Nauset Environmental Services, Inc.

an Air Quality Company

27 October 2009

NES Job # 3-888
Report No. **NES**/IAQ-09/1033

Jack Sprat
General Real Estate
Chatham, MA 02633

Re: Mold/moisture inspection
for 69 Ridgewood South (W. Chatham)

Dear Mr. Sprat:

Nauset **E**nvironmental **S**ervices, Inc. (**NES**) is pleased to submit this letter report from an inspection of mold/moisture issues at 69 Ridgewood South (W. Chatham). Following initial verbal authorization, **NES** sent William M. Vaughan, PhD, QEP, CIEC to the property on 26 October 2009 to inspect for areas of moisture and observable mold growth.

BACKGROUND: During pre-purchase evaluation of this home, potential buyers had commented on the apparent mold growth on some surfaces. **NES** was retained to carry out an inspection to ascertain the extent of visible mold growth (VMG) and the source of moisture that promoted that growth.

EXECUTIVE SUMMARY The results from this inspection found light condensation mold growth (CMG) on some ceilings and walls. The CMG is only on the surface and is in response to moisture condensing on cooler surfaces on high dew point (high spring/summer relative humidity) days over the years.

Suggestions are provided for controlling future CMG.

ON SITE ACTIVITIES – Dr. Vaughan arrived at the house on 26 October about 10:00 am. He met you and you escorted hi through the house. Dr. Vaughan inspected the house for mold and moisture conditions on all levels. Photographs were taken at this time (see Attachment A).

OBSERVATIONS: Observations at 69 Ridgewood South during this inspection are provided below:

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General

- It was a sunny day with a temperature near 50F and calm winds.
- The house had baseboard hot water radiators.
- There was NO heavy, moldy odor noted on entering the house. [Moldy odors come from "microbial volatile organic compounds (MVOCs)" that are released from active colonies digesting the organic matter on which they are growing.]

First floor

- There was condensation mold growth (CMG) on the front ceiling in the living room

  CMG forms in the thin layer of water that condenses when high dew point air contacts cooler surfaces. The dew point temperature of the air is loosely related to relative humidity but is specifically defined as that temperature at which the air gives up some of its moisture to a surface cooler than that temperature. This condensation occurs frequently in bathrooms on ceilings when the room is not ventilated. It forms in other rooms primarily in the transition season when a building's surfaces are warming up from winter and damp outdoor air enters through windows or doors or when windows and doors are opened after an air conditioner has chilled those surfaces.

  As far as mold is concerned, mold spores contain digestive enzymes that are inactive when dry. When there is moisture, even a thin layer, spores on that surfaces are activated and start to digest even the thinnest layer of organic matter that may have blow in from outdoors or been created by indoor activities such as cooking. Once the mold digests enough organic matter it can produce structures that search for organic matter nearby. If the moisture dries up or the organic matter is depleted, the mold goes dormant, waiting for more moisture. Hence, CMG builds up slowly over time until it is visible to the human eye. [NOTE: Mold spores are so small that they cannot be "seen" without a microscope. What is observed are tiny colonies that may or may not be linked together.] CMG is characterized by a general light pattern that is fairly uniform over and on a surface as opposed to a denser pattern that develops in the presence of considerably more moisture than the thin layer of condensation.

- There was little to no observable CMG on the kitchen and dining room ceilings.
- There was light CMG in the left rear bedroom.
- There was no CMG in the bathroom.
- Under the bathroom sink there was no odor or mold growth, only stains from rusty containers stored there (see photo).
- The utility area off the bathroom did not have any indication of leaks or readily observable mold growth.

Second floor

- There was no CMG on the bathroom ceiling.
- The bathroom sink did not have staining, moldy odors or readily observable mold growth.
- The right rear bedroom did not have CMG.
- The front bedroom had CMG on the front of the ceiling, but not toward the rear where it was under the attic. Someone had tried to wipe away the CMG (see photo).
- There was also CMG on the front wall of this bedroom.

Basement

- There was no moldy odor noted on entering the basement.
- There were cobwebs scattered around the basement, indicating that it has been damp in the past.
- The basement was not finished and mainly used for storage.

- There as an old dehumidifier that was unplugged and had not been operating for some time. As noted below it should be replaced with a modern, energy efficient unit, drained into a condensate pump that would discharge to the available PVC drain pipes in the ceiling or to the washing machine discharge, and operate continuously year round.

Exterior

- Most of the downspouts terminate in piping that appears to go to drywells (see photo). It is not easy to tell whether drywells are still functional. They do "age" and can become plugged with gravel washing off the roof over the years.
- The shrubbery is growing too closed to the building (see photo) to allow proper ventilation and drying.

