filter to generate negative pressurization.
iv. Consider using airlocks and a clean changing room.
v. Egress pathways should also be covered if a clean changing room is not used.

(c) The work area should be unoccupied.

(d) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(e) Moldy materials, that can be cleaned, should be cleaned using a soap or detergent solution. Materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a soap or detergent solution or HEPA-vacuumed in the work area (or clean changing room) prior to their transport to unaffected areas of the building. There are no special requirements for the disposal of moldy materials.

(f) Before leaving isolated areas, workers should remove disposable clothing to prevent the tracking of mold-containing dusts outside of the work area.

(g) The work area and egress pathways (and clean changing room if present) should be HEPA-vacuumed and cleaned with a damp cloth and/or mop with a soap or detergent solution and be visibly clean prior to the removal of isolation barriers. Plastic sheeting should be discarded after use.

(h) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Section 5.0 PPE

All persons entering the established work area shall at a minimum don the following personal protective equipment:

i. A minimum of half-face elastomeric respirators with HEPA filters used in accordance with the OSHA respiratory protection

standard (29 CFR 1927.134)
ii. Full body coveralls with head and foot coverings
iii. Gloves and eye protection (Goggles)

The recommended PPE should be considered as the minimum level of protection. Additional factors including, but not limited to: 1) use of chemicals, 2) remediation methods, 3) confined spaces, etc. may require additional PPE. A job hazard analysis should be conducted once the specific means and methods are established by the contractor to identify and evaluate any additional hazards that may be present at the worksite.

Section 6.0 Clearance Criteria

Currently, no regulatory or health-based standard exists for indoor levels of microbiological contaminants.

A health-based numerical standard for acceptable exposure to microbial contaminants is not feasible for a variety of reasons. Microbial contaminants in air as well as dust are ubiquitous throughout the environment and are composed of fungal spores, fragments of fungi, bacteria, (toxic) complex organic compounds, as well as fragments and feces of insects and similar organisms. In addition, human responses to microbial contaminants vary over a tremendous range, and it is not possible to sample and analyze for all possible microbial contaminants by a single method.

Therefore, clearance for this project shall be conducted by the performance of a detailed visual inspection of the work area(s). The visual inspection shall be performed by a New York State Licensed Microbial Assessment Professional. The visual inspection shall be performed after the final cleaning of the work area has been conducted with sufficient time for drying of the remediated areas. Visual clearance of the area shall be conducted as outlined in Section 3.4 of the American Industrial Hygiene Association (AIHA) publication "Assessment, Remediation and Post-Remediation Verifications of Mold in Buildings."

Section 7.0 Occupant Notification and Postings

In order to ensure that occupants of the facility are provided with appropriate information about the remediation project to be conducted, the contractor and building owner shall provide written notification of the remediation to building occupants at least five (5) calendar days prior to the commencement of the project. The written notification shall be posted in conspicuous locations where other building occupant notifications are posted. The posting shall include at a minimum the following information:

- Commencement and completion dates
- Building, structure and room location(s) or area designation for the remediation project
- The amount of material being remediated

- The name, address, and phone number of the remediation contractor
- The name, address, and phone number of the building owner

The building owner, wherever possible, shall identify at risk populations (Elderly, young and immunocompromised) which may be affected by the remediation project and shall provide direct written notification to such populations at least five (5) days prior to the project.

Prior to commencement of the project, the remediation contractor shall post warning signs and barrier tape to provide adequate warning to persons in order that they may take appropriate actions to protect themselves signs and barrier tape shall comply with the following.

1. Danger signs shall be provided and shall be 14" x 20". These signs shall bear the following information:

ACCESS RESTRICTED TO

AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE

CLOTHING

ARE REQUIRED IN THIS AREA

   Signs shall be posted at the entrance to all established regulated work areas. Additional signage as required by Federal, State and Local regulations shall also be posted.

2. Provide 3" yellow barrier tape printed with black lettered "DANGER CONSTRUCTION AREA". Locate barrier tape across all corridors, entrances, and access routes to active microbiological remediation areas.

Signs, barrier tape and any other warnings shall be posted prior to the commencement of the project and shall remain until the completion of the project.

Section 8.0 Cost Estimate and Duration

Based upon the information provided in the assessment report, the estimated time for the completion of this project is approximately (3 – 4) working days for Cairo Public Library. The estimated cost for the remediation project is $ 12,000 to $20,000. This assumption is based on a standard crew of three (3) remediation workers and one supervisor for an eight (8) hour day. Hidden conditions and other factors may be encountered during the remediation project, which may require modifications to the work schedule and cost estimate.

Section 9.0 Moisture Identification and Correction

Information obtained during the assessment process, in combination with information provided by the client representative, appears to indicate that the underlying source of moisture is coming from the HVAC system. The AHU should be thoroughly inspected to ensure the settings are correct for the space being served, and the proper amount of fresh-air is being brought in. It appears that the relative humidity was elevated within the Library for a prolonged period of time.

