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Reference: chimneys at Buildings 2 and 3, Northface Condominiums, North Conway, NH

Dear Melissa,

Thank you for assisting Kate and I last week as we went from unit to unit at Northface. As you know we documented the appliance installation in each unit and fortunately were able to obtain manufacturer's installation requirements on almost every appliance. In this report we will provide information based on historical code requirements from the approximate time when the units were constructed along with today's requirements. As you work through the report, you will see why it is important to have both the historical and present perspectives. Before delving into the details, there are terms that the readers should understand so, some definitions.

Appliance – in this case, the “appliance” will be the wood-burning stoves, the pellet-burning stoves or the one manufactured fireplace that we discovered.

Solid-Fuel Burning Appliance – A chimney connected device that burns solid fuel (wood in this case) designed for the purpose of heating, cooking or both.

Pellet Fuel-Burning Appliance – A closed combustion pellet vented or chimney-connected solid fuel burning appliance incorporating a fuel-feed control mechanism.

Chimney Connector – The pipe that connects a fuel-burning appliance to a chimney.

Code – The written (adopted) rules or laws that mandate the safety requirements for a structure overall. The “codes” often provide the information for when and where installation or construction of certain elements are required, while “standards” (see definition further down) provide the information on how to accomplish the requirements. Please understand that codes and standards provide minimum requirements. What “minimum requirements” means is an installer cannot legally install in a manner that does not at least meet the requirements of the adopted codes. An installer can, however, install or build in a manner that is greater than code compliant. Example: Let us say the minimum floor protector size that is required for a certain woodstove is 24” x 36”. The installation would not be code compliant if installed on a floor protector that is 20” x 30” but would be compliant on one that is 28” x 48”.

Combustible Material – material made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that can ignite or burn, whether flame proofed or not, or whether plastered or unplastered.

Fireplace Stove – A freestanding, chimney-connected, solid fuel-burning appliance that is designed to be operated with the fire chamber either open or closed.

Floor Protector – A noncombustible surfacing applied to the floor area underneath and extending in front, to the sides, and to the rear of a heat-producing appliance.

Flue – The general term for a passage through which combustion gases are conveyed from the combustion chamber of the appliance to the air outdoors. In the case of Northface Condominiums, the flues are inside the masonry chimneys.

Hearth Extension – The noncombustible surfacing applied to the floor beneath an appliance and extending in front of and to the sides of an appliance.

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Listed – Equipment included in a list published by an organization that is concerned with the evaluation of products or services and inspection of listed equipment and whose listing states that the equipment meets appropriate standards or has been tested and found suitable for a specified purpose. NOTE: throughout this report you may read text similar to “in accordance with its listing.” What that means, for example, is that a solid fuel burning appliance may be (first) tested and (then) approved by an appropriate testing agency or “listed” to be installed in a manner that would appear less restrictive than the minimum requirements of a code. This testing may show, for example, that the appliance can be installed closer to combustible materials due to some inherent safety feature that is designed and built into the appliance. This is why it is always important for an inspector to determine if an appliance is “listed” and if so, that appliance might be able to be installed in a manner that is different than the requirements of the applicable code.

New Hampshire State Fire Code – the 2015 edition of NFPA 1 with State of NH amendments. The State Fire Code (editions applicable by date) did exist back in the 1980’s.

New Hampshire State Building Code – the 2015 edition of the International Building Code with State of NH amendments. NOTE: at the time of construction, there was no state-wide building code and if constructed before 1987, there was no local (Town of Conway) building code.

Room Heater, Solid Fuel – A chimney connected, solid fuel burning room heater which is designed to be operated with the fire chamber closed.

Solid Fuel – Wood, coal and other similar organic materials and any combination of them.

Standard – In the definition of “code” (above) it’s stated, *“The codes often do not provide details for installation or construction of required elements within a building.”* That’s when we have to move to the “standards” which are adopted requirements that detail how a building element is to be constructed and of what materials or, how an appliance or other piece of equipment is to be installed.

Thimble – A fixed or removable ring, tube, or lining usually located in the hole where the chimney connector passes through a wall or enters a chimney or vent.

The reason Bergeron Technical was asked to come to Northface Condominiums and inspect the installation of solid fuel burning appliances in buildings two and three was that in October of 2021 Assistant North Conway Fire Chief Chad McCarthy had been asked to review information provided by a chimney cleaning company. The information reviewed by Chad stated the installation of the various appliances was not code compliant as three wood-burning stoves were connected to and venting into a single flue at each of the eight flues. Our efforts while on site documented the connections of multiple appliances to single flues and also documented additional code deficiencies related to the installation of the appliances themselves.

