Nauset Environmental Services, Inc.

an Air Quality Company

1 September 2015 **NES** Job #900
Report No. **NES**/IAQ-15/1782

Thomas J. Mello
Tisbury Department of Public Works
P.O. Box 788
Tisbury, MA 02568-0788

Re: Mold/moisture inspection plus reception sampling
at Tisbury Police Stations – 32 Water Street (Tisbury)

Dear Mr. Mello:

Nauset **E**nvironmental **S**ervices, Inc. (**NES**) is pleased to submit this letter report on a mold/moisture inspection and reception area sampling at Tisbury Police Stations – 32 Water Street. Following initial verbal authorization, **NES** sent William Vaughan, PhD, QEP, CIEC to this property on 26 August 2015. This report is CONFIDENTIAL and proprietary and can only be distributed by or with the approval of the Clients to whom it is addressed.

BACKGROUND: Reportedly, a heavy rain in early August resulted in observations of water seepage at several locations in the building. There was concern about possible mold growth, especially since there had been reports of irritation experienced in the vicinity of the reception area on the second floor – coughing by employees and visitors. **NES** was authorized to carry out a thorough mold/moisture inspection to identify any suspect damp areas and, eventually, to carry out worst-case, fan-disturbed sampling in the reception area.

EXECUTIVE SUMMARY: This mold/moisture inspection by **NES** found several areas of damp, water-impacted walls in the office areas calling for cautious water-damage response since there is the possibility of hidden mold growth in the damp wall cavities, Condition 3 contamination.

The air sampling revealed **acceptable mold spore levels in the reception area, BUT unacceptable debris/dust (irritant) levels**, calling for improved cleaning and replacement of badly deteriorated carpeting.

Some general house-keeping suggestions are provided to keep on top of irritation conditions in the building.

A scope of work (SOW) is provided to address the care needed in opening water-damaged walls in anticipation of Condition 3 contamination. .

ON SITE ACTIVITIES – Dr. Vaughan arrived at the Police Station 26 August 2015 at about 09:20 am. Dr. Vaughan had an initial orientation meeting with Assistant Chief, Eric Meisner, before beginning his inspection and sampling activities. During this inspection Dr. Vaughan used a digital Tramex MRH III non-penetrating moisture meter and a calibrated Extech Hygro-Thermometer Pen (Model 445580) to measure temperature and relative humidity that is periodically calibrated to two known humidities. Photographs taken during the inspection are found in Attachment A.

HYPOTHESIS TESTING

After inspecting the general conditions in the building, Dr. Vaughan determined that an air sampling strategy was needed to assess mold spore and irritant condition in the main complaint area – the reception area - to address the following hypothesis regarding possible residual environmental issues:

> Hypothesis A There **are** spore levels of concern the reception area, especially under disturbed conditions when **Condition 2**, settled spores, and spores from hidden mold growth, **Condition 3**, are suspended into the air.

The airborne mold spore samples were taken under worst case, fan-disturbed conditions. Air samples were collected on Cyclex-d™ cassettes for microscopic analysis. [The expiration dates for the Cyclex-d™ cassettes used was April 2016.]

After the sampling flow rate was confirmed for the pump at 20 lpm using a rotometer transfer standard (traceable to NIST via a BIOS DryCal calibrator), the interior air samples were taken for a timed ten-minute interval using a digital timer. The sampling locations were documented with photographs seen in Attachment A. A log sheet documented the activity and conditions during the sampling. No outdoor reference sample was taken since the focus was on indoor conditions.

The "disturbed" sample was taken after disturbing the surfaces in the reception area using a 12" fan set on high speed for a couple of minutes. The drafts from the fan also suspend the mold spores and irritants from hard-to-reach areas where they have settled but would be dislodged by occupant activities as well as spores from latent (not yet visible) mold growth. The disturbed sampling began following at least a 3-5 minute calm period that allows larger particles/debris to settle out of the air and minimize interference/obscurance on the collecting surface in the cassette.

The exposed and labeled air sample cassettes were combined with a completed chain of custody form and shipped to EMLab P&K, LLC. (Marlton, NJ). The air samples were designated for "Fungi - Spore Trap Analysis." The following perspective indicates why EMLab P&K, LLC was selected:

- "Because there is currently no governmental certification for environmental microbiology laboratories (except for drinking water and wastewater microbiology), EMLab P&K, LLC is an active participant in the EMPAT (Environmental Microbiology Proficiency Analytical Testing) program sponsored by the American Industrial Hygiene Association (AIHA). P&K has been formally accredited by the AIHA in Environmental Microbiology since July 1300 with a laboratory identification number of 103005."
- EMLab P&K is one the largest commercial analytical laboratories and is unique in that all of their analytical employees are degreed analysts, the majority with Masters or Ph.D.'s in mycology, microbiology or a related field.

- "EMLab P&K has modeled its quality control system after the ISO guidelines, one of the most stringent sets of international standards in the industry, to ensure that its customers receive the high standard of accuracy, reliability and impartiality that they have come to expect from a leader in the environmental industry."

OBSERVATIONS: Observations at the Police Station during the 25 August site visit are provided below: [Directions - left-right and front-rear – refer to viewing the building from the parking lot.] Follow-up suggestions are highlighted in gray in the text below

General

- The weather was sunny (near 80F) and humid with light breezes.
- There was no noticeable biological/moldy odor noted on entering the air conditioned building. [Moldy/biological odors come from *currently active* "microbial volatile organic compounds (MVOCs)" that are released from active colonies digesting the organic matter on which they are growing.]
- [There were 5-6 commercial dehumidifiers from Oceanside restoration on the two levels and two HEPA-filtered air scrubbers in the reception area that were turned off before and during the air sampling. These units were installed in response to the leaks reported above.]

Lower level

- There was a sense of dampness in the lobby with relative humidity reading 69% at a temperature of 79F.
- The elevator was warm and damp feeling. [Check the elevator pit for standing water and improve/correct drainage as needed.]

BRIEFING ROOM

- There were dirt streaks across the drop ceiling tiles (DCTs) near supply grates (see photos), indicating inadequate filtration of the supply air. [Replace affected DCTs AND locate and replace the air handler filter with a proper sized pleated media now and on a quarterly basis.]
- There were indications of several plumbing leaks above stained DCTs (see photos). [Ensure that the leaks have now been addressed or do so now and replace impacted DCTs.]

MEN's LOCKER ROOM

- There were dirt streaks across the DCTs near supply grates (see photos), indicating inadequate filtration of the supply air. [Replace replace the air handler filter with a proper sized pleated media now and on a quarterly basis.]

WOMEN's LOCKER ROOM

- No obvious mold/moisture problems were observed.

RIGHT INTERVIEW ROOM

- There were stained DCTs indicating plumbing leaks above stained DCTs (see photos). [Ensure that the leaks have now been addressed or do so now and replace impacted DCTs.]
- The supply grates were dirty (see photos). [Clean the grates AND locate and replace the air handler filter with a proper sized pleated media now and on a quarterly basis.

Second floor

RECEPTION AREA

- The receptionist, Patty, indicated that:
  - She feels throat irritation and periods of coughing while at work that go away when she is home and over the weekend.
  - She indicated that some visitors to the area also have experienced coughing episodes.
- There was thin and well-worn carpeting in the general reception area (see photo). [See sampling results and related suggestions below.]
  - The cleaning staff was present during this inspection and, when questions, indicated that even though they are supplied with a HEPA-filtered vacuum, its HEPA filter had not been replaced in a couple of years. SINCE the HEPA designation by EPA indicated filters capable of "removing 99.97% of the particles down to 0.3 microns (0.00039 inches), the lower size range of mold spores and irritants, it is important to have proper filters. [Purchase a few HEPA filters and have them on hand to change out annually to improve cleaning.]

- The supply grates were quite clean at the time of this inspection, almost as if they had recently been wiped clean (see photos), however the return grate showed evidence of collected dirt and had not been recently cleaned. [Clean grates semi-annually.]

- The MM indicated the following conditions near the copier:
  - 99% FS-DW lower left corner under rear window – NOT acceptable [[needs exploration, see SOW below]

KITCHEN

- There is evidence of an above-ceiling leak at the left side of the counter (see photo). [Check to see that it has been satisfactorily corrected and replace DCTs.]
- The MM (moisture meter) indicated acceptably dry conditions under the kitchen window in the range of 30-40% of full scale on the drywall setting (FS-DW).

OFFICERS' ROOM (front)

- The climate conditions were comfortable with a relative humidity of 48% at 75F.
- The grates were clean.
- There was water-damaged ceiling in the right, front corner of the room (as viewed from the street) (see photo).
- When checked with the MM it indicated unacceptably moist conditions in that front ceiling and wall from water seepage:
  - 99% FS-DW on ceiling and vertical wall (see photos).
    [This observation indicates the possibility of hidden mold growth, Condition 3 contamination, in the wall cavity, calling for serious caution in responding to the damp wall so that potential hidden spores are not released to the occupied area – see SOW below.]
- The MM indicated the following conditions in other areas of the room:
  - 23-26% FS-DW either side of the front wall discussed above - acceptable
  - 43-55% FS-DW under front windows – marginally acceptable
  - ~40% FS-DW under right side window, where accessible – acceptable

- 23-36 % FS-DW in side and rear walls - acceptable

OFFICERS' ROOM (rear)

- Grates were clean (see photo).
- The MM indicated the following conditions in the room:
  - 43-55% FS-DW under right side, front window – marginally acceptable
  - 67+% FS-DW at lower left corner of rear window frame (see photo) – suspect for moisture intrusion
  - 30-50% FS-DW under rear window – acceptable
  - 73-75% FS-DW under left corner of rear window (see photo) – NOT acceptable [needs exploration, see SOW below]

Attic

- The pleated media filter for the middle air handler was quite dirty (see photo) and needs to be changed. [This filter should be changed quarterly, so a small stockpile should be provided near the unit.]
- There were water stains and signs of leaks near the exhaust stack penetration from this unit and a water collection arrangement directing water into the unit's drip pan (see photo). MM readings indicated and elevated reading above of 32-33% moisture content (MC) on the nearby joist and sheathing indicating a current leak (see photos). [The roof seal around this penetration should be checked and corrected as well as areas near water staining in the attic.]

Table 1 lists the sample location for the total spore Cyclex-d™ air sampling for this round of sampling. Table 2 summarizes the results of the microscopic analysis of this air samples from this round of sampling. The EMLab P&K mold report is found in Attachment B. Attachment C describes the properties of the dominant spores and structures found.

Table 1 – Mold Spore Sampling Locations

(**Bold** sample numbers indicate disturbed air samples)

Sample #	Location	Comments
900-1	reception area disturbed	(T=79, RH=47%)

DISCUSSION:

MOLD - There are several terms and concepts that should be explained before looking in detail at the data from these samples:

- CONTAMINATION -The terms Condition 2 and 3 used describe mold contamination are part of the August 2008 Institute for Inspection Cleaning and Restoration Certification (IICRC) S520-2008, "Standard and Reference Guide for Professional Mold Remediation." **Condition 2** involves evidence of settled spores from a contaminated area, a condition documented to some extent by "disturbed" air samples. **Condition 3** refers to "actual mold growth and associated spores … active or inactive, visible or hidden."

- OUTDOOR SPORES - While ALL molds ultimately originate in nature, outdoors, there are some molds that are referred to as "outdoor fungi." This term means that that they are found only outdoors because they depend on plants, other fungi or animals to complete their life cycle. Others need a complex ecosystem to complete their life cycle. These outdoor spores *may* be found indoors because they were transported there but hardly ever develop colonies indoors. These include the ascospores, basidiospores (some coming from mushrooms that develop in the wild) and rusts. When found indoors these "outdoor" spores indicate the space has been experienced air exchange with the outdoors, not growth in response to moist conditions.

- INDOOR SPORES - There are some molds that have adapted to a variety of food sources - organic debris, processed wood (i.e. cellulose, paper, etc.) and more - that are commonly found indoors - loosely referred to as "indoor spores," even though they initially came in from outdoors. With the proper level of damp to wet conditions some of them amplify/grow indoors and serve as moisture/leak indicators. In our area of southern New England, **NES** has found that the primary moisture/leak-indicators are the *Aspergillus* and *Penicillium* molds (referred to as "*Asp-Pen* like" when their spores are counted under a microscope since their spores are indistinguishable). Less often **NES** has found that *Cladosporium*, the most abundant spore type found in outdoor air samples, can also amplify under moist conditions indoors and may serve as a secondary moisture/leak indicator.
- STANDARDS - Many people look for standards to compare mold readings to with the desire to define a healthy or unhealthy space. Obviously very high spore readings found by counting spores/structure in a collected sample under a microscope (**S/m^3** - spores/structures per cubic meter sampled) or colony readings found by counting the colonies that develop/grow on a nutrient media after sampled air has impacted that nutrient media (**CFU/m^3** - colony forming units per cubic meter) are undesirable. Because of the wide range of human sensitivities or allergic reactions to the irritants in/on mold spores AND the limited scientific research linking spore levels to various immune system reaction, no scientifically-based "standards" have yet been developed by medical or governmental agencies.

[One medical commentary was issued in May 2004 by the Institute of Medicine (part of the National Academy of Sciences) in its report on "Damp Indoor Spaces and Health," in which they state, "there are no generally accepted health-based standards for acceptable concentrations of fungal (mold) spores, hyphae or metabolites in the air." However, there is informal guidance from industrial hygienists and some allergists to try to keep indoor spore levels below 1,000 S/m^3 in order to minimize the irritation for the *general* population. Some have suggested that a "healthy" level be considered at 500 CFU/m^3 or 500 S/m^3. **NES** uses 1,000 S/m^3 of *Asp/Pen* like spores as its informal guideline for the general population (see explanatory note at www.NausetEnvironmental.com) and 500 S/m^3 of *Asp/Pen* like spores for sensitized individuals. Sensitized or allergic individuals may well be irritated and react at levels well below that guideline level. More information can be found on mold and health at the Centers for Disease Control and Prevention website - http://www.cdc.gov/mold/dampness_facts.htm.]

- DEBRIS RATING - This column in the Attachment B data report for the Cyclex-D spore trap results is an evaluation of the "non-biological debris on the impact area examined by the microscopist." As more non-biological debris is plated on the impact area during the sampling, it coats and covers spores laid down earlier so that the microscopist cannot see/count the spores. Hence, higher debris ratings indicate difficulty in determining the number/type of spores collected on the sticky surface of the impact area. In addition, the more debris, the greater the chance that a spore would miss a sticky area and NOT even be collected. Hence, higher debris ratings lead to *under counting* of spores actually in the air.

Table 2 – Airborne Spore Levels (see Attachment B)
(**Disturbed sample numbers and results** are indicated by **bold** type.
Concentrations are expressed as spores/structures per cubic meter, S/m^3.)

Sample #	Total	Breakdown of dominant species (~80%)
900-1	**120**	Ascospores (NONE) – 0%, ***Asp-Pen* like (NONE) – 0%,** basidiospores (60) – 52%, *Cladosporium* (40) – 35%

NOTE: "*Asp-Pen* like" refers to *Aspergillus* and *Penicillium* spores that are indistinguishable under the light microscope. The symbol "<1%" is read as "less than 1%."

Looking at the data from Attachment B extracted into Table 2, one sees that

- The disturbed sample in the reception area (#900-1) had a very low total mold spore concentration of 120 S/m^3. 87% of this reading were common outdoor spores – basidiospores (52%) and Cladosporium (35%). *Asp-Pen*-like spores which **NES** refers to as common moisture/leak indicators (see above) were NOT DETECTED. [Asp-Pen like spores are irritating to allergic or sensitized individuals. They are also a common indicator of indoor mold growth in response to **wet/moist conditions; so NES** looks for trends/patterns in those values in particular to see what the indications and implications are for the occupied space.]

There were no *Stachybotrys* spores detected during this sampling. *Stachybotrys* is the "toxic black mold" mentioned heavily in the media.

NOTE also: The "debris rating" was "4+" for this disturbed air sample. As noted above, this rating is an indication of non-biological matter that has plated on the collection slide during the sampling, covering up some of the surface and preventing the microscopist to view/count some spores (see header for Attachment B). The **"4+" debris rating** indicates that 76-90% of the sample trace was obscured, leading to a likely undercount of spores present in #900-1, **BUT, MORE IMPORTANTLY, indicates the likely presence of irritants in the reception area .**

SUMMARY & DISCUSSION
The sensory/instrumental inspection of this building did not indicate active biological growth in the occupied space at this time. The MM readings did indicate several water-impacted areas that may have hidden mold growth, also known as **Condition 3 contamination,** in response to water

seepage, calling for careful examination so as not to distribute spores from such growth to the occupied spaces.

The moisture readings indicated **unacceptably damp conditions** in the in the front Officers Room wall and under two rear windows in the rear Officer's Room and Reception area.

The hypothesis testing by air sampling ***REFUTED* hypothesis A for the disturbed sample in the reception area** (meaning mold conditions were ACCEPTABLE).

> Hypothesis A There **are** spore levels of concern the reception area, especially under disturbed conditions when **Condition 2**, settled spores, and spores from hidden mold growth, **Condition 3**, are suspended into the air.

The hypothesis **testing indicates that mold spore levels in the reception area are acceptable BUT that irritant levels associated with dust and debris are NOT acceptable.**

RECOMMENDATIONS:

MOISTURE
There are several suspect leak areas that need to be addressed and corrected if not done so already:

- Kitchen ceiling
- Briefing room ceiling
- Interview room (right) ceiling
- Attic stack penetrations
- Various areas where stained DCT indicate leak events
  [Once a leak has been repaired, it is best to replace the DCTs to remove the reminder of past leaks and serve as markers for renewed leaks in the same area.]

There are at least three areas with indication of water damage from seepage that need careful attention in case hidden mold, Condition 3 contamination, has developed:

- ► Front Officers Room – front wall
- ► Rear Officers Room – under left side of rear window
- ► Reception area - under left side of rear window

In each area localized negative pressure containment needs to be set up prior to opening the walls and proceeding with water damage repair as well as possible mold remediation. Since mold remediation guidance covers most eventualities, follow the MOLD SOW below.

It is important to realize that moisture and biological growth are intimately linked. Moisture/leak control is essential since **even a 99.9+% effective mold remediation effort will leave spores behind that will multiply and produce new colonies if additional water/moisture is provided**! Hence this SOW includes moisture-control items as a priority as well as possible mold remediation measures.

- Once wall cavities are opened up and cleaned as needed, operate a commercial dehumidifier in each containment to dry the nearby structure till the wood frame read no

higher than 18% MW/MC at several locations. DO NOT RELY ON RELATIVE HUMIDITY TO INDICATE ADEQUATE STRUCTURAL DRYNESS.

MOLD

SEQUENCE OF STEPS IN REMEDIATION AND AIR POLISHING:

In light of the Condition2 and Condition 3 contamination in the indicated areas they should be cleaned by a professional mold mitigator. An appropriate mold remediation professional would be one with remediation training and individual credentials recognized by the American Council on Accredited Certification (www.acac.org) and/or the IICRC (www.iicrc.org).

In particular:

- Each area indicated above should be isolated by a plastic containment barrier with negative pressure.
- Since the presence of hidden mold growth in these cavities is unknown at this time, any workers in a contained area should wear respiratory and clothing protection per the general guidance of IICRC S520-2008 Section 8 and Chapter 6.
- **All air scrubbers should be cleaned from the previous job** AND, *most importantly*, checked (preferably using a particle counter to document its collection efficiency) to be sure that the HEPA filter in each unit is seated/sealed properly to ensure that particles are being captured and NOT recirculated!

- After each area is contained under negative pressure the wall cavities should be opened and the source of the seepage identified for future correction.
- Remove drywall at least two feet beyond any readings of elevated moisture or two feet beyond finding any visible mold growth.
- Bag and remove impacted drywall from each containment.

- Clean each containment under the general guidance of IICRC S520-2008 Section 12 and Chapter 14 by
    - HEPA vacuuming ALL surfaces in each containment.
    - Wiping down with moldicide and seal the more impacted areas as appropriate.

Take a final step to remove settled spores by "polishing the air." This step is especially important for areas that are contaminated with settled spores, as this basement is, and the goal is to significantly reduce these settled spores. The "air polishing" steps are:

- TURN OFF NEGATIVE AIR so that spores are not drawn in from adjacent, uncleaned areas.
- Set up one air scrubbers in each containment, as opposed to operating in the negative air mode. This work can proceed in sequence in each area to allow efficient use of equipment. [NOTE: Continuing the use of negative air at this time can draw in spores from adjacent uncleaned areas, reducing the effectiveness of the prior cleaning effort.]
- Set up 1-2 oscillating fans in each containment to minimize stagnant air zones. Direct them to sweep the floor and other horizontal surfaces to minimize settling.

- Periodically, use a leaf blower to stir up the settled spores left over after the remediation activities above so that they can eventually be moved to the air scrubbers on drafts from the fans and be filtered out of the air. **BE CAREFUL NOT TO DAMAGE THE INTEGRITY OF THE ISOLATION BARRIERS WITH THE STRONG DRAFTS SINCE THAT WOULD SPREAD CONTAMINATION, defeating the purpose of this entire effort.** At the same time, re-orient the oscillating fans to sweep new areas and re-direct the exhaust from the air scrubber to blow over different surfaces.
- Operate the oscillating fans and air scrubbers for at least 24-36 hours in each containment, periodically revisiting the areas for leaf blower mixing and **ALSO** repositioning the smaller fans and scrubber exhaust.
- Operate the oscillating fans and air scrubbers **an ADDITIONAL 24 HOURS AFTER the last aggressive leaf blowing** to reduce the cloud of stirred-up spores.

- Turn off all fans/scrubbers at least 12 hours before any post-remediation air sampling is scheduled to allow particles to settle into a "normal" quiet state.

Post-remediation sampling - To confirm the success of the remediation effort, post-remediation verification air sampling *could* be carried out in the basement *BEFORE removing any containment* per IICRC S520. [This post-remediation verification (PRV) sampling also needs to be carried out in a timely fashion, preferably within a few days to a week of the effort, so that ensuing moisture/humidity does not have a chance to mask an acceptable effort by regrowth. IF the space is kept dehumidified, the PRV effort can extend to a week or two.] The PRV effort *should be carried out BEFORE any remodeling/renovation* to minimize the likelihood of enclosing residual spores behind new surfaces. The goal for a successful remediation would be that that the moisture/leak indicator spores, *Aspergillus/Penicillium* like spores, are below 1,000 S/m^3 for the disturbed samples and preferably closer to 500 S/m^3 to protect sensitized individuals and that *Stachybotrys* is found at no more than single digit spore levels in a single sample

---

To avoid problems with mold in the future, be attentive to any and all water intrusion or condensation issues. In particular:

- Respond quickly to correct any leaks that may develop or become evident.

== == == == == == == == ==

The above discussion and recommendations are related to background information provided and the conditions visually observable at the time of **NES**'s site visit on 26 August 2015 and are thus limited to these activities and timeframe. Future events and changes in the condition and operation of the building may well alter the conditions for biological activity/growth, especially moisture. Such changes will alter the relative significance of these recommendations and the effectiveness of their implementation. Thus the impact of such changes and cannot be considered part of the scope of this report/work.

I trust the above information is sufficient for your current needs. Please call us with any questions or to clarify points.

Very truly yours,

William M. Vaughan, PhD, QEP, CIEC
President, Senior Scientist
QEP=Qualified Environmental Professional (since 1994)
CIEC=Council-certified Indoor Environment Consultant (#0608142)

C:\BV Files - Dell\IAQ\900 Tisbury DPW - MMI + baseline.RPT.docx

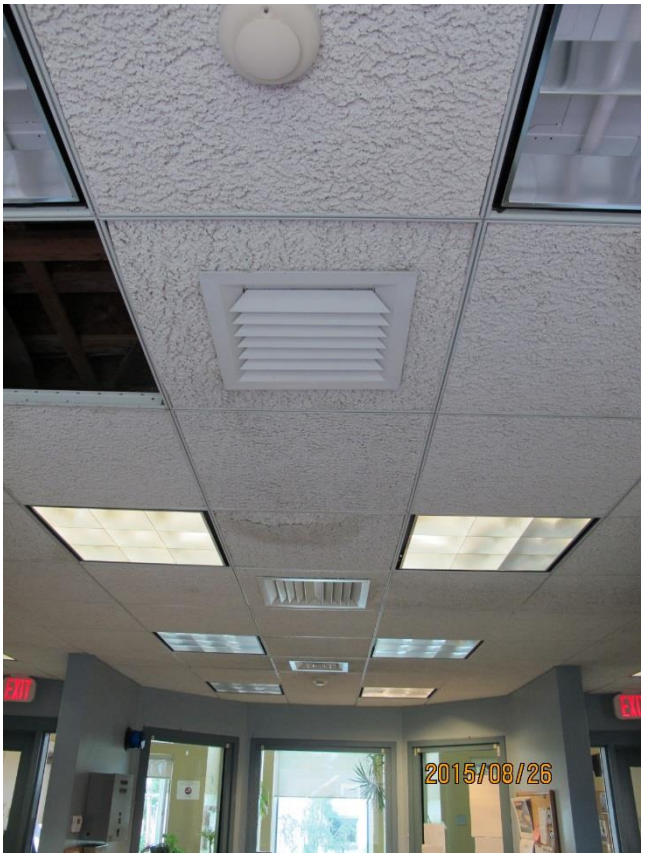
Attachment A

Photographs Taken During the Inspection & Sampling

Inspection photos

Tisbury Police Station 32 Water Street

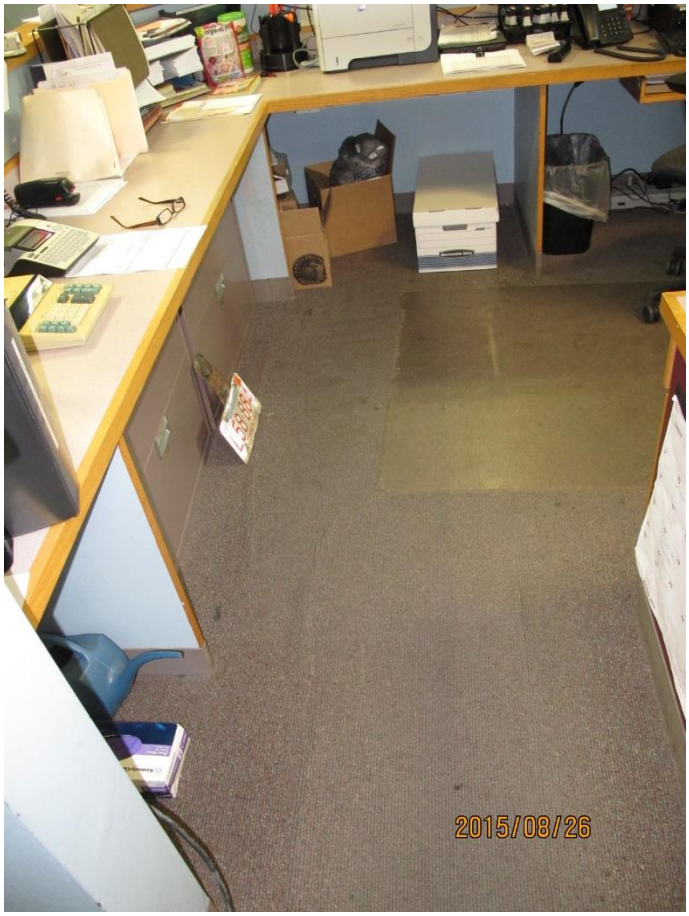
Second floor



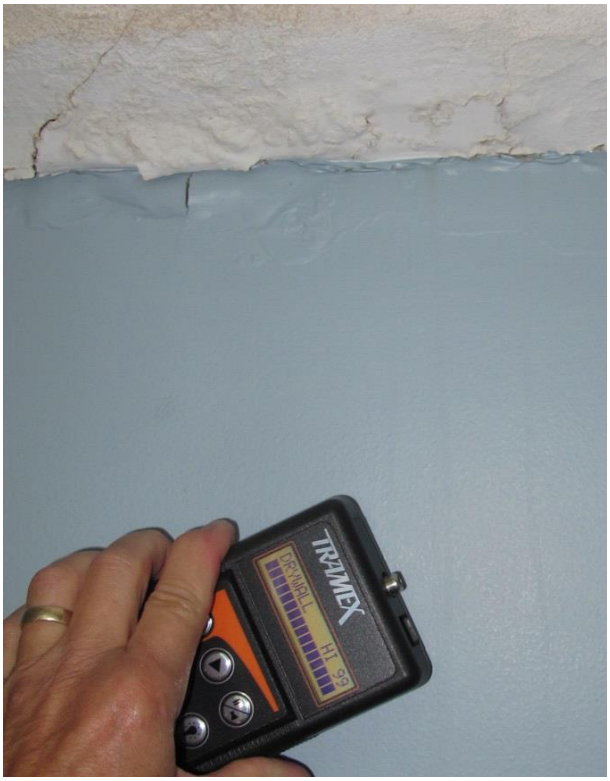
Clean supply grates in reception area

Dirty return grate in reception area

Old, deteriorate carpet in reception area (perhaps contributing to the high debris reading in the air sample)



Water-damaged right, front wall (as viewed from the parking lot) in front Officers Room

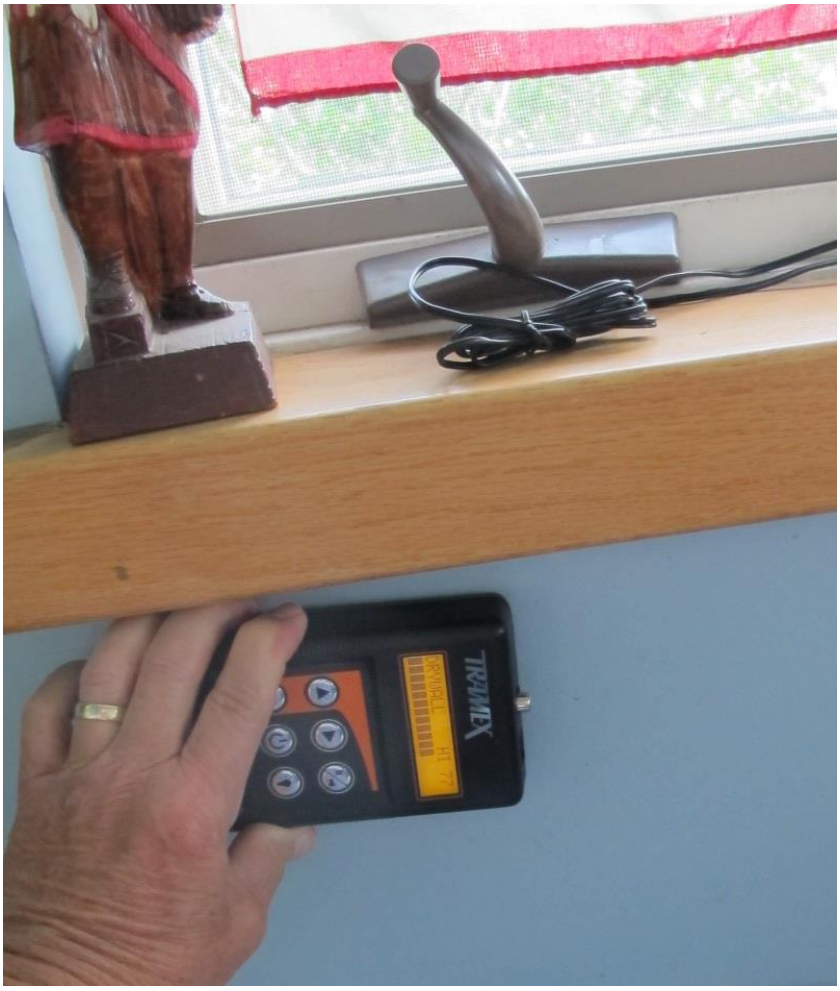


MM readings of 99% FS-DW in damaged ceiling area and wall below

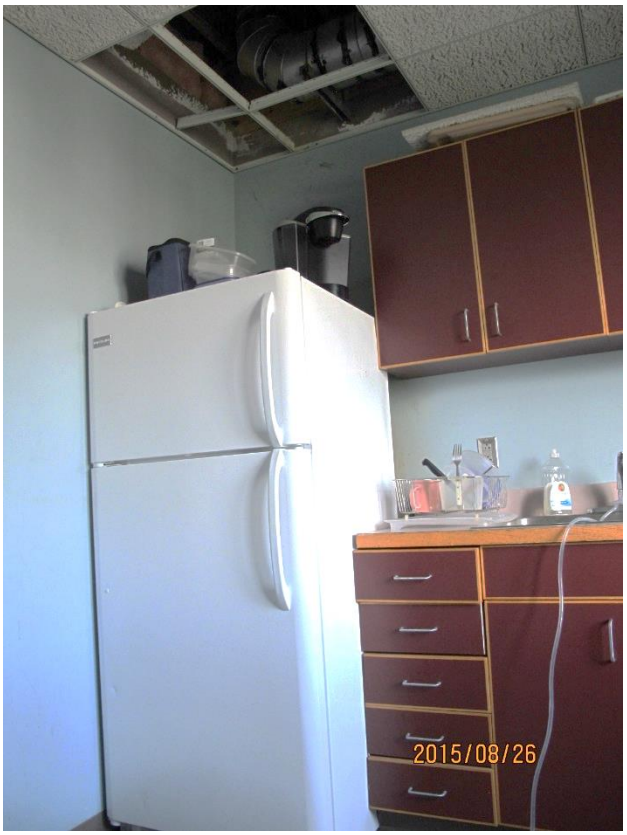
Rear wall in front Officers Room

MM reading of 67% FS-DW under lower left corner of rear window in right side wall of rear Officers Room

MM reading of 77% FS-DW in lower left corner of rear window in rear Offices Room – a strong indication of moisture penetration



Clean grate in rear Officers Room



Suspect leak area above ceiling in kitchen

Elevated MM reading of 99% FS-DW under left corner of rear window in reception area indicating water seepage into cavity

Dirty air filter for middle air handler in attic next to jury-rigged leak trap

Elevated MM reading of 34+% MC indicating a still active leak associated with exhaust penetration

Lower Level

Two Oceanside dehumidifiers operating in and near briefing room

Ceiling leak in Briefing Room

Dirt pattern on DCTs indicating ineffective air filter for air handler serving Briefing Room

Indication of leaks in right interrogation room

Sampling Location

ATTACHMENT B

Laboratory results from EMLab P&K, LLC

The "Debris Rating" column in the data report is an evaluation of the "non-microbial debris on the impact area examined by the microscopist. Here is a summary of the meaning/significance of those codes.

Non-Microbial Particulate Debris Rating	Description	Interpretation
0	No particles detected in impaction line area.	No particulates on slide in impaction line area. The absence of particulates could *indicate improper sampling or a blank sample*, as most air samples typically contain some particulates
1	Minimal non-microbial debris present.	Reported values are *not affected by debris*.
2	Up to 25% of the trace occluded with non-microbial particulates.	Non-microbial particulates can mask the presence of fungal spores. As a result, *actual values could be higher than the numbers reported*. Higher debris ratings increase the probability of this bias.
3	26% to 75% of the trace occluded with non-microbial particulates.	
4	76% to 90% of the trace occluded with non-microbial particulates	
5	Greater than 90% of the trace occluded with non-microbial particulates.	Sample *could not be read due to excessive debris*. Reported concentrations are estimations calculated from the number of spores observed on the perimeter of debris. The sample should be collected at shorter time interval, or other measures taken to reduce the collection of non-microbial debris.

The Limit of Detection is the product of a raw count of 1 and 100 divided by the percent read. The analytical sensitivity (counts/m3) is the product of the Limit of Detection and 1000 divided by the sample volume.

*All AIHA accredited laboratories are required to provide raw counts of fungal structures in spore trap reports. These counts are defined by AIHA as "Actual count without extrapolation or calculation". The number in parentheses next to the fungal type represents the exact number (or raw count) of fungal structures observed.

‡ A "Version" greater than 1 indicates amended data.

§ Total has been rounded to two significant figures to reflect analytical precision.

EMLab P&K
3000 Lincoln Drive East, Suite A, Marlton, NJ 08053
(866) 871-1984 Fax (856) 489-4085 www.emlab.com

Client: **NAUSET ENVIRONMENTAL SERVICES**
C/O: William M. Vaughan
Re: **900; Tisbury Police Dept - MMI**

Date of Sampling: 08-26-2015
Date of Receipt: 08-27-2015
Date of Report: 08-31-2015

SPORE TRAP REPORT: NON-VIABLE METHODOLOGY

Lab ID-Version‡ Location	Air vol. (L)	Background Debris	Counts of Fungal Structures	Fungal Structures/m3	Presumptive Fungal ID (raw counts*)	Percentage
6518328-1	200	**4+**	12	60	**Basidiospores (3)**	**52**
08/31/2015			8	40	**Cladosporium** (2)	**35**
9W-1			1	5	Epicoccum (1)	4
Reception - disturbed			1	5	Other brown (1)	4
			1	5	Pithomyces (1)	4
				§ **Total: 120**		
			1	5	Hyphal fragments (1)	N/A
Comments:						

Background debris indicates the amount of non-biological particulate matter present on the trace (dust in the air) and the resulting visibility for the analyst. It is rated from 1+ (low) to 4+ (high). Counts from areas with 4+ background debris should be regarded as minimal counts and may be higher than reported. It is important to account for samples volumes when evaluating dust levels.

The analytical sensitivity is the spores/m3 divided by the raw count. The limit of detection is the analytical sensitivity multiplied by the sample volume divided by 1000.

*All AIHA accredited laboratories are required to provide raw counts of fungal structures in spore trap reports. These counts are defined by AIHA as "Actual count without extrapolation or calculation". The number in parentheses next to the fungal type represents the exact number (or raw count) of fungal structures observed.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total has been rounded to two significant figures to reflect analytical precision.

*All AIHA accredited laboratories are required to provide raw counts of fungal structures in spore trap reports. These counts are defined by AIHA as "Actual count without extrapolation or calculation". The number in parentheses next to the fungal type represents the exact number (or raw count) of fungal structures observed.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".
§ Total has been rounded to two significant figures to reflect analytical precision.

.

Attachment C

Ecology and Pathology of Species Reported

NOTE: Characteristics of the major species found at levels above 10% and listed above have been collected from the University of Minnesota, Dr. Fungus and EMLab P&K, LLC websites.

ascospores

ECOLOGY - A general category of spores that have been produced by means of sexual reproduction. Many ascospores can germinate and later produce asexual spores (conidia). To further complicate matters, some asexual fungi can also become sexual under specific conditions, these are considered ascomycetes.

PATHOLOGY - This generalized group contains potential opportunistic pathogens and toxin producers. They are suspected allergens, though not yet proven.

Aspergillus species

ECOLOGY – Spores from this genus are commonly found in outdoor air, but less frequently than *Cladosporium, Penicillium,* Basidomycetes or yeasts. (Their spores are difficult to differentiate from *Penicillium* spores hence they are reported with those spores when only microscopic identification is requested, rather than culturing.)

PATHOLOGY – Of the more than 150 species and varieties of *Aspergillus*, some are known to cause diseases in animals and humans. Several species are commonly isolated in buildings. Many *Asp.* Species can produce mycotoxins depending on the substrate on which they are growing. Antigens of *Asp.* species are available commercially.

basidiospores

ECOLOGY - Sexual spores from a variety of molds that do not thrive in the indoor environment.

PATHOLOGY - Some basidiospores have been shown to cause allergies and asthma.

Cladosporium sp.

ECOLOGY - They are the most commonly identified outdoor fungus (48-60 species). The most common ones include *Cladosporium elatum*, *Cladosporium herbarum*, *Cladosporium sphaerospermum*, and *Cladosporium cladosporioides*. *C. herbarum* is the most frequently found species in outdoor air in temperate climates. Since it is a "dry" spore formed in very fragile chains, it is easily dispersed, hence often found in air samples. The outdoor numbers are reduced in the winter and are often high in the summer. While often found indoors their numbers are less than outdoor numbers, implying that the outdoor environment is the source of these spores. Indoor *Cladosporium* sp. are commonly found on the surface of fiberglass duct liner in the interior of supply ducts, on windows with occasional condensation and on wall surfaces in high humidity conditions or occasional condensation. A wide variety of plants serve as food sources for this fungus. It is found on dead plants, woody plants, food, straw, soil, paint and textiles. They are common in soils, dead organic matter and the air. These fungi can decompose cellulose and are considered "ubiquitous."

PATHOLOGY - The ability to sporulate heavily, ease of dispersal, and buoyant spores makes this fungus the most important fungal airway allergen; causes asthma and hay fever in the Western hemisphere. They are a rare human pathogen. They can cause mycosis and produce greater than 10 antigens (initiators of allergic response) available commercially. They are a common cause of extrinsic asthma (immeadiate-type hypersensitivity: Type I allergen), Type III hypersensitivity pneumonitis: hot tub lung, moldy wall hypersensitivity, etc. Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema.

***Penicillium* sp**.

ECOLOGY - A wide number of organisms have placed in this genus and they are well studied because of their value as producers of antibiotics. Identification to species, among the 200 or so identified to date, is difficult and expensive. They are often found in aerosol and soil samples. They are a ubiquitous saprophyte (meaning they live on dead or decaying organic matter) and "are found everywhere." They are commonly found in temperate regions in soil, food, cellulose and grains as well as on living vegetation. They are also found in paint and compost piles and soils. They are commonly found in water-damaged dry wall, damp latex paint, carpet, wall paper, and on interior fiberglass duct insulation. (Their spores are difficult to differentiate from *Aspergillus* spores hence they are reported with those spores when only microscopic identification is requested, rather than culturing.)

PATHOLOGY - They may cause hypersensitivity pneumonitis and/or allergic alveolitis in susceptible individuals. They are reported to be allergenic (skin). Some species can produce mycotoxins. They are a common cause of extrinsic asthma (immeadiate-type hypersensitivity: type I). Acute symptoms include edema and bronchiospasms, chronic cases may develop pulmonary emphysema. Can cause allergic reactions to sensitized people and are associated with mycotic keratosis in humans.

Molds - www.epa.gov/iaq/molds [provides link to mold resources]

Building Sciences - http://www.buildingscience.com/resources/more-topics/mold/

Centers for Disease Control**:** http://www.cdc.gov/mold/dampness_facts.htm

Minnesota Department of Health: Mold in Homes
http://www.health.state.mn.us/divs/eh/indoorair/mold/index.html