

# Nauset Environmental Services

an Indoor Environment Company

Date

Customer

Re: Mold/Moisture Inspection

Dear Customer,

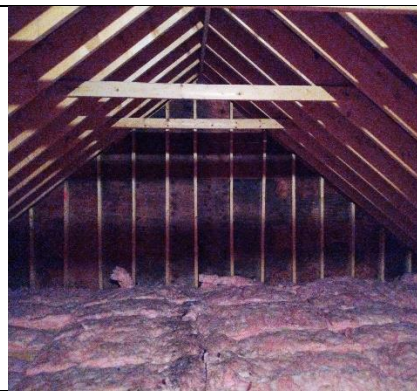
**Assignment:** Nauset Environmental Services (NES) was asked by the homeowner to undertake a mold/moisture inspection to include the collection of fan-disturbed air samples to document current conditions at the above-referenced home subsequent to concerns raised by the tenants relative to elevated humidity and mold growth.

**This report is confidential, proprietary and can only be distributed by or with the approval of the NES client to whom it is addressed.**

**Observations & Activities:** Out inspection of the home's exterior revealed the following:



Note how wet the cedar shingles on the north-facing gable end, particularly the section immediately opposite the attic.



Notice significant staining on sheathing on north-facing gable wall in attic which, when tested with the Tramex moisture meter (MM) showed saturated conditions.






Note debris in the gutter. Also note the small, "hockey puck" style soffit vents that extend around the house which may contribute to inadequate attic ventilation.

We did not detect any musty odors while touring the home's interior. [Moldy odors come from currently active colonies, i.e., microbial volatile organic compounds (MVOCs) that are released from active colonies digesting the organic matter upon which they are growing.]

Using a Tramex moisture meter (MM), we detected elevated moisture levels in the particleboard shelf directly below the kitchen sink and also all along the cove molding on the L-shape portion of the kitchen counter. The particleboard below the sink is sagging quite severely which indicates there have been one or more significant water releases there.

The tenants shared a recent photo they had taken in the basement documenting a recent release of water from the first floor which appears to line up with the kitchen cabinetry. There is a small bit of visible mold growth (VMG) on the back side of the wooden kick plate the tenant removed from the L portion of the kitchen cabinetry.

		
<p>The particleboard shelf under the kitchen sink has collapsed from excessive moisture and the Tramex moisture meter (MM) revealed saturated conditions.</p>	<p>The particleboard on the L portion of the kitchen cabinetry shows saturated conditions when tested with the MM.</p>	<p>VMG on the underside of the kitchen cabinetry cove molding.</p>

There was also some VMG on one of the wooden windows in the master bedroom which the tenants attribute to excessive condensation on the window glass. Any such instances of excessive condensation on the home's windows is likely due in large part to the absence of bath fans to capture and exhaust shower steam out of the house. There were also several scented candles burning in the home during our visit. According to [bard.google.com](http://bard.google.com): *"During the burning process, candles release water vapor as a byproduct of combustion. This moisture adds to the overall humidity level."* Also *"When burned, paraffin wax can release chemicals like benzene and toluene, which are known carcinogens."*



VMG on a wooden window in the master bedroom.

Using an Extech Humidity Pen, we measured relative humidity levels and found them exceeding 70% on both levels of the occupied portion of the home. It is important to keep humidity levels below 70% (aim for 60%) to prevent mold contamination.

We discovered that neither bathroom is equipped with an exhaust fan. It is therefore likely that shower steam is a major contributor to the elevated humidity inside the home.

As noted in the captioned photo above, our inspection of the attic revealed that the north-facing sheathing on the northern gable wall is stained and saturated.

**Sampling Activities:** To document current conditions in the home, we walked two areas (living room and second floor master bedroom) within the occupied portion of the home with a handheld fan directing the air stream along and atop horizontal surfaces to aerosolize settled dust. We jostled window treatments and struck upholstered furniture and bed linens in those rooms with our hand. The intent was to simulate an aggressively lived-in space and aerosolize some of the settled dust. After waiting approximately 5 minutes, we collected a fan-disturbed air sample in each space and shipped them to AIHA-LAP accredited mold laboratory Eurofins in Marlton, NJ for analysis.

**Data Interpretation:** We compare the indoor air sample results against NES’s health-based guideline of 1,000 *Penicillium/Aspergillus* (*Pen/Asp*) spores per cubic meter of air (S/m<sup>3</sup>) for the general public (500 S/m<sup>3</sup> for mold-sensitive individuals). *Pen/Asp* is considered an indoor moisture indicator species. (For more discussion on this, see [Informal Spore Guidelines | Nauset Environmental Services.](#))

We also take note of the Debris Rating assigned by the laboratory which is an assessment of the amount of non-mold particulate matter (skin scales, dust mite and other insect-related materials, pet dander, pollen, soot, etc.) present in a sample. A higher debris rating means the sample is more difficult to analyze and spores (especially smaller spores like *Pen/Asp*) may be obscured which can make it more difficult to accurately determine the concentration of mold spores in the sample. In general, a debris rating of 2 or less is considered acceptable. A debris rating of 3 or higher may indicate the sample is not representative of the actual mold level in the air because the mold spores are occluded by other particles.

Lastly, we also take note of the absence or presence of *Stachybotrys* spores. *Stachybotrys* is often referred to as the “toxic black mold”. It is a mold that has a very high water requirement to establish a colony and holds its spores in a slimy mass. The presence of *Stachybotrys* spores can indicate that conditions had been wet enough for long enough to establish at least one colony.

**Lab Results:** Appendix A has the full lab report. The most relevant data are summarized in the table below.

<b>Living Room</b>			
<b>Background Debris Rating</b>	<b>Concentration of Pen/Asp spores (S/m<sup>3</sup>)</b>	<b>Exceed NES’s guideline?</b>	<b>Stachybotrys (#spores)</b>
<b>4+</b>	180	no	<b>0</b>
<b>Master Bedroom</b>			
<b>Background Debris Rating</b>	<b>Concentration of Pen/Asp spores (S/m<sup>3</sup>)</b>	<b>Exceed NES’s guideline?</b>	<b>Stachybotrys (#spores)</b>
<b>4+</b>	280	no	<b>0</b>

**Discussion:** Neither fan-disturbed air sample recorded a *Pen/Asp* spore concentration approaching NES's health-based guideline; nor did either sample show any *Stachybotrys* (i.e., "toxic black mold") spores.

Curiously, both samples recorded elevated concentrations of *Basidiospores*. According to Bard, "*Basidiospores are more commonly found outdoors in areas with decaying organic matter, such as forests and gardens.*" We have occasionally seen elevated basidiospore spore levels in air samples collected in homes and offices with many houseplants. According to Bard, "*While some basidiospores can cause respiratory problems in people with allergies, they are generally not considered to be a health hazard.*"

The Background Debris Ratings assessed by the laboratory analysts for both samples were elevated indicating that the mold spore concentrations could be higher than those reported by the lab. As noted above, there were several scented candles burning while we collected the air samples. It is possible that candle soot contributed to these elevated Debris Rating readings.

**Recommendations:** It is important to realize that moisture and biological growth are intimately linked. Moisture control and good housekeeping controls are essential to prevent mold contamination.

We measured elevated relative humidity levels in the occupied portion of the home, detected elevated moisture levels in different parts of the home with our moisture meter, and observed two small patches of visible mold growth. This is all evidence that moisture control and general housekeeping both need to be improved.

We offer the following Recommendations for your consideration:

1. Exhaust ventilation should be installed in both bathrooms so that steamy air from baths and showers is captured and exhausted out of the house.
2. The attic sheathing in the north-facing gable wall is saturated. This is evidence the attic ventilation needs to be improved. A well-ventilated attic should have equally effective upper and lower venting. There appears to be a ridge vent (upper venting) running the length of the house. It is possible the "hockey puck" type soffit vents (lower venting) are inadequate. We recommend you retain the services of a competent energy auditor to evaluate this. The Commonwealth's Mass Save program ([masssave.com](http://masssave.com)) can provide a referral. Mass Save energy audits are free and the improvements recommended by the auditor are often heavily subsidized by the Mass Save program.
3. Water vapor may be infiltrating the attic around the thin plywood barrier separating the attic from the occupied portion of the home. Installation of a thermal dome would probably remedy this. Again, this is a service the Mass Save energy auditor can often provide.
4. There appears to be an active leak in the kitchen under the sink and/or dishwasher. The cabinetry there needs to be removed so that a plumber can inspect the area thoroughly and diagnose and remedy the problem(s).
5. Considering the home's proximity to the ocean and the elevated relative humidity levels we measured inside the home (in January which is typically the driest month), there may be value in installing ductless mini-splits which should remain on 24/7/365 so they are available to strip moisture out of the air and control the relative humidity inside the home. Mass Save has in the recent past offered generous rebates for mini-split installs.

6. Several gutters showed evidence of excessive debris. They should be cleaned out to prevent ice dams.
7. Scented candles should be used sparingly and always ventilate the space after their use.
8. We do not believe the air sampling data are indicative of a situation requiring professional mold remediation service. A thorough house cleaning with a vacuum cleaner equipped with HEPA filtration should suffice for now. The vacuum cleaner *must* have HEPA filtration. Use the vac's hand attachment to clean dust off the windowsills and edges. The small patches of VMG we observed can be cleaned with the HEPA vac hand attachment. It would be prudent for anyone using a vacuum cleaner to wear appropriate respiratory protection; an N95 mask at a minimum.

Failing to implement the moisture controls enumerated in the Recommendations above could ultimately result in conditions that would prompt us to change our evaluation regarding the need for professional mold remediation.

**Closing:** The above discussion and recommendations are related to the conditions visually observable and measurable at the time of our visit. Subsequent events and/or changes in the condition and operation of the house may well alter the conditions for biological activity. Thus, the impact of such changes cannot be considered part of this report. Please contact me if you have any questions.

Very truly yours,



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