In evaluating the installations of the various appliances, we first consider the code requirements that would have been in place when first installed and then, we consider the code requirements if the appliances were installed today. It is important to know how codes are applied. For example, if a solid fuel burning appliance was installed in a fully code compliant manner back in 1985, that appliance can generally remain installed and in use, regardless of code changes that occur during the life of the installation. As code changes occur, and they do frequently, the installation would be considered “grandfathered.” Please note however, we used the word “generally” (above) for a reason, that reason being that if an installation is discovered to be inherently dangerous to life or property, a Code Official could require the installation to be modified or possibly removed to eradicate the danger. Also know that if an installation was not code compliant when first performed, that installation can never develop a “grandfathered” status, which is why it is important to determine the code requirements at the time of installation. If a “grandfathered” installation is removed and will be replaced, the new installation is

required to meet the current code requirements or the listing requirements for the appliance. Let's consider the code requirements from back in the 1980's.

The applicable standard for the installation of solid-fuel burning appliances back in the 1980's would have been the 1980 edition of NFPA 211, *the Standard for the Installation of Chimneys, Fireplaces, Vents and Solid-fuel Burning Appliances*. Using this standard, we compared the installations of the various appliances that we found at Northface Condominiums to the 1980 requirements. From the 1980 edition of NFPA 211:

Table 5-5(a) Chimney Connector and Vent Connector Clearances from Combustible Materials

Solid-Fuel Residential Appliances using Single-Wall Metal Pipe Connectors 18" minimum clearance

Note 1: The minimum clearance noted above applies except if the listing of an appliance specifies different clearance, in which case the listed clearance takes precedence.

Note 4: Clearances shall be based on good engineering practice and acceptable to the authority having jurisdiction (AHJ). In the case of Northface Condominiums, the AHJ would be the Chief of North Conway Fire Department.

Table 5-5(b) Connector Clearances, Inches, With Specified Forms of Protection

NOTE: at Northface Condominiums, the majority of the units have brick masonry, or a similar masonry material applied to the two walls behind the appliances. NFPA 211 (1980) Table 5-5(b), provides three options for wall protection however, only option (b) "3 1/2" thick masonry spaced out 1" and adequately tied to the wall being protected" can be considered however, table footnote 2 also has to be considered.

Footnote 2 – All methods of protection require adequate ventilation between protective material and adjacent combustible walls and ceilings.

No method has been provided for ventilation of the enclosed space between the brick and the supporting wall therefore, this clearance reduction method does not apply.

At the time of our inspection in January of 2022, the majority of the appliance installations did not comply with the 1980 requirement for connector clearances to combustibles. Furthermore, we could not consider the masonry wall coverings as a compliant reduction method as the required ventilation method (openings at the top and bottom of the masonry walls) for the area between the back of the brick wall covering and the supporting wall does not exist.

Section 5-7.1 If a "thimble" is used to facilitate removal of the chimney connector, the thimble shall be permanently cemented in place with high-temperature cement.

The majority if not all of the chimney connectors are connected via a thimble that is attached to the chimney. Several of the thimbles are not attached adequately and some are not attached at all. In most cases there is no secure attachment between the chimney connector and the thimble. Many connectors can easily be removed from the thimble.

Section 5-7.11 Connectors shall be securely supported, and joints fastened with sheet-metal screws, rivets, or other approved means.

The majority of the joints between the various sections of connector material were adequately secured.

Section 5-8.2 Unless listed for such connection, solid fuel burning appliances shall not be connected to a flue serving another appliance burning other fuels.

We did not observe any fuels other than solid fuels being burned in the various appliances that we inspected.

Section 8-2.1 Solid fuel appliances shall be listed and installed in accordance with the terms of their listing.
See specific installation information by unit number below.

Section 8-5.2 The clearance of chimney connectors to combustible material shall be as specified in Table 5-5(a).
See specific installation information by unit number below

Specific Installation Information by Unit Number – Building #2

Unit #9 – Lopi (brand) wood burning stove. Serial # 1108-11423 Date 1-2002. Stove is placed diagonally on the hearth. Installation is not code compliant as installation manual and placard on back of stove both say, “Do not connect this unit to a chimney flue serving another appliance.”

Unit #10 – Meredith (brand) wood burning stove. Serial #424. Stove is placed diagonally on the hearth. Installation is not code compliant as vent connector is too close to the masonry and the stove is too close to the front of the hearth.

Unit #11 - No stove at the time of inspection. Reportedly a pellet stove will be installed when an ongoing remodeling is completed. We noted an electrical device box in the floor of the hearth which did not appear compliant with the requirements of the National Electric Code. Additionally, the thimble which will connect the chimney connector to both the chimney and the appliance is not secured in any way to the chimney flue.

Unit #12 - Meredith (brand) wood burning stove. Serial #364. Stove is placed diagonally on the hearth. Installation is not code compliant as vent connector is too close to the masonry and the stove is too close to the front of the hearth.

Unit #13 – Jotul Model F100 Serial #13243 Installation is not code compliant as it is stated on the placard on the rear of the stove “Do not connect this appliance to a chimney flue serving another appliance”.

Unit #14 – Lopi Model 380 – NT Serial # 14712 Installation is not code compliant as it is stated on the placard on the rear of the stove “Do not connect this unit to a chimney flue serving another appliance”.

Unit #15 – Meredith (brand) wood burning stove. Serial #631 Installation is not code compliant as vent connector is too close to the masonry and the stove is too close to the front of the hearth.

