

NOAA-SSMC-3

Survey September '99

FINAL REPORT

Microbiological Sampling Report

for

National Oceanic & Atmospheric Administration

Sampling Conducted at Building SSMC-3

On September 20 – 27, 1999

Interagency Agreement #: D8H00CO36100

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Prepared by

US Public Health Service

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Executive Summary

At the request of the National Oceanic & Atmospheric Administration (NOAA), surface tape-lift, swab, and vacuum cassette dust samples were collected from mechanical rooms and occupied areas at Building SSMC-3, located at 1315 East-West Highway, Silver Spring, Maryland. Sampling strategy was developed by Joe Spurgeon, CIH, Ph.D., representing Federal Occupational Health (FOH). Sampling was performed by Dr. Spurgeon and field personnel from Aerosol Monitoring & Analysis, Inc. (AMA) during September 20 - 27, 1999. The objective of this sampling was to determine whether there are any surface fungal, especially for *Stachybotrys chartarum* (SC), contamination at the mechanical rooms and some selective occupied areas of the 15th floor and Fitness Center.

Ninety-nine (99) tape-lift samples and 45 swabs were collected from mechanical rooms. Twenty (20) swabs and 14 vacuum cassette dust samples were collected from occupied areas. Microscopic analysis was performed on tape-lift samples. Dilution plating and direct plating was conducted on swab and cassette dust samples, respectively.

No *Stachybotrys*-like spores were detected from any tape-lifted samples collected from mechanical rooms. None of swab samples collected from mechanical rooms showed presence of *Stachybotrys chartarum*. Sporadic fungal growth was detected from some tape-lift and swab samples collected from mechanical rooms. Predominant fungal genus detected was one of the common outdoor fungi, *Cladosporium*.

Using vacuum cassette dust samples, *Stachybotrys chartarum* was detected from panel surfaces of Room 15641 and carpet surfaces of Fitness Center. One of three samples collected from the return plenum on top of the light at Fitness Center showed 160 CFU/swab of *Stachybotrys chartarum*. With limited data collected from the 15th floor, surface fungal burden on supply diffusers was lower than that of return troughers. Fungal burden on surfaces of return troughers of concerned areas was not higher than that of control areas.

Recommendations for the facility are provided as follows:

Immediate measures

- Thoroughly vacuum carpet and panel surfaces with High Efficiency Particulate Air (HEPA) vacuum cleaners at area of 15641 and Fitness Center.
- It is prudent to perform thorough HEPA vacuuming on porous surfaces (i.e. carpet, panels, etc.) at concerned areas: 15107, 15327, and 15828.
- Investigate the Fitness Center to identify reservoirs of *Stachybotrys chartarum*, if any.

Long-term measures

- Use HEPA vacuum cleaners for routine office cleaning.
- Investigate water intrusion problems and permanently fix them to prevent recurring of the problems.
- Properly maintain each air handler units in the mechanical rooms.

INTRODUCTION

At the request of the National Oceanic & Atmospheric Administration (NOAA), surface tape-lift, swab, and vacuum cassette dust samples were collected from mechanical rooms and selected occupied areas at Building SSMC-3, located at 1315 East-West Highway, Silver Spring, Maryland. Sampling strategy was developed by Joe Spurgeon, CIH, Ph.D., representing Federal Occupational Health (FOH). Sampling was performed by Dr. Spurgeon and field personnel from Aerosol Monitoring & Analysis, Inc. (AMA) during September 20 - 27, 1999. The objective of these samplings was to determine whether there are any surface fungal especially for *Stachybotrys chartarum* (SC), contamination at the mechanical rooms and some selective occupied areas of the 15th floor and Fitness Center.

EVALUATION METHODOLOGY

Field Sampling

Tape-lift Sampling

Ninety-nine (99) tape-lift samples were collected from mechanical rooms of SSMC-3. Three samples were collected from each mechanical room of floors 1-15: one from inside the supply access panel, one from inside the air handler unit (AHU) door, and one from the AHU wall. Each sample was collected by pressing a piece (about 2 inches long) of double-sided tape onto the surface of interest. The tape was then transferred to a frosted microscope slide. All samples were sent to the P & K Microbiology Services, Inc. (P & K) for optical microscopy and fungal spore identification.

Vacuum Cassette Dust Sampling

Fourteen (14) samples were collected from surfaces of carpet or partition panels. Specific sampling locations were selected by NOAA and are presented in Table 1. Samples were collected using open-face, 25-mm cassettes with 0.8 mm MCE filters attached with a high flow rate pump. According to AMA, samples were collected by placing the cassette open to the object (panel or carpet) and holding steadily for 1 minute (flow rate of 14L /min). All samples were sent to the P & K for analysis.