Appendix B

The New York City Department of Mental Health and Hygiene publication "Guidelines on Assessment and Remediation of Fungi in Indoor Environments"

Guidelines

on

Assessment and Remediation of Fungi in Indoor Environments

New York City Department of Health and Mental Hygiene

November 2008

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Preface

This 2008 document revises existing guidelines and supersedes all prior editions. It is based both on a review of the current literature regarding fungi (mold) and on comments from a review panel consisting of experts in the fields of mycology/microbiology, environmental health sciences, environmental/occupational medicine, industrial hygiene, and environmental remediation.

These guidelines are intended for use by building owners and managers, environmental contractors and environmental consultants. It is also available for general distribution to anyone concerned about indoor mold growth. The attached fact sheet, "*Mold Growth: Prevention and Cleanup for Building Owners and Managers*," is a simplified summary of these guidelines, which may be useful for building owners, managers and workers. It is strongly recommended that the complete guidelines be referred to before addressing the assessment or remediation of indoor mold growth.

In 1993, the New York City Department of Health and Mental Hygiene (DOHMH) first issued recommendations on addressing mold growth indoors. In 2000, DOHMH made major revisions to the initial guidance and made minor edits in 2002.

The terms *fungi* and *mold* are used interchangeably throughout this document.

This document should be used only as guidance. It is not a substitute for a site-specific assessment and remediation plan and is not intended for use in critical care facilities such as intensive care units, transplant units, or surgical suites. Currently there are no United States Federal, New York State, or New York City regulations for the assessment or remediation of mold growth.

 These guidelines are subject to change as more information regarding this topic becomes available.

The New York City Department of Health and Mental Hygiene would like to thank the following individuals and organizations for participating in the revision of these guidelines. Please note that these guidelines do not necessarily reflect the opinions of the participants or their organizations.

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Introduction

Fungi (mold) are present almost everywhere. In an indoor environment hundreds of different kinds of mold are able to grow wherever there is moisture and an organic substrate (food source). They can grow on building and other materials, including: the paper on gypsum wallboard (drywall); ceiling tiles; wood products; paint; wallpaper; carpeting; some furnishings; books/papers; clothes; and other fabrics. Mold can also grow on moist, dirty surfaces such as concrete, fiberglass insulation, and ceramic tiles. It is neither possible nor warranted to eliminate the presence of all indoor fungal spores and fragments; however, mold growth indoors can and should be prevented and removed if present.

The purpose of these guidelines is to provide an approach to address potential and observed mold growth on structural materials in commercial, school, and residential buildings. Mold growth in critical care areas of health-care facilities such as intensive care units or surgery suites may pose significant health concerns to patients. This document is not intended for such situations. Please visit the US Centers for Disease Control and Prevention (CDC) at www.cdc.gov for more information on dealing with mold growth and its cleanup in health-care facilities.[1] Mold on bathroom tile grout, in shower stalls, and on bathtubs is a common occurrence. Occupants can control this growth through frequent use of household cleaners.

Water accumulation in indoor environments can lead to mold growth (and other environmental problems), which has been associated with human health effects (see ***Appendix A***).[2-6] Indoor mold growth can be prevented or minimized, however, by actively maintaining, inspecting, and correcting buildings for moisture problems and immediately drying and managing water-damaged materials. In the event that mold growth does occur, this guide is intended to assist those responsible for maintaining facilities in evaluating and correcting this problem.

Removing mold growth and correcting the underlying cause of water accumulation can help to reduce mold exposures and related health symptoms.[7,8] Prompt remediation of mold-damaged materials and infrastructure repair should be the primary response to mold growth in buildings. The simplest, most expedient remediation that properly and safely removes mold growth from buildings should be used. Extensive mold growth poses more difficult problems that should be addressed on a case-by-case basis in consultation with an appropriate building or environmental health professional. In all situations, the source of water must be identified and corrected or the mold growth will recur.

Effective communication with building occupants is an important component of all remedial efforts. Individuals who believe they have mold-related health problems should see their physicians. Individuals who may have an occupationally related illness should be referred to an occupational/environmental physician for evaluation, following any needed initial care. Clinic contact information is available from the New York State Department of Health at www.health.state.ny.us/environmental/workplace/clinic_network.

Environmental Assessment

The presence of mold growth, water damage, or musty odors should be addressed quickly. In all instances, any sources of water must be identified and corrected and the extent of water damage and any mold growth determined. Water-damaged materials should be removed or cleaned and dried. For additional information on cleaning water-damaged materials and personal belongings, refer to the EPA document "Mold Remediation in Schools and Commercial Buildings."[9]

A trained building or environmental health professional may be helpful in assessing the extent of the moisture problem and mold growth and developing a site-specific work plan. The presence of a trained professional to provide oversight during remediation can also be helpful to ensure quality work and compliance with the work plan. According to the American Industrial Hygiene Association a trained professional should have, at a minimum, a relevant science or engineering degree and two years of full-time supervised experience in mold assessment.[10]

Visual Inspection

A visual inspection is the most important initial step in identifying a possible mold problem and in determining remedial strategies. The extent of any water damage and mold growth should be visually assessed and the affected building materials identified. A visual inspection should also include observations of hidden areas where damages may be present, such as crawl spaces, attics, and behind wallboard. Carpet backing and padding, wallpaper, moldings (*e.g.* baseboards), insulation and other materials that are suspected of hiding mold growth should also be assessed.

Ceiling tiles, paper-covered gypsum wallboard (drywall), structural wood, and other cellulose-containing surfaces should be given careful attention during a visual inspection. Ventilation systems should be visually checked for damp conditions and/or mold growth on system components such as filters, insulation, and coils/fins, as well as for overall cleanliness.

Equipment such as a moisture meter or infrared camera (to detect moisture in building materials) or a borescope (to view spaces in ductwork or behind walls) may be helpful in identifying hidden sources of mold growth, the extent of water damage, and in determining if the water source is active.

Using personal protective equipment such as gloves and respiratory protection (*e.g.* N-95 disposable respirator) should be considered if assessment work might disturb mold. Efforts should also be made to minimize the generation and migration of any dust and mold.

Environmental Sampling

Environmental sampling is **not** usually necessary to proceed with remediation of visually identified mold growth or water-damaged materials. Decisions about appropriate remediation strategies can generally be made on the basis of a thorough visual inspection. Environmental sampling may be helpful in some cases, such as, to confirm the presence of visually identified

mold or if the source of perceived indoor mold growth cannot be visually identified.

If environmental samples will be collected, a sampling plan should be developed that includes a clear purpose, sampling strategy, and addresses the interpretation of results. [11,12] Many types of sampling can be performed (*e.g.* air, surface, dust, and bulk materials) on a variety of fungal components and metabolites, using diverse sampling methodologies. Sampling methods for fungi are not well standardized, however, and may yield highly variable results that can be difficult to interpret.[11-17] Currently, there are no standards, or clear and widely accepted guidelines with which to compare results for health or environmental assessments.

Environmental sampling should be conducted by an individual who is trained in the appropriate sampling methods and is aware of the limitations of the methods used. Using a laboratory that specializes in environmental mycology is also recommended. The laboratory should be accredited in microbiology by an independent and reputable certifying organization.

For additional information on sampling, refer to the American Conference of Governmental Industrial Hygienists' publication, "Bioaerosols: Assessment and Control" and the American Industrial Hygiene Association's " Field Guide for the Determination of Biological Contaminants in Environmental Samples."[11,18]

Remediation

The goal of remediation is to remove or clean mold-damaged materials using work practices that protect occupants by controlling the dispersion of mold from the work area and protect remediation workers from exposures to mold. The listed remediation methods were designed to achieve this goal; however, they are not meant to exclude other similarly effective methods and are not a substitute for a site-specific work plan. Since little scientific information exists that evaluates the effectiveness and best practices for mold remediation, these guidelines are based on principles used to remediate common indoor environmental hazards. These guidelines are not intended for use in critical care facilities such as intensive care units, transplant units, or surgical suites.

Prior to any remediation, consideration must be given to the potential presence of other environmental hazards, such as asbestos and lead. These guidelines are based on possible health risks from mold exposure and may be superseded by standard procedures for the remediation of other indoor environmental hazards.

Moisture Control and Building Repair

In all situations, the underlying moisture problem must be corrected to prevent recurring mold growth. Indoor moisture can result from numerous causes, such as: façade and roof leaks; plumbing leaks; floods; condensation; and high relative humidity. An appropriate building expert may be needed to identify and repair building problems. An immediate response and

thorough cleaning, drying, and/or removal of water-damaged materials will prevent or limit microbial growth.

Relative humidity should generally be maintained at levels below 65% to inhibit mold growth.[19] Short-term periods of higher humidity would not be expected to result in mold growth.[20] However, condensation on cold surfaces could result in water accumulation at much lower relative humidity levels. Relative humidity should be kept low enough to prevent condensation on windows and other surfaces.

Emphasis should be placed on ensuring proper repairs of the building infrastructure so that water intrusion and moisture accumulation is stopped and does not recur.

Worker Training

Proper training of workers is critical in successfully and safely remediating mold growth.[21,22] Training topics that should be addressed include:

- Causes of moisture intrusion and mold growth
- Health concerns related to mold exposure
- The use of appropriate personal protective equipment
- Mold remediation work practices, procedures, and methods

For additional information, the National Institute of Environmental Health Sciences' publication, "Guidelines for the Protection and Training of Workers Engaged in Maintenance and Remediation Work Associated with Mold" lists minimum training criteria for building maintenance and mold remediation workers that should be completed before addressing indoor mold growth.[23]

Trained building maintenance staff can address limited and occasional mold growth. For larger jobs, more extensively trained mold remediation workers may be needed.

Cleaning Methods

Non-porous materials (*e.g.* metals, glass, and hard plastics) can almost always be cleaned. Semi-porous and porous structural materials, such as wood and concrete can be cleaned if they are structurally sound. Porous materials, such as ceiling tiles and insulation, and wallboards (with more than a small area of mold growth) should be removed and discarded. Wallboard should be cleaned or removed at least six inches beyond visually assessed mold growth (including hidden areas, see ***Visual Inspection***) or wet or water-damaged areas.[24] A professional restoration consultant should be contacted to restore valuable items that have been damaged.

Cleaning should be done using a soap or detergent solution. Use the gentlest cleaning method that effectively removes the mold to limit dust generation. All materials to be reused should be dry and visibly free from mold. Consideration should also be given to cleaning surfaces and

materials adjacent to areas of mold growth for settled spores and fungal fragments. A vacuum equipped with a High-Efficiency Particulate Air (HEPA) filter could also be used to clean these adjacent areas.

Disinfectants are seldom needed to perform an effective remediation because removal of fungal growth remains the most effective way to prevent exposure. Disinfectant use is recommended when addressing certain specific concerns such as mold growth resulting from sewage waters. If disinfectants are considered necessary, additional measures to protect workers and occupants may also be required. Disinfectants must be registered for use by the United States Environmental Protection Agency (EPA). Any antimicrobial products used in a HVAC system must be EPA-registered specifically for that use.

The use of gaseous, vapor-phase, or aerosolized (*e.g.* fogging) biocides for remedial purposes is **not** recommended. Using biocides in this manner can pose health concerns for people in occupied spaces of the building and for people returning to the treated space. Furthermore, the effectiveness of these treatments is unproven and does not address the possible health concerns from the presence of the remaining non-viable mold.

Quality Assurance Indicators

Measures to ensure the quality and effectiveness of remediation should be undertaken regardless of the project size. Evaluations *during* as well as *after* remediation should be conducted to confirm the effectiveness of remedial work, particularly for large-scale remediation. At minimum, these quality assurance indicators should be followed and documented:

- The underlying moisture problem was identified and eliminated
- Isolation of the work area was appropriate and effective
- Mold removal and worksite cleanup was performed according to the site-specific plan
- Any additional moisture or mold damage discovered during remediation was properly addressed
- Upon completion of remediation, surfaces are free from visible dust and debris.
- If environmental sampling was performed, the results of such sampling were evaluated by a trained building or environmental health professional.[10]

Restoring Treated Spaces

After completing mold remediation and correcting moisture problems, building materials that were removed should be replaced and brought to an intact and finished condition. The use of new building materials that do not promote mold growth should be considered. Anti-microbial paints are usually unnecessary after proper mold remediation. They should not be used in lieu of mold removal and proper moisture control, but may be useful in areas that are reasonably expected to be subject to moisture.

Remediation Procedures

Three different sizes of remediation and the remediation of heating, ventilation, and air-conditioning (HVAC) systems are described below. Currently, existing research does not relate the amount of mold growth to the frequency or severity of health effects. However, as the presence of moldy materials increases, so does the potential for exposure[8] and the need to limit the spread of mold-containing dusts and worker exposures. As such, the size of the area impacted by mold growth as well as practical considerations were used to help define remedial procedures.

Since the following areas were arbitrarily selected, site-specific conditions must be considered in choosing adequate remediation procedures. For more information on the unique characteristics of building types and occupancies that may influence remediation procedures refer to the American Industrial Hygiene Association's publication, "Recognition, Evaluation, and Control of Indoor Mold."[25]

Small Isolated Areas (10 square feet or less) – *e.g.* ceiling tiles, small areas on walls

(a) Remediation can be conducted by trained building maintenance staff. Such persons should receive training on proper cleaning methods, personal protection, and potential health hazards associated with mold exposure. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

(b) Respiratory protection (e.g., N-95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should also be worn.

(c) The work area should be unoccupied.

(d) If work may impact difficult-to-clean surfaces or items (e.g. carpeting, electronic equipment), the floor of the work area, egress pathways, and other identified materials/belongings should be removed or covered with plastic sheeting and sealed with tape before remediation.

(e) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(f) Moldy materials that can be cleaned should be cleaned using a soap or detergent solution. Materials that cannot be cleaned should be removed from the building in a sealed

plastic bag(s). Plastic sheeting should be discarded after use. There are no special requirements for the disposal of moldy materials.

(g) The work area and areas used by workers for egress should be HEPA-vacuumed (a vacuum equipped with a High-Efficiency Particulate Air filter) or cleaned with a damp cloth and/or mop and a soap or detergent solution.

(h) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Medium-Sized Isolated Areas (10 – 100 square feet)

(a) Remediation can be conducted by trained building maintenance staff. Such persons should receive training on proper cleaning methods, personal protection, and potential health hazards associated with mold exposure. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

(b) Respiratory protection (e.g., N-95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should also be worn.

(c) The work area should be unoccupied.

(d) Cover the floor, egress pathways, and items left in the work area with plastic sheeting and seal with tape before remediation.

(e) Seal ventilation ducts/grills and other openings in the work area with plastic sheeting. The HVAC system servicing this area may need to be shut down to properly seal vents.

(f) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(g) Moldy materials that can be cleaned should be cleaned using a soap or detergent solution. Materials that cannot be cleaned should be removed from the building in sealed plastic bags. Plastic sheeting should be discarded after use. There are no special requirements for disposal of moldy materials.

(h) The work area and areas used by workers for egress should be HEPA-vacuumed and cleaned with a damp cloth and/or mop and a soap or detergent solution.

(i) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Large Areas (greater than 100 square feet in a contiguous area) – *e.g.* on separate walls in a single room

Properly trained and equipped mold remediation workers should conduct the remediation. The presence of a trained building or environmental health professional (see ***Environmental Assessment***) to provide oversight during remediation may be helpful to ensure quality work and compliance with the work plan. The following procedures are recommended:

(a) Personnel trained in the handling of mold-damaged materials equipped with:

i. A minimum of half-face elastomeric respirators with P-100 filters used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134)
ii. Full body coveralls with head and foot coverings
iii. Gloves and eye protection

(b) Containment of the affected area:

i. The HVAC system servicing this area should be shut down during remediation.
ii. Isolation of the work area using plastic sheeting sealed with duct tape. Furnishings should be removed from the area. Ventilation ducts/grills, any other openings, and remaining fixtures/furnishings should be covered with plastic sheeting sealed with duct tape.
iii. Consider using an exhaust fan equipped with a HEPA filter to generate negative pressurization.
iv. Consider using airlocks and a clean changing room.
v. Egress pathways should also be covered if a clean changing room is not used.

(c) The work area should be unoccupied.

(d) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(e) Moldy materials, that can be cleaned, should be cleaned using a soap or detergent solution. Materials that cannot be cleaned should be removed from the building in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a soap or detergent

solution or HEPA-vacuumed in the work area (or clean changing room) prior to their transport to unaffected areas of the building. There are no special requirements for the disposal of moldy materials.

(f) Before leaving isolated areas, workers should remove disposable clothing to prevent the tracking of mold-containing dusts outside of the work area.

(g) The work area and egress pathways (and clean changing room if present) should be HEPA-vacuumed and cleaned with a damp cloth and/or mop with a soap or detergent solution and be visibly clean prior to the removal of isolation barriers. Plastic sheeting should be discarded after use.

(h) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Remediation of HVAC Systems

Mold growth in heating, ventilation, and air-conditioning (HVAC) systems can pose building-wide problems. Obtaining professional help should always be considered in addressing even small amounts of mold growth or moisture problems within an HVAC system. Recurring problems, regardless of size, may indicate a systemic problem and appropriate professional help should be sought.

Small Isolated Area of Mold Growth in the HVAC System (<10 square feet) – *e.g.* box filter, small area on insulation

(a) Remediation can be conducted by trained building maintenance staff that are familiar with the design and function of the impacted HVAC system. Such persons should receive training on proper cleaning methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

(b) Respiratory protection (*e.g.* N-95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.

(c) The HVAC system should be shut down prior to any remedial activities.

(d) Efforts should be made to reduce dust generation. Dust suppression methods particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that

create excessive dust should be avoided.

(e) The use of plastic sheeting to isolate other sections of the system should be considered.

(f) Moldy materials that can be cleaned should be cleaned using a soap or detergent solution. Growth-supporting materials that are moldy, such as the insulation of interior-lined ducts, flexible ducts, and filters, should be removed and sealed in plastic bags. There are no special requirements for the disposal of moldy materials.

(g) The work area and areas used for egress should be HEPA-vacuumed and cleaned with a damp cloth and/or mop and a soap or detergent solution. Any plastic sheeting should be discarded after use.

(h) All areas should be left dry and visibly free from mold, dust and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Large Area of Mold Growth in the HVAC System (>10 square feet)

Properly trained and equipped mold remediation workers with specific training and experience in HVAC systems, should conduct the remediation. The presence of a trained building or environmental health professional (see ***Environmental Assessment***) with experience and specific knowledge of HVAC systems, to provide oversight during remediation can be helpful to ensure quality work and compliance with the work plan. The following procedures are recommended:

(a) Personnel trained in the handling of mold-damaged materials equipped with:

i. A minimum of half-face elastomeric respirators with P-100 filters used in accordance with the OSHA respiratory protection standard (29 CFR 1910.134)
ii. Full body coveralls with head and foot coverings
iii. Gloves and eye protection

(b) The HVAC system should be shut down prior to any remedial activities.

(c) Containment of the affected area:

i. Isolation of work area from the other areas of the HVAC system using plastic sheeting sealed with duct tape
ii. The use of an exhaust fan equipped with a HEPA filter to generate negative pressurization should be considered
iii. Consider using airlocks and a clean changing room
iv. Egress pathways should also be covered if a clean changing room is not used

(d) Efforts should be made to reduce dust generation. Dust suppression methods

particularly during any cutting or resurfacing of materials are highly recommended. Methods to consider include: cleaning or gently misting surfaces with a dilute soap or detergent solution prior to removal; the use of High-Efficiency Particulate Air (HEPA) vacuum-shrouded tools; or using a vacuum equipped with a HEPA filter at the point of dust generation. Work practices that create excessive dust should be avoided.

(e) Moldy materials that can be cleaned should be cleaned using a soap or detergent solution. Growth-supporting materials that are moldy, such as the insulation of interior-lined ducts, flexible ducts, and filters, should be removed in sealed plastic bags. The outside of the bags should be cleaned with a damp cloth and a soap or detergent solution or HEPA-vacuumed prior to their removal from the isolated work area. There are no special requirements for the disposal of moldy materials.

(f) Before leaving isolated areas, workers should remove disposable clothing to prevent the tracking of mold-containing dust outside of the work area.

(g) The work area and egress pathways (and clean changing room if present) should be HEPA-vacuumed and cleaned with a damp cloth and/or mop and a soap or detergent solution prior to the removal of isolation barriers. Plastic sheeting should be discarded after use.

(h) All areas should be left dry and visibly free from mold, dust, and debris. Check that other quality assurance indicators (see ***Quality Insurance Indicators***) have also been met.

Communication with Building Occupants

Communication with occupants of affected spaces is important regardless of the size of the project but is especially important when mold growth requiring large-scale remediation is found. When large-scale remediation is performed, the building owner, management, and/or employer should notify occupants in the building. Notification should include a description of the remedial measures to be taken and a timetable for completion. Group meetings, held before and after remediation, with full disclosure of plans and results, can be an effective communication mechanism. Building occupants should be provided with a copy of all inspection reports upon request. For more detailed information on risk communication refer to the American Industrial Hygiene Association's publication, "Recognition, Evaluation, and Control of Indoor Mold."[26]

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Appendix A

Health Effects

Several comprehensive reviews of the scientific literature on the health effects of mold in indoor spaces have been published in recent years.[1-3] This appendix reflects these reviews but has also considered more recently published articles.

Potential for Exposure and Health Effects

Fungi are common in both indoor and outdoor environments and play a vital role in the earth's ecology by decomposing organic matter such as dead trees and leaves. As a result, all people have routine exposure to fungi, which may occur through inhalation, ingestion, and touching moldy surfaces. The main route of exposure to mold for people living or working in moldy indoor environments is inhalation of airborne fungal spores, fragments, or metabolites.[2] Ingestion and dermal exposures are less understood in these scenarios and can easily be minimized or prevented by workers through proper hygiene and work practices. Therefore, the remaining discussion will focus on the adverse health effects of mold due to inhalational exposure.

Adverse health effects may include: allergic reactions; toxic effects and irritation; and infections.[1-5] The mere presence of mold growth does not necessarily indicate that people present in the area will exhibit adverse health effects. However, as the amount of mold-impacted materials increases, so do potential exposures. Certain exposures may represent a significant risk such as occupational exposures to high concentrations of fungi and chronic (long-term) exposures, especially of individuals with underlying health conditions such as asthma, compromised immune systems, or allergies.

Evidence linking mold exposures to severe human health effects is documented in reports of occupational disease, particularly in forestry and agricultural settings where inhalation exposures were typically high and/or chronic.[2,6-11] The intensity of mold exposure and associated health effects experienced in undisturbed indoor environments is usually much less severe than that experienced by agricultural or forestry workers.[2,7,12-14] With the possible exception of exposures from mold remediation work, such high-level exposures are not expected indoors.[15-16] Although high-level exposures are unlikely to occur in undisturbed indoor settings, chronic exposures to lower levels may still raise health concerns.

Several factors influence the likelihood that individuals might experience health effects following exposure to mold in indoor environments. These include: the nature of the fungal material (e.g., allergenic, toxic/irritant, or infectious); the degree of exposure (amount and duration); and the susceptibility of exposed people. Susceptibility varies with genetic predisposition, age, state of health, concurrent exposures, and previous sensitization. It is not possible to determine "safe" or "unsafe" levels of exposure for the general public because of variation of individual susceptibility, lack of standardized and validated environmental exposure sampling methods, and lack of reliable biological markers. [17]

In addition to the adverse health effects associated with exposure to mold, in 2004, the Institute of Medicine (IOM) reported health risks associated with living in damp indoor environments. The IOM reported evidence suggesting an association between damp indoor environments and the development of asthma. Reported respiratory symptoms included, wheezing, coughing, and exacerbation of asthma.[2]

Allergic and Hypersensitivity Effects

It is well established that fungi can cause allergic reactions in humans. The most common symptoms associated with allergic reactions include runny nose, sneezing, post-nasal drip with sore throat, eye irritation, cough, wheeze, and other symptoms associated with the aggravation of asthma.[2,13,18-23] Immunological responses to mold include allergic rhinitis, hypersensitivity pneumonitis, and asthma exacerbations. These conditions require prior exposure for sensitization. These symptoms may persist for some time after removal from the source.

Allergic rhinitis is a group of symptoms that mostly affects the mucous membranes of nasal passages and may result from an allergic reaction to fungi. Symptoms often associated with "hay fever" such as congestion, runny nose, and sneezing may occur.[5,24]

Hypersensitivity pneumonitis (HP) is a rare lung disease with delayed onset (3-8 hours) of fever, shortness of breath, cough, chest tightness, chills, and general malaise. With continued exposure, HP can lead to permanent lung disease. The occurrence of HP, even among those that are highly exposed to fungi, is rare. HP has typically been associated with repeated heavy exposures in forestry and agricultural settings, which raises concerns for workers routinely performing mold remediation, but has also been reported in indoor settings with lower level chronic exposures.[3,11,18,25-27]

Allergic bronchopulmonary aspergillosis (ABPA) and allergic fungal sinusitis (AFS) are examples of rarely occurring allergic reactions to non-invasive fungal growth in the respiratory system. Most symptoms are non-specific resembling asthma or chronic sinusitis. In addition, ABPA and AFS usually occur in those with underlying medical problems. In the case of ABPA, this includes cystic fibrosis, asthma, and other predisposing medical conditions.[28,29]

Recent studies, which have suggested an association between the presence of indoor mold and the development of asthma or allergies, are limited and difficult to interpret. Stark *et al.* found higher concentrations of dust-borne mold in infants' homes were associated with development of allergic rhinitis, which is a known risk factor for childhood asthma.[24] However, other studies have shown higher concentrations of dust-borne fungi and other microorganisms in infants' homes were associated with a *decreased* risk for asthma and wheezing.[30,31] Jaakkola et al. reported an association between a moldy odor in the home and development of asthma, but no association with visible mold or water damage was found. Although the sample size for this subset was small, it suggests that active mold growth might be a stronger risk factor for certain health effects than presence of nonviable or inactive mold alone.[32] This also is supported by recent studies that have shown allergen production is significantly increased during active growth.[33,34]

Though available, allergy testing for molds is limited, subject to high rates of error, and can be difficult to interpret. Preparations for skin testing or the specific antigen in blood tests may be different from the mold to which an individual is sensitive. A positive test indicates an allergic response but does not definitively link a specific mold exposure to an individual's current health condition.[5]

Irritant and Toxic Effects

Irritant Effects

Indoor growth of mold can lead to the production of volatile organic compounds (VOCs), also referred to as microbial VOCs (MVOCs), and the presence of fungal glucans.[13,35-38] Glucans are components of many fungal cell walls. Some studies have reported an association with the inhalation of glucans and airway irritation and inflammation, but results have been mixed and may not be applicable to expected indoor concentrations. Observed effects may also be the result of exposure to or contact with other fungal components, metabolites, or synergistic effects with other microbial agents.[17,36,39] Resolution of irritant symptoms upon removal from the source can help distinguish irritant effects from allergic symptoms.[5]

MVOCs are responsible for the musty odor often associated with mold growth, which may be noticeable at very low concentrations. Many of the MVOCs are common to other sources in the home.[40] The very low levels usually found indoors have not been shown to cause health effects.[35,37]

Toxic Effects

Some symptoms and maladies have been attributed to the toxic effects of fungi in indoor environments. Certain fungi can produce toxins (mycotoxins) at varying levels that are dependent on many complex environmental and biological factors.[41] The reported symptoms from exposure to mycotoxins indoors include headaches, irritation, and nausea/loss of appetite, but are often non-specific (*e.g.* fatigue, inability to concentrate/remember), and may be caused by other environmental and non-environmental agents.[2,42-46] Although health effects from exposures to mycotoxins have been associated with certain occupational exposures or ingestion of mold-contaminated food, scientific support for the reported effects in indoor environments has not been established. This may be due to the lower levels of exposure and different routes of exposure.[2,5,13,21,27,46-49]

Stachybotrys is colloquially referred to as "black mold" or "toxic mold." It has been suggested that toxins produced by this mold are associated with specific health effects. Acute Idiopathic Pulmonary Hemorrhage (AIPH) in infants has been described in several reports suggesting a relationship with *Stachybotrys*. AIPH is an uncommon condition that results in bleeding in the lungs. The IOM reviewed the existing studies and concluded that there was insufficient evidence to determine if mold exposure was associated with AIPH.[2,3] The evidence is also insufficient for an association between inhalation of *Stachybotrys* toxins indoors and neurological damage.[2,26,49]

Although severe health effects from the inhalation exposures to *Stachybotrys* toxins indoors is plausible, it is not well-supported, and the issue remains controversial.[2,3,5,27,49,50]

Organic dust toxic syndrome (ODTS) describes the abrupt onset of fever, flu-like symptoms, and respiratory symptoms in the hours following a single, heavy exposure to dust-containing fungi and other microorganisms. Unlike HP, ODTS does not require repeated exposures to bioaerosols and can occur after the first exposure. ODTS has been documented in farm workers handling contaminated material, but may also affect workers performing remediation of building materials with widespread mold growth.[2,11,27] ODTS is a self-limited illness, which usually improves within 24 hours after the discontinuation of exposure. It may be underreported among workers exposed to fungi, but would not be expected in occupants of buildings with mold growth.[11,27]

Infectious Disease

Only a small number of fungi have been associated with infectious disease. Few of these fungi are typically found in the indoor environment.[51,52] Several species of *Aspergillus* are known to cause aspergillosis, most commonly *A. fumigatus*, *A. flavus*, and rarely, other species. Aspergillosis is a disease that generally affects severely immunosuppressed persons. Exposure to these molds, even in high concentrations, is unlikely to cause infection in healthy individuals.[21,53] Heavy exposure to fungi associated with bird and bat droppings (*e.g. Histoplasma capsulatum* and *Cryptococcus neoformans*) can lead to health effects, usually transient flu-like illnesses, in healthy individuals. More severe health effects are primarily encountered in immunocompromised persons.[18,54]

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FACT SHEET

MOLD GROWTH – PREVENTION AND CLEANUP FOR BUILDING OWNERS AND MANAGERS

Mold can grow indoors on many wet or damp building materials. Mold may cause health problems in some people.

Mold needs water or moisture to grow. Stop indoor mold growth by fixing leaks, drying wet materials, and cleaning up the mold.

THINGS BUILDINGS OWNERS AND MANAGERS CAN DO TO PREVENT MOLD GROWTH

Fix Water Problems

- Correct water leaks immediately
- Dry any water-damaged items immediately

Control Moisture Sources

- Make sure that bathroom exhaust fans are working, if present
- Make sure that a bathroom window can be opened, if no exhaust vent is present
- Use a dehumidifier to keep humidity levels low in basements

HOW TRAINED BUILDING MAINTENANCE STAFF CAN CLEAN MOLD GROWTH

First, look to see how much damage there is, including any hidden mold growth. If the mold covers a large area (more than 100 square feet), is in the HVAC system, or is difficult to get to, you may need professional help. If the there is less than 100 square feet of mold growth then you should be able to handle the cleanup job yourself:

- Inform affected building occupants about the plan to clean
- Occupants should be removed from the work area before cleaning
- Cover or remove difficult-to-clean surfaces or items (e.g. carpeting, electronics) from the work area before cleaning
- Maintenance staff should use safety goggles, gloves, and a disposable respirator when removing mold growth
- Cleaning should be done using soap or detergent, and water
- Most porous materials (e.g. ceiling tiles, insulation) that are moldy should be removed and thrown away
- If more than a small area (10 square feet) of mold growth is present:
    - ✓ Cover the floor in the work area with plastic sheeting
    - ✓ Cover entry and exit pathways with plastic sheeting
    - ✓ Seal any ventilation ducts with plastic sheeting
    - ✓ Mop and/or HEPA-vacuum the work area and pathways
- Dispose of any plastic sheeting, moldy materials, and used sponges or rags in sealed heavy-duty plastic bags.
- If the mold returns quickly or spreads, you may have an ongoing water problem. Fix water problems immediately.
- For complete recommendations on the assessment and remediation of mold, visit our web site at nyc.gov/health

SUGGESTED SUPPLIES TO CLEAN MOLD GROWTH

- Soap or detergent
- Disposable rags/sponges and scrub brush
- Buckets
- Heavy-duty plastic garbage bags
- Protective gear (goggles, rubber gloves, N95 respirator)

FOR MORE INFORMATION

Visit our web site at **nyc.gov/health** for complete recommendations on mold removal or call the New York City Department of Health and Mental Hygiene. In NYC, **call 311**.

Appendix C

Company & Personnel Certifications

WE ARE YOUR DOL

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DIVISION OF SAFETY AND HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BUILDING 12, ALBANY, NY 12226

MOLD ASSESSMENT CONTRACTOR LICENSE

Quality Environmental Solutions & Technologies, Inc.
1376 Route 9
WAPPINGERS FALLS, New York 12590

License Number: 24-648BS-SHMO
Date of Issue: 2024-12-26
Expiration Date: 2026-12-31

(This license is valid only for the contractor named above)

For the Commissioner of Labor

Amy Phillips, Director
Division of Safety and Health

EXCELSIOR

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MINORITY- AND WOMEN-OWNED BUSINESS ENTERPRISE ("MWBE")

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Empire State Development's Division of Minority and Women's Business Development grants a

Minority Business Enterprise (MBE)

pursuant to New York State Executive Law, Article 15-A to:

Quality Environmental Solutions & Technologies Inc. DBA QuEST

Certification Awarded on: May 13, 2024
Expiration Date: May 13, 2029
File ID#: 49952

NEW YORK STATE OF OPPORTUNITY. Division of Minority and Women's Business Development

A Division of Empire State Development

STATE OF NEW YORK - DEPARTMENT OF LABOR
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Zachary Timpano

Paul Rodriguez	9/28/2018
Trainer Name	Date of Issue

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