Unit #16 – Dutchwest India LTD (brand) As presently installed the owner has placed an electric log unit inside the stove. However, should the electric log be removed, the installation will not be code compliant as the installation manual for the stove states “Do not connect it to a chimney serving another appliance.”

Unit #17 – Jotul Castine F 400 Serial #00289 Installation is not code compliant as it is marked on the rear of the appliance “Do not connect this appliance to a chimney flue serving another appliance”.

Unit #18 – Quadra-Fire Explorer I Wood Stove The installation is not code compliant as the installation manual states, “Do NOT connect this appliance to a chimney flue servicing another appliance”.

Unit #19 – Majestic (brand) no additional information on the stove or found online. The installation is not code compliant as the required clearances to combustibles between the chimney connector and the adjacent walls are not adequate.

Unit #20 – Garrison Model II Serial #006969 The installation is not code compliant as it is stated on the placard attached to the rear of the stove “Do not connect this unit to a chimney flue serving another appliance”.

As you can see after reading the information provided above for Building #2, there is not one wood stove installation in Building #2 that was code compliant at the time of installation. We have completed the similar review of the appliances installed in Building #3 to the same end result. Can these installations be corrected using the existing appliances, chimneys, and installation configurations? It’s not likely. The clearance to

combustible issues at the chimney connectors will likely be impossible to correct as in many cases the entrance for the connector into the chimney is tight to one of the surrounding walls which provides no space for either the 18" or even the reduced clearance if the installed clearance reduction method was code compliant which, it is not. Additionally, the majority of the appliances state either in their installation manuals or on the appliance itself that they are not to be installed into a flue that vents another appliance.

After completing our review and consideration of the 1980 edition of NFPA 211, we moved into the presently enforced 2013 edition. This review found no revisions that would allow the installations to remain or to be approved.

Possible Remedies

We have investigated several brands of wood burning stoves and have not found any that allow connection to a flue venting another appliance. We cannot say we investigated all manufacturers but the ones that are readily available, we have investigated. The next possibility could be wood pellet burning stoves. There are many pellet stoves that are vented using 3" or 4" vents. We think it is possible, while not easy but possible, to install three separate appropriately sized vents into the existing chimney flues. The vent-material would be PelletVent Pro biofuel venting, likely a combination of solid pipe sections and BioFlex Pipe that would be secured together and placed into the chimney from above. We have assisted with similar corrections on a project in the past with the work being done by S.D. Szetela Masonry.

The final opportunity that we see would be to remove the existing chimneys entirely and reconstruct new. This would have to be explored carefully as six flues would have to be installed in each reconstructed chimney. The flues would then need to be installed in a manner that would allow proper access into each unit in order to attach to the appliance inside the unit yet be able to maintain proper alignment and clearances of the flues inside the chimneys.

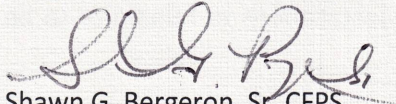
Conclusion

We are particularly concerned due to the length of time that these appliances have been in place and have been in use. The profession of fire prevention has learned how combustible materials can deteriorate over time due to a process called pyrolysis. Exposure of combustible materials to elevated temperatures for an extended period of time, in this case several decades, can change the chemical and molecular makeup of that material, reducing its ignition temperature. When constructed back in the 1980's the wood wall-framing materials that are encapsulated in the walls behind the brick masonry wall finish had an ignition temperature (likely) between 400° - 500° Fahrenheit. Over the decades that have passed, these materials have been subjected to extended periods of elevated temperature, so it is very likely pyrolysis has occurred. We are concerned that these materials could ignite at temperatures that they may regularly be exposed to during use of the wood burning stoves. This deterioration is concealed and out of sight but should not be out of mind.

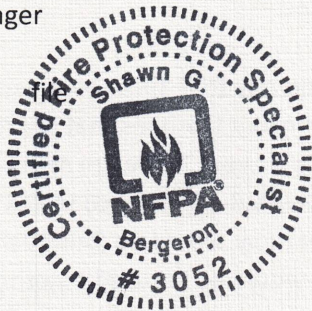
Lastly, we cannot forget the observation of Assistant Chief McCarthy that led to Bergeron Technical being at Northface, that observation being that the 2013 edition of NFPA 211, specifically Section 9.8.2 states *"Unless listed for such connection, solid fuel-burning appliances shall not be connected to a chimney serving another appliance"*. Of the close to two dozen appliances that we inspected at Northface, not one is listed to be installed other than with its own dedicated flue.

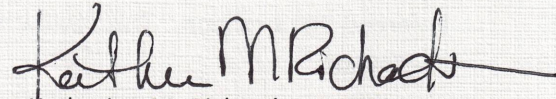
Based on the information detailed above, the opinion of Bergeron Technical Services is the existing solid fuel burning appliances in both Building Two and Building Three at Northface Condominiums should not be used as they are unsafe and present a risk to the building and the occupants therein.

Sincerely,
Bergeron Technical Services, LLC


Shawn G. Bergeron, Sr. CFPS
Manager

Cc:




Katharine M. Richardson, CFPS