DISCUSSION & SUMMARY:

During this moisture and mold inspection the conditions in the living space of this house were found to be dry with observable CMG on various surfaces. As explained above, CMG is a natural response of mold spores to thin layers of condensed water that form when elevated dew point air encounters cooler surfaces.

The dampness evident in the basement is demonstrated by the presence of cobwebs. After the air is dried by operating a dehumidifier properly (see below) the spiders forming the cobwebs will have fewer microscopic organisms to live on and eventually disappear.

SUGGESTIONS:

There is little one can do to prevent water from condensing on surfaces. So light CMG is to be expected over the years.

In bathrooms replacing toggle switches with timer switches will encourage the operation of exhaust fans long enough after the room is used to exhaust the high dew point air following a shower, for example.

One can address the presence of CMG, especially if there are allergic or sensitized individuals planning to live in the house:

- Use a HEPA-filtered vacuum to clean the affected surfaces since the HEPA (high efficiency particulate air) filter retains small particles like mold spores and reduces their dispersal
- Once a surface is cleaned it can be wiped with an appropriate moldicide OR pained with a mold-resistant paint. Paints from Fiberlock, Drilok and Zinsser can be found with multi-year warranties resist mold growth.

T improve the drying of the building, trim the vegetation so there is *at least* a foot clearance from the building to allow better ventilation and drying.

Additional general recommendations to reduce the risk of future moisture/mold problems in the house include the following:

- Respond quickly to correct any leaks that may develop or become evident.
- Turn off the water to the washing machine ANY TIME the home is vacated for several days since rubber hose failure can occur in any season and cause massive water damage! It is preferable to follow this practice after EVERY use of the washing machine.
- Operate an Energy Star-rated dehumidifier on the floor of the basement throughout the year with adequate separation from solid objects and in conjunction with a small bilge pump in the collection bucket or a condensate pump outside the unit that discharges the collected water to a suitable drain, possibly the washing machine discharge. The goal is to lower the humidity to near 55-60%, so a modest dry setting is usually sufficient. Periodically clean the unit following the manufacturer's instructions.

- Clean and maintain the gutters and downspouts to ensure removal of water from the foundation

- Become familiar with the suggestions in Mold Survival Guide for Your Home and Your Health by Jeff May.

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The above discussion and recommendations are related to the information you provided and the conditions visually observable at the time of **NES**'s site visit on 23 October 2009 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 can not be considered part of the scope of this report/work.

I trust the above information is sufficient for your current needs. Please call me 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 (#0608032)