Table 1. Summaries of sampling locations for vacuum cassette dust samples collected on September 23, 1999.

| Building | Condition | Room /Cubicle #s | Total Sample Number |
|-----------------|------------------|---|----------------------------|
| SSMC-3 | Control* | 15205, 15752 | 2 |
| SSMC-3 | Concerned* | Fitness Center, 15107, 15137, 15327, 15641, 15828 | 12 |

* Concerned: Areas had water damage or mold growth according to NOAA.

Control: Areas where no water damage occurred as identified by NOAA.

Swab Sampling

Sixty-five (65) swab samples were collected from this facility: 45 from mechanical rooms and 20 from occupied areas (Table 2). One swab sample was collected from each mechanical room from floors 1 to 15, on the metal surface of fan blade edge. Three samples were collected from mechanical rooms of other specialty areas: one from the fan blade edge, one from the fan motor blade face, and one from the fresh air inlet in metal duct areas. Sampling locations for occupied areas were similar to those selected for vacuum cassette dust samples. Sterilized swabs were used to wipe on surfaces of supply diffusers and return troughers at the light fixture. According to AMA, the sampling area was approximately 4 in². All samples were sent to P & K for fungal analyses.

Table 2. Summaries of swab sampling locations on September 22 - 23, 1999.

| Building | Areas | Room #s | Total Sample Number |
|----------|-----------------|---|---------------------|
| SSMC-3 | Mechanical Room | Print shop (3 rd floor), Fitness Center (M2 level), Plaza (M1 level), 1EME2 (1 st floor), Conference room @ Plaza level | 15 |
| SSMC-3 | Mechanical Room | Floors 1- 15 | 30 |
| SSMC-3 | Occupied Areas | Fitness Center, 15107, 15137, 15205, 15327, 15641, 15752, 15828 | 20 |

Laboratory Procedures

Tape-lift Samples

According to P & K through a phone conversation, samples were first examined under a stereoscope. A section of ¾ - 1 inch of the tape from each sample was cut and examined under a compound microscope. The laboratory reported fungal spores as *Cladosporium*-like, *Alternaria*-like, *Stachybotrys*-like, etc. Qualitative information (ranged from massive to trace to no growth) was provided for each sample collected (see Attachment).

Vacuum Cassette Dust Samples

According to P & K through a phone conversation, insufficient dust was collected for analysis. Therefore, the filter with trace dust collected was placed onto an agar plate filled with corn meal agar (CMA). Total fungal colonies formed on each CMA plate were counted, recorded, and identified.

Swab Samples

Each swab sample was processed through dilution plating on malt extract agar (MEA) and CMA. Total

fungal colonies formed on each plate were counted, recorded, and identified.

RESULTS AND DISCUSSION

All laboratory analytical reports are presented in Attachment.

Tape-lift Samples

No *Stachybotrys*-like spores were detected from any samples collected. None of the samples collected showed massive fungal growth. Signs of fungal contamination or growth (evaluated by the presence of hyphae, conidiophores, and spores by P & K) were detected from some samples (Table 3).

Cladosporium-like spores were the predominant fungi detected from these samples, followed by *Alternaria*-like spores.

Table 3. Sampling locations suggested fungal contamination from tape-lifted samples collected at different areas of mechanical rooms on September 20 -22, 1999.

| Building | Floor | AHU | Sampling Location | Predominant Fungal Genera |
|----------|-------|-----|---------------------------------|---------------------------|
| SSMC-3 | 12 | 12A | ME2, inside supply access panel | <i>Alternaria</i> -like |
| SSMC-3 | 11 | 11A | ME2, inside AHU door-bottom | <i>Cladosporium</i> -like |
| SSMC-3 | 9 | 9A | ME2, inside supply duct door | <i>Cladosporium</i> -like |
| SSMC-3 | 9 | 9B | ME1, inside supply duct door | <i>Cladosporium</i> -like |
| SSMC-3 | 7 | 7B | ME1, inside AHU door grill | <i>Cladosporium</i> -like |
| SSMC-3 | 4 | 4B | ME1, inside AHU door grill | <i>Cladosporium</i> -like |
| SSMC-3 | 3 | 3B | ME1, inside supply duct door | <i>Cladosporium</i> -like |
| SSMC-3 | 1 | 1A | ME2, inside AHU door grill | <i>Cladosporium</i> -like |

The interpretation of these results is difficult. This is due to (1) only a small sample area (2-inch in length) from surfaces of interest was collected, (2) only portions of the collected tape were examined under microscope, and (3) there were no

replications.

Vacuum Cassette Dust Samples

Stachybotrys chartarum was detected from two of 14 samples: panel at Room 15641 and carpet at the Fitness Center. Both of these samples showed 2 CFUs of *Stachybotrys chartarum*.

The interpretation of these vacuum cassette sample results is difficult. The reasons are three-fold: (1) only a small sample area (4.91 cm²) from surfaces of interest was collected, (2) insufficient amounts of dust were collected for analysis, and (3) no replications. Nevertheless, SC-positive results indicated presence of *Stachybotrys chartarum* on surfaces sampled.

Swab Samples

Mechanical Rooms

None of the 45 samples collected from mechanical rooms showed presence of *Stachybotrys chartarum* either on MEA or CMA plates. Most of fungal levels ranged from below the detection limits of 40 CFU/swab to 4,000 CFU/swab, except for six samples where fungal levels were at 10⁴ – 10⁵ CFU/swab levels (Table 4). *Cladosporium* was the predominant fungal genus recovered from these samples.

Occupied Areas

None of the samples collected from the 15th floor showed the presence of *Stachybotrys chartarum*. However, 160 CFU/swab of *Stachybotrys chartarum* was detected on MEA plate from a sample collected from Fitness Center. This sample was collected from the return air plenum on top of the light at the Fitness Center of M2 level. *Stachybotrys chartarum* was not detected from any other five samples collected from the Fitness Center.

Table 4. Mean surface fungal burden (CFU/swab) on samples collected from surfaces of mechanical rooms at SSMC-3, on September 20 - 23, 1999.

| Building | Floor | Room | AHU | Surface | Fungal Levels |
|----------|-------|----------------|-----|------------------------|---------------|
| SSMC-3 | M2 | Fitness Center | MC | Fan blade edge - metal | 602,700 |
| SSMC-3 | 14 | ME1 | 14B | Fan blade edge -metal | 943,000 |
| SSMC-3 | 13 | ME2 | 13A | Fan blade edge -metal | 67,650 |
| SSMC-3 | 12 | ME2 | 12A | Fan blade edge -metal | 45,100 |
| SSMC-3 | 10 | ME1 | 10B | Fan blade edge -metal | 100,450 |
| SSMC-3 | 1 | ME1 | 1W | Fan blade edge -metal | 377,200 |

In general, surface fungal burden on surfaces of supply diffuser was lower than that of return troughers. Total fungal burden on surfaces of return troughers at control areas was not lower than that of concerned areas (Table 5).

Table 5. Mean surface fungal burden (CFU/swab) on supply diffusers and return troughers collected from 15th floor on September 23, 1999.

| Building | Condition | Room | Supply Diffusers | Return Troughers |
|----------|-----------|-------|------------------|------------------|
| SSMC-3 | Control | 15205 | 20 | 3,280 |
| SSMC-3 | Control | 15752 | <40 | 160 |
| SSMC-3 | Concerned | 15107 | <40 | 80 |
| SSMC-3 | Concerned | 15137 | 80 | 940 |
| SSMC-3 | Concerned | 15327 | <40 | 380 |
| SSMC-3 | Concerned | 15641 | 40 | 180 |
| SSMC-3 | Concerned | 15828 | 40 | 460 |

CONCLUSIONS

Mechanical Rooms

No *Stachybotrys*-like spores were detected from any tape-lifted samples collected. None of the swab samples collected from mechanical rooms showed the presence of *Stachybotrys chartarum*. Sporadic fungal growth was detected from some tape-lift and swab samples collected from mechanical rooms.

Predominant fungi detected were commonly found outdoors, *Cladosporium*.

Fitness Center and Selective Areas on 15th Floors

Using vacuum cassette dust samples, *Stachybotrys chartarum* was detected from panel surfaces in Room 15641 and carpet surfaces in the Fitness Center. One of three samples collected from the return plenum on top of the light at Fitness Center showed 160 CFU/swab of *Stachybotrys chartarum*.

On the 15th floor, surface fungal burden on supply diffusers was lower than that of return troughers. Fungal burden on surfaces of return troughers of concerned areas was not higher than that of control areas.

RECOMMENDATIONS

Immediate Measures

- Thoroughly vacuum carpet and panel surfaces with High Efficiency Particulate Air (HEPA) vacuum cleaners in the area of 15641 and in the Fitness Center.
- It is prudent to perform thorough HEPA vacuuming on porous surfaces (i.e. carpet, panels, etc.) at concerned areas: 15107, 15327, and 15828.
- Investigate the Fitness Center to identify reservoirs of *Stachybotrys chartarum*, if any.

Long-term Measures

- Use HEPA vacuum cleaners for routine office cleaning.
- Investigate water intrusion problems and permanently fix them to prevent recurring of the problems.
- Properly maintain each air handler units in the mechanical rooms.

ATTACHMENT

Microbiological laboratory reports for samples collected

from building SSMC-3, on September 20 – 27, 1999

**All attachments can be retrieved from the Library
located on the Second Floor in SSMC 3**