APPENDIX C
CODE CHANGE PROPOSAL
NORTH CAROLINA
BUILDING CODE COUNCIL

B-7

325North Salisbury Street, Room 5_44
Raleigh, North Carolina 27603
(919) 647-0009
carl.martin@ncdoi.gov

Petition for Rule Making Item Number _____

Granted by BCC	_____	**Adopted by BCC**	_____	**Approved by RRC**	_____
Denied by BCC	_____	**Disapproved by BCC**	_____	**Objection by RRC**	_____

PROPONENT: **ANNETTE S. POWELL** PHONE: (**336 404 - 6390**)
REPRESENTING: **SELF**
ADDRESS: **113 BYRNWOOD DRIVE**
CITY: **JAMESTOWN** STATE: **NC** ZIP: **27282**
E-MAIL: **powell238@northstate.net** FAX: ( ) **None -**

North Carolina State Building Code, Volume **Mechanical Code** - Section **312.1**
NC Residential Code -Section **M1401.3**

CHECK ONE: [**X**] Revise section to read as follows: [ ] Delete section and substitute the following:
[ ] Add new section to read as follows: [ ] Delete section without substitution:

~~LINE THROUGH MATERIAL TO BE DELETED~~ UNDERLINE MATERIAL TO BE ADDED

Please type. Continue proposal or reason on plain paper attached to this form. See reverse side for instructions.

See pages 2 and 3.

Will this proposal change the cost of construction?	Decrease [ ]	Increase [ ]	No	[**X**]
Will this proposal increase to the cost of a dwelling by $80 or more?		Yes [ ]	No	[**X**]
Will this proposal affect the Local or State funds?	Local [ ]	State [ ]	No	[**X**]
Will this proposal cause a substantial economic impact (≥$1,000,000)?		Yes [ ]	No	[**X**]

- Non-Substantial – Provide an economic analysis including benefit/cost estimates.
- Substantial – The economic analysis must also include 2-alternatives, time value of money and risk analysis.
- Pursuant to §143-138(a1)(2) a cost-benefit analysis is required for all proposed amendments to the NC Energy Conservation Code. The Building Code Council shall also require same for the NC Residential Code, Chapter 11.

REASON:

See pages 4 through 50.

Annette S. Powell
Signature: _____ Date: **March 27, 2023**

North Carolina Mechanical Code 312.1 (NCMC 312.1) and North Carolina Residential Code M1401.3 (NCRC M1401.3) with Revisions

312.1 Load calculations. Heating and cooling system design loads for the purpose of sizing systems, appliances and equipment shall be determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183. Alternatively, design loads shall be determined by an approved equivalent computation procedure, using the design parameters specified in Chapter 3 [CE] of the International Energy Conservation Code.

~~For permitting, inspections, certificate of compliance or certificate of occupancy, verification of load and sizing calculation submittals and reviews shall not be required.~~

For permitting, inspections, certificate of compliance or certificate of occupancy, load and sizing calculation submittals shall be required.

For permitting, inspections, certificate of compliance or certificate of occupancy, load and sizing calculation review shall not be required.

Continued

M1401.3 Equipment and appliance sizing. Heating and cooling equipment and appliances shall be sized in accordance with ACCA Manual S or other approved sizing methodologies based on building loads calculated in accordance with ACCA Manual J or other approved heating and cooling calculation methodologies.

Exception: Heating and cooling equipment and appliance sizing shall not be limited to the capacities determined in accordance with ACCA Manual S where either of the following conditions applies:

1. The specified equipment or appliance utilizes multistage technology or variable refrigerant flow technology and the loads calculated in accordance with the approved heating and cooling calculation methodology are within the range of the manufacturer's published capacities for that equipment or appliance.

2. The specified equipment or appliance manufacturer's published capacities cannot satisfy both the total and sensible heat gains calculated in accordance with the approved heating and cooling calculation methodology and the next larger standard size unit is specified.

~~For permitting, inspections, certificate of compliance or certificate of occupancy, verification of Calculations for HVAC Systems-ACCA Manual D, ACCA Manual J, ACCA Manual S load and sizing calculation submittals and review shall not be required.~~

For permitting, inspections, certificate of compliance or certificate of occupancy, Calculations for HVAC Systems-ACCA Manual D, ACCA Manual J, ACCA Manual S load and sizing calculation submittals shall be required.

For permitting, inspections, certificate of compliance or certificate of occupancy, Calculations for HVAC Systems-ACCA Manual D, ACCA Manual J, ACCA Manual S load and sizing calculation review shall not be required.

REASONS

The general purpose for these revisions to NCMC 312.1 and NCRC M1401.3 is to confirm compliance with these codes in performing load calculations. The more detailed reasons for these revisions, which often overlap, are:

1. TO DEMONSTRATE CODE COMPLIANT LOAD CALCULATIONS HAVE BEEN PERFORMED

It seems only logical that HVAC contractors be required to demonstrate code compliant load calculations have been performed, given:

- **a. NCMC 312.1 and NCRC M1401.3 require specific parameters, procedures, and methods be used to perform load calculations;**
- **b. The concerning number of heating contractors in North Carolina reported by the Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors (the Board) to have allegedly not used code compliant parameters, procedures and methods to perform load calculations from 2018 through 2022 (See Reason #4, pages 6-8, and Table 1, pages 17-18.);**
- **c. The indispensability of code complaint load calculations to the comfort, safety, health, and general welfare of North Carolina homeowners; and**
- **d. Stories of North Carolinians who have suffered from HVAC contractors not performing load calculations and not performing code compliant load calculations (See Reason #5, pages 8-9 and 38-50).**

An efficient way to demonstrate code compliant load calculations have been performed is to have them submitted with applications to obtain permits. Luis Jimenez, Guilford County Chief Permitting Officer, said that, since August 2022, applications to obtain permits are done online, and HVAC contractors can simply upload these calculations with the applications. This method of submittal will provide mechanical inspectors and code compliance officials easy assess to the load calculations that were performed.

The issue of submitting load calculations to the permitting agency is not a new concept. One case in point is "an excerpted article from the December 2012 *Engineering Newsletter* published by the North Carolina Department of Insurance – Office of State Fire Marshal. The Roles of the Code Officials and the State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors and Verification of Calculations for HVAC Systems-Manual J, Manual S, Manual D," which states, in part:

"…Is the permitting Agency required to take, review, and retain the calculations performed by the contractor for Manual J, Manual S, and Manual D?…it is within the permitting Agency's authority to require drawings and specifications and additional data as required in order to determine the compliance with the applicable Codes, refer to Section 106.2.1 and 106.2.2 of the NC Administrative Code. Some agencies require these calculations before a permit is issued, some before final inspection, and others not at all. Several agencies have a policy of scanning the Manual J, Manual S, and Manual D in, and keeping it with the other design documents. This also is effective, as it demonstrates that the calculations were performed, and does not slow turnaround time for a permit…" https://nclicensing.org/wp-content/uploads/2022/07/Load-Calculation-Interpretation.pdf

2. TO ALLOW CONFIRMATION THAT REPLACED AND INSTALLED HVAC SYSTEMS AND EQUIPMENT ARE CONSISTENT WITH LOAD CALCULATIONS PERFORMED

By having digital access to load calculations, mechanical inspectors will be able to confirm the sizes of replaced and installed HVAC systems and equipment are consistent with the load calculations submitted with the applications to obtain permits. In addition, knowledgeable and experienced mechanical inspectors will be able to assess, unofficially, the reasonableness of the sizing of the HVAC systems and equipment; and, alert building contractors and HVAC contractors, as well as homeowners of any concerns.

3. TO ALLOW CONFIRMATION THAT CODE REQUIRED PARAMETERS, PROCEDURES, AND METHODS WERE USED TO PERFORM LOAD CALCULATIONS, AND ALL CODE REQUIRED LOAD CALCULATIONS WERE PERFORMED

These revisions to NCMC 312.1 and NCRC M1401.3 will provide code compliant officials the necessary information to more confidently confirm code mandated parameters, procedures, and methods for performing load calculations were used, and all code required load calculations were performed. In addition, by having these load calculations, the more knowledgeable, experienced code compliance officials may be able to assess, unofficially, the reasonableness of the actual sizing of HVAC systems and equipment; and, when there are concerns, alert building contractors and HVAC contractors of these concerns. Finally, when code compliance officials suspect or find load calculation violations,

having load calculation data can provide documentation to support refusals to issue certificates of compliance or occupancy. In my opinion, it would be reckless for code compliance official to issue a certificate of compliance or occupancy without having seen load calculation documentation.

However, load calculation violations discovered by code compliance officials, as well as sizing concerns of mechanical inspectors, often come AFTER systems and equipment have been installed; and can require, at great expense of time and money, the replacement and alteration of installed HVAC systems and equipment. These revisions to NCMC 312.1 and NCRC M1401.3 have the potential to PREVENT many of these "after the fact" situations.

4. TO REDUCE THE NUMBER OF HEATING CONTRACTORS WHO DO NOT PERFORM CODE COMPLIANT LOAD CALCULATIONS

The number of heating contractors in North Carolina who currently do not perform code compliant load calculations is unknown. However, a disaggregation of the "Disciplinary Reports," published in the Board's bi-monthly newsletters, indicates that, from 2018 through 2022, a sizable number of heating contractors in North Carolina allegedly violated codes related to performing load calculations.

See (1) "SUMMARY of DISAGGREGATