



CONSULTATION REPORT

for

**State of Connecticut, Department of Public Works
State Office Building
165 Capitol Avenue, Room G-4
Hartford, CT 06106**

SITE VISITED

**State of Connecticut, Department of Revenue Services
25 Sigourney Street
Hartford, CT 06106**

Submitted By:

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SUMMARY

PURPOSE

An initial, limited industrial hygiene consultation visit was made in response to a request from Jacquelyn Brown of the State of Connecticut, Department of Public Works, to evaluate employee exposure to the possible presence of airborne fungi on the 6th, 14th, and 16th-19th floors of a state-owned high rise building.

An opening conference was held on April 30, 2001 with Ms. Brown to discuss the scope of the survey and to reiterate the employer's rights and responsibilities, especially to correct imminent danger or serious hazards.

Following the opening conference, the consultant conducted a walk-through of the areas included in the consultation. Several consultation services, including the CONN-OSHA consultation program, have conducted indoor air quality investigations at the facility. Currently, the primary concern of employees involves problems with water incursion and the potential exposure to fungi.

CONCLUSIONS

Summary of Monitoring Data

Air sampling was performed to evaluate the levels of fungi in the facility. "Malt Extract Agar" media was utilized to conduct the sampling. Numerous reference sources indicate that indoor air fungal levels should be equal to or less than outdoor air fungal levels. The results of the air sampling revealed that the majority of indoor air fungal levels were none detected. However, Zone 5 on the 17th floor had an indoor air fungal level which was approximately equal to the sample collected outdoors. In addition, several fungal genera were detected in air samples from the 17th floor which were not detected in the outdoor ambient air sample. The results are detailed in Table I of the Monitoring Report section.

RECOMMENDATIONS

Air sampling results did not indicate that there was amplification of airborne fungi on the day of the consultation. There is generally a correlation between water infiltration and the amplification of fungi. Due to the fact that the facility continues to have ongoing occurrences of water infiltration, it is recommended that:

- Sources of moisture incursion continue to be identified and remediated. Architectural specialists and/or structural engineers with expertise in microbial remediation may need to be consulted.
- All materials in areas which have been subject to moisture incursion be thoroughly inspected for signs of water damage, fungal growth, and odors. These materials include papers, files, books, office furniture, workstation partitions, and carpeting. Water-affected and/or damaged materials should be handled as follows:
 - Isolate water-affected and/or damaged areas.
 - Schedule remediation activities during times when employees are not working in the building.

- Follow current microbial remediation guidelines, such as the “Guidelines on Assessment and Remediation of Fungi in Indoor Environments” published by the New York City Department of Health.
- Discard non-essential books and papers (i.e. file folders).
- Photocopy valuable items and discard originals.
- Thoroughly dry and effectively clean [i.e. high efficiency particulate air (HEPA) vacuum] paper materials that cannot be replaced or photocopied.
- Clean and disinfect non-porous surfaces, including file cabinets, workstation surfaces, partition surfaces, and chair arms and legs. Attention should be given to surfaces which may have come in direct contact with moisture/water (i.e. areas underneath file cabinets).
- Discard porous materials. Procedures to clean and disinfect water-damaged porous materials do not often prove to be effective. In areas where water infiltration cannot be immediately eliminated, consider replacing porous materials with non-porous materials where practicable.
- Establish procedures to ensure that the remediation methods used to prevent and/or abate fungal growth are effective. Conduct periodic inspections of areas that have been affected by moisture incursion to ensure that there is no visible fungal growth, odors, or wet materials.

DISCUSSION - Facility Walk-through

The Department of Revenue Services occupies the 5th, 6th, 14th-19th, and 20th floors of a twenty story building. The building was constructed primarily from masonry and metal approximately fifteen years ago. The first four levels of the building are used as a parking garage. In 1994, the building was purchased by the State of Connecticut and has since been maintained by the Connecticut Department of Public Works (DPW) and an on-site building manager, the Tunxis Management Company.

Water infiltration has been an ongoing problem at the facility. Renovation activities to eliminate water infiltration have included repairing and rebuilding exterior balconies around the perimeter of the building. Interior sheet rock walls were also removed and replaced on the 17th Floor. The sheet rock was replaced after the H.L. Turner Group, Inc. revealed, through fungal spore trap sampling, that amplified microbial sources were likely to be present in the wall cavity.

Sources of water infiltration continue to be reported by building occupants. Water reportedly enters the building through the tops of windows in some areas as well as from some balconies. Stanley Weisen, Inc. has been contracted to repair exterior window structures.

The consultant was informed that DPW is in the process of hiring Hoffman Architects to design and repair exterior building components, including problems with the building envelope. DPW anticipates that these repairs will begin in 2002.

In the interim, a 2' area of carpet has been removed from the perimeter of the 17th floor, exposing the concrete flooring. DPW is in the process of acquiring funds to remove and replace carpeting on a number of floors, including the 17th Floor.

Notice of Obligation

In the event of a CONN-OSHA enforcement inspection, it is important to remember that the Compliance Officer is not legally bound by the consultant's advice or by the consultant's failure to point out a specific hazard. You may, but are not required to, furnish a copy of this report to the Compliance Officer, who may use it to determine your good faith efforts toward safety and health and reduce any proposed penalties. You are, however, required to furnish any employee exposure data from this report as required by 31-372-101- 1910.20.

Michelle M. Major

Michelle M. Major, Occupational Hygienist

Attachments

A - Safety and Health Program Management

The following are the basic elements of an effective employee safety and health program.

- **MANAGEMENT LEADERSHIP AND EMPLOYEE INVOLVEMENT** assigns safety and health responsibility and authority to supervisors and employees and hold them accountable. It includes policy formulation; program review; and encouragement of employee involvement.
- **WORKSITE ANALYSIS** identifies current and potential hazards. It includes a thorough baseline survey, to review work processes and individual potential hazards; management of change (to deal with facilities; equipment; and the physical, economic and regulatory environment); job hazard analysis (written safe operating procedures for major tasks); a self-inspection program, using checklists to determine whether facilities and equipment are hazardous, and pairing inspectors to facilitate employee training and participation and to increase the possibility that new observers will find overlooked conditions; a system for reporting hazards; accident and incident investigation; and analysis of injuries and illnesses.
- **HAZARD PREVENTION AND CONTROL.** Prevention consists of regular maintenance and housekeeping; emergency planning and preparation; first aid; ready access to emergency care; when required, medical surveillance; and, at the employer's option preventive healthcare (e.g., group health insurance, smoking cessation, and wellness programs). Control includes guards, enclosures, locks, protective equipment, safe work procedures (the result of job hazard analysis), and administrative placement of personnel so as to minimize hazards.
- **TRAINING** of all personnel, from managers through supervisors to employees, about the hazards they may be exposed to, and their identification, prevention, and control. Managers and supervisors also need training in program management (e.g., enforcing rules, conducting drills). Training can demonstrate management leadership and facilitate employee involvement.

In assessing program effectiveness, a consultant looks first at written materials (e.g., statement of purpose, goals and objectives, emergency plan) for clarity, completeness, and currency, then for evidence that the written materials have been effectively implemented.

Safety and Health Program Management, with Employee Involvement

A safe and healthful workplace depends on effective management, to involve line workers, supervisors and managers in ensuring that hazards are identified and that effective physical and administrative protections are established and maintained.

The following observations page may help you avoid the recurrence of the hazards and other findings noted during the survey, and prevent the occurrence of other hazards.

Management Leadership and Employee Involvement

Employer and employee interviews suggested that management is committed to employee safety and health. Lines of communication for safety and health concerns have been established, and authority and responsibility for such concerns have been defined. Management does appear to set an example for safe and healthful behavior.

Worksite Analysis

In the past several years a number of consultative services, including the CONN-OSHA consultation program, have been utilized to address indoor air quality concerns in the facility.

Hazard Prevention and Control

Work is ongoing in the area of hazard prevention and control. Sources of moisture incursion continue to be identified and remediated. There are also plans to replace carpeting on several floors.

Training

Employee training should be conducted routinely to inform employees about the building's air quality issues.

B - Training Provided by Consultant

The consultant met with management to discuss methods for eliminating potential and known sources of fungal contamination in indoor environments. Disinfection is rarely effective for porous materials that have been subject to water damage. Therefore, it is recommended that water-damaged porous materials be removed and replaced. Non-porous surfaces and materials which have been subject to water damage can, however, be cleaned and disinfected.

C - Monitoring Report

Air sampling was performed on April 30, 2001 to evaluate the levels of molds and fungi present in several areas of the facility. The sampling was performed using a "Graseby-Anderson Model 10-709 N-6-1 ACFM" single stage viable impactor sampler at an approximate flow rate of 28.3 liters of air per minute. The air samples were each collected onto a standard petri dish filled with "Malt Extract Agar" culture media for a three-minute time period.

The samples were sent to the Wisconsin Occupational Health Laboratory for analysis. Analysis was accomplished through enumeration and classification of incubated colonies. Biological materials which were unable to produce spores were counted and included as non-sporulating fungi.

The results are expressed in terms of numbers of colony forming units per cubic meter of air (CFU/M³) and are listed in Table I.

Table I. Fungal Quantification and Speciation - April 30, 2001

Malt Extract Agar Media

Sample Location	Total Number of *CFU/M ³	CFU/M ³	Types of CFU/M ³
Zone 1, 6 th Floor	None Detected	None Detected	None Detected
Zone 4, 6 th Floor	None Detected	None Detected	None Detected
Zone 5, 6 th Floor	None Detected	None Detected	None Detected
Zone 6, 6 th Floor	None Detected	None Detected	None Detected
Zone 3, 14 th Floor	None Detected	None Detected	None Detected
Zone 4, 16 th Floor	None Detected	None Detected	None Detected
Zone 5, 16 th Floor	None Detected	None Detected	None Detected
Zone 7, 16 th Floor	None Detected	None Detected	None Detected
Zone 1, 17 th Floor	None Detected	None Detected	None Detected
Zone 2, 17 th Floor	None Detected	None Detected	None Detected
Zone 3, 17 th Floor	None Detected	None Detected	None Detected
Zone 4, 17 th Floor	12	12	<u>Penicillium</u> sp.
Zone 5, 17 th Floor	48	12 12 12 12	<u>Acremonium</u> sp. <u>Aureobasidium pullulans</u> Non-sporulating fungi <u>Penicillium</u> sp.
Zone 6, 17 th Floor	None Detected	None Detected	None Detected
Zone 7, 17 th Floor	None Detected	None Detected	None Detected
Zone 7, 18 th Floor	None Detected	None Detected	None Detected
Zone 1, 19 th Floor	None Detected	None Detected	None Detected
Zone 4, 19 th Floor	None Detected	None Detected	None Detected
Zone 7, 19 th Floor	None Detected	None Detected	None Detected
Outdoor Ambient Air	47	35 12	<u>Cladosporium cladosporioides</u> <u>Mucor</u> sp.

*CFU/M³ = Colony Forming Units/Cubic Meter of Air

There is no Permissible Exposure Limit (PEL) for fungi established under the State of Connecticut, Department of Labor, Occupational Safety and Health Division (CONN-OSHA) regulations. There is also no Threshold Limit Value (TLV) for fungi established as a recommended guideline by the American Conference of Governmental Industrial Hygienists (ACGIH).

Numerous reference sources indicate that indoor air fungal levels should be equal to or less than outdoor air fungal levels. The results of the air sampling conducted on April 30, 2001 revealed that the majority of indoor air fungal levels were none detected. However, Zone 5 on the 17th floor had an indoor air fungal level which was approximately equal to the outdoor sample. In addition, certain fungal genera were detected in air samples from the 17th floor which were not detected in the outdoor sample.

Refer to the Fungal Glossary on page 4 of this section for further information about fungi identified through air sampling.

Fungal Glossary

NOTE: Molds have the potential to be irritants and allergens. They can produce symptoms of watery eyes, runny noses, scratchy throats, headaches and malaise.

Acremonium - It is a fungus that is ubiquitous in nature and is associated with decaying plant materials and foods as well as soils. It is commonly associated with cellulose-based building materials suffering from chronic wet conditions.

Aureobasidium - The species of this mold, Aureobasidium pullulans, is a worldwide common soil isolate. It colonizes on the surfaces of leaves in the fall. It requires elevated humidity or moisture.

Cladosporium - This is the most commonly encountered mold in both indoor and outdoor air. It is a common allergen.

Mucor - This mold is commonly encountered in building dust and carpet samples. It can cause allergic alveolitis.

Penicillium - There are over two hundred species of this organism. It is found on concrete wall surfaces. It has been recovered from carpets and from drywall surfaces that have been subject to flooding. Some species may be toxigenic.

The above fungal glossary was compiled with the assistance of the Wisconsin Occupational Health Laboratory.

CONNECTICUT DEPARTMENT OF LABOR
DIVISION OF OCCUPATIONAL SAFETY & HEALTH



Questionnaire

The mission of the Connecticut Division of Occupational Safety & Health (CONN-OSHA) Consultative Services is to provide timely, courteous and professional consultative services to Connecticut employers and their employees so they may recognize and control workplace hazards and prevent occupational injuries, illnesses and fatalities. In a continuing effort to improve our services, we ask that you complete the following questionnaire. Your responses will tell us if the program is working and how we can improve. Your opinion is important to us.

PLEASE CHECK THE APPROPRIATE RESPONSE:

- In what way did you learn about CONN-OSHA's Consultative Services?

<input type="checkbox"/> Previous Consultation	<input type="checkbox"/> Insurance Company Referral
<input type="checkbox"/> Public Presentation/Speech	<input type="checkbox"/> Publications/Flyers
<input type="checkbox"/> Personal Contact	<input type="checkbox"/> US/DOL-OSHA Referral
<input type="checkbox"/> Conference/Trade Show	<input type="checkbox"/> CONN-OSHA Staff Referral
<input type="checkbox"/> Business Acquaintance	<input type="checkbox"/> Other: _____

- Did you receive a prompt response to your request for assistance?

Yes No

 How long did you have to wait for a consultation? _____ weeks

- Was the consultant friendly, courteous and knowledgeable about the machinery and/or processes associated with your business? Yes No

Please explain:

- Would you recommend our services to other businesses? Yes No

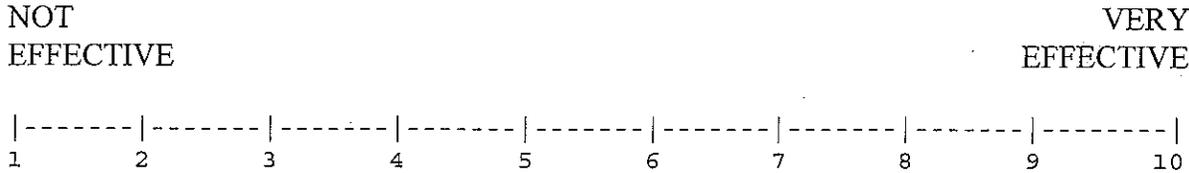
Please explain:

5. Did the report address all issues of interest to you? Yes No
Was it written in such a manner to be easily followed and understood? Yes No
Please explain:

6. Check the applicable statement(s) below:
- We have implemented the recommendations made by the consultant.
 - We are in the process of implementing the recommendations.
 - We plan to implement all the recommendations.
 - We plan to implement only part of the recommendations.
 - We do not plan to implement your recommendations.
 - We plan to request additional services in the future.

7. List any suggestions you feel would improve our program and services:

8. Please rate the overall effectiveness of this consultation in solving your safety and health problems:



We appreciate the courtesy extended by your company during this consultation. Should your company need additional assistance with workplace safety and health problems or issues, please call CONN-OSHA's consultants at any time.

Donald A. Heckler, Director
CONN-OSHA
(860) 566-4550

Connecticut Labor Department
Division of Occupational Safety & Health
38 Wolcott Hill Road
Wethersfield, CT 06109

Firm Name: _____ Consultation Date: _____
Consultant: _____ Visit Number: _____
Contact Person: _____ Phone: _____