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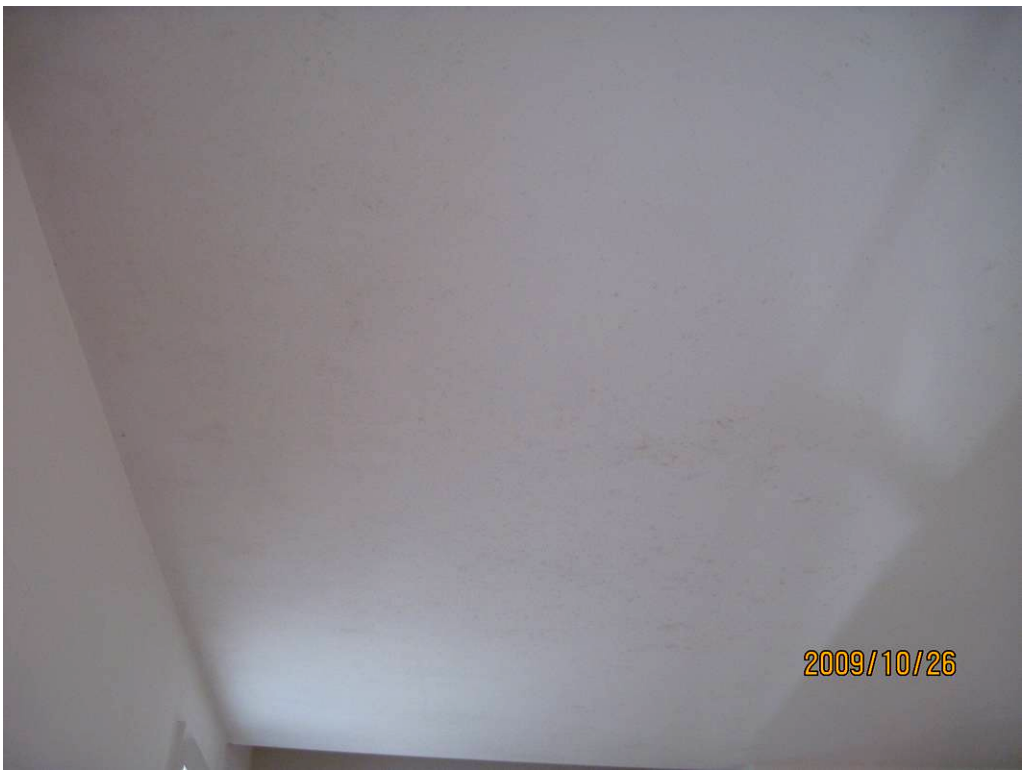
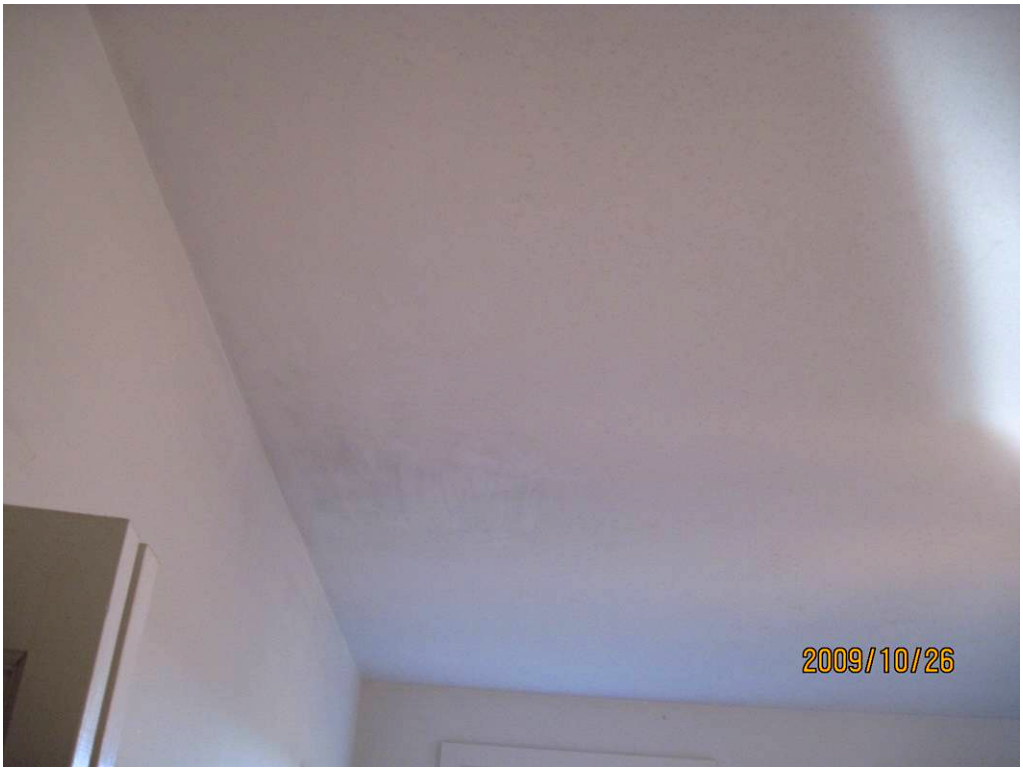
Attachment A

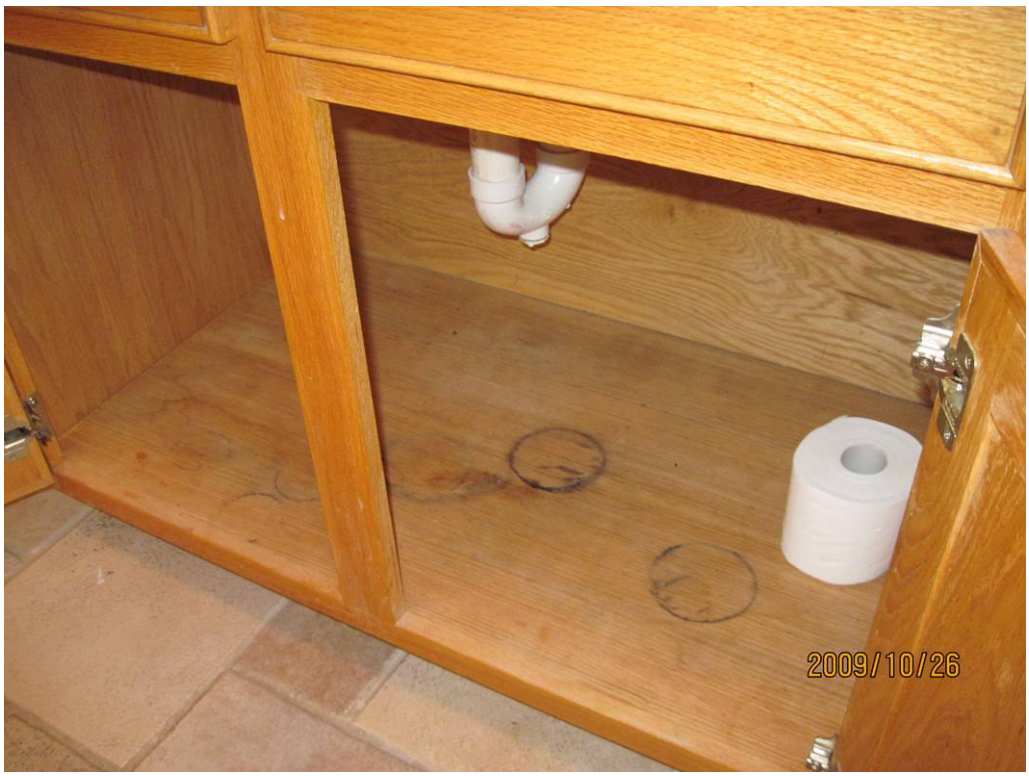
Photographs Taken During the Inspection



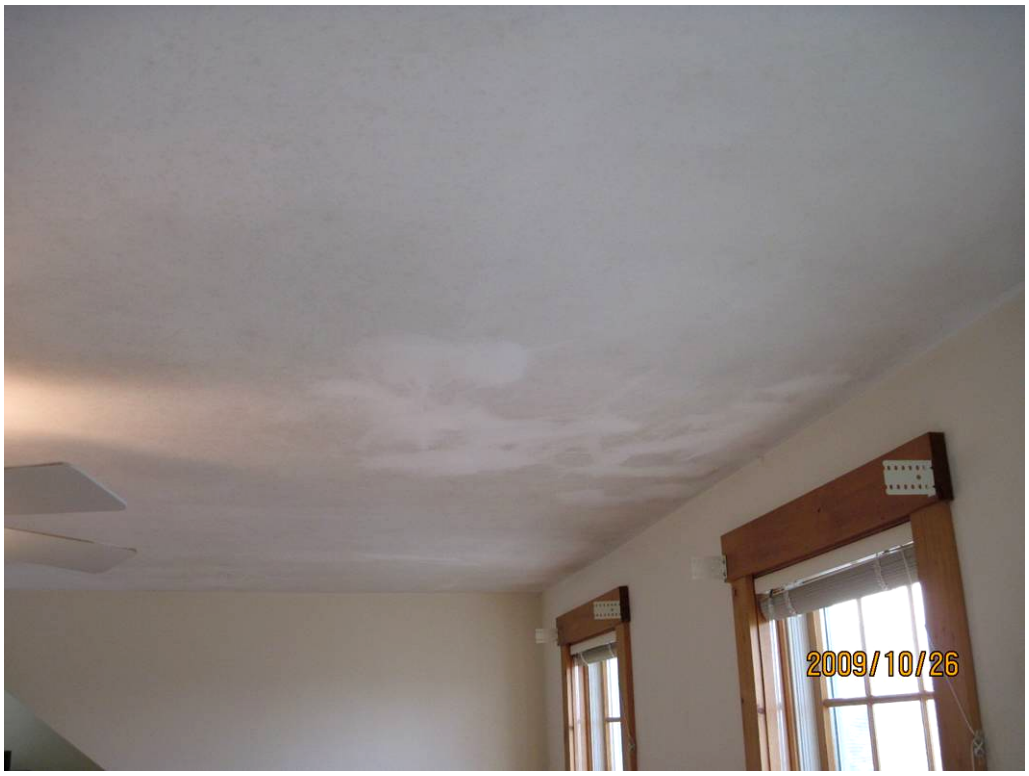
Blotchy CMG on living room ceiling



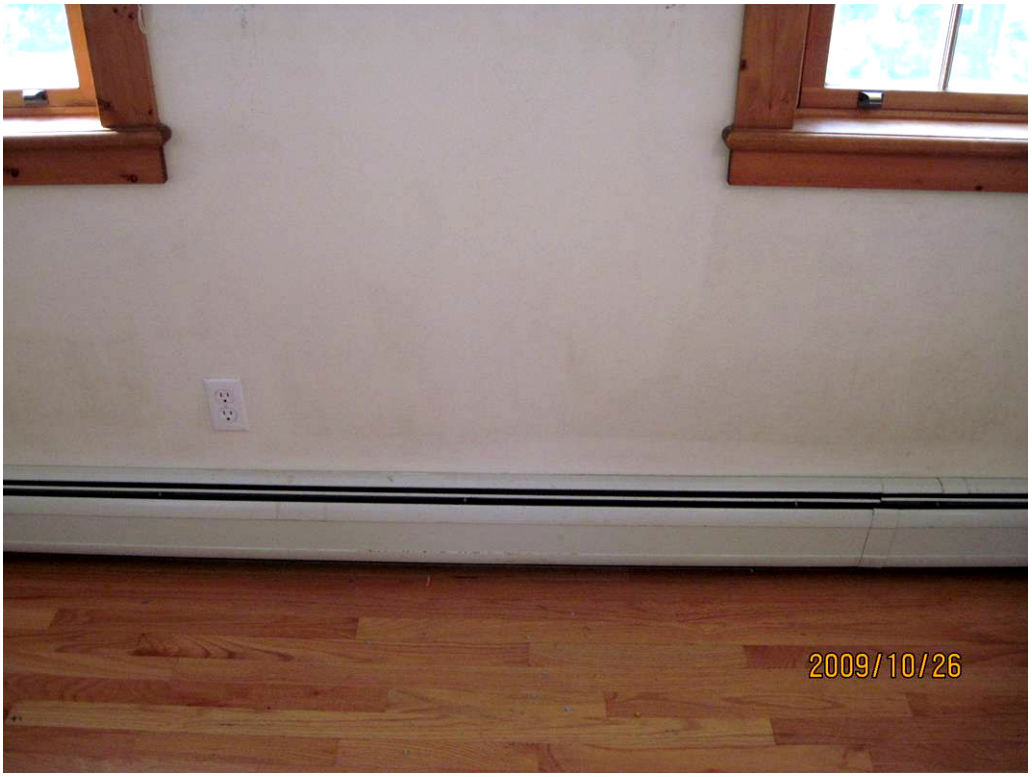
Blotchy CMG on left rear bedroom ceiling



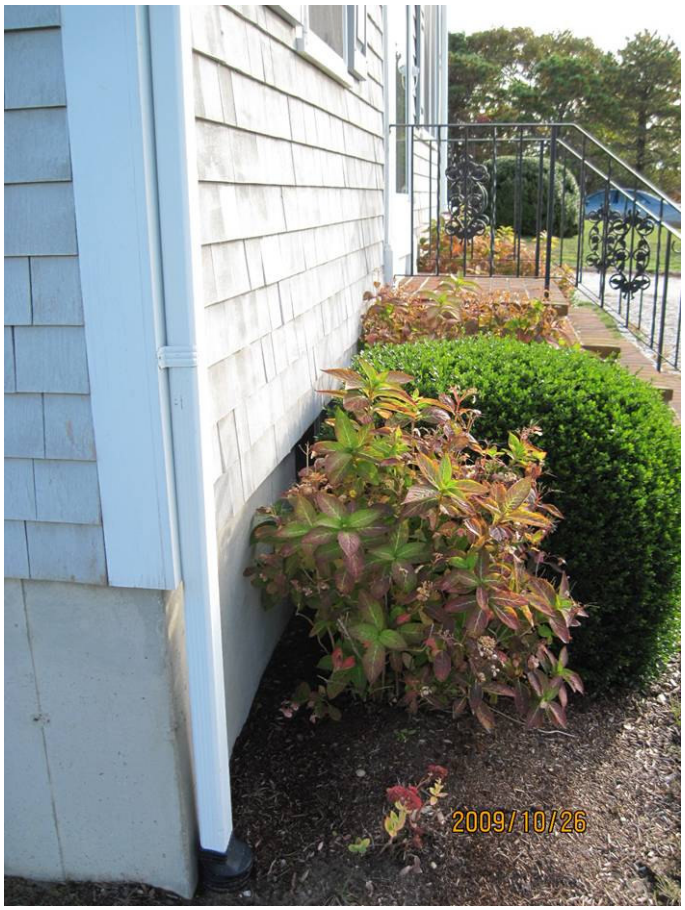
Rust stains under bathroom sink but no mold growth



CMG in second floor bedroom where an attempt was made to wipe it off



CMG on front wall of second floor bedroom



Downspout that appears to be heading to a dry well and vegetation too close to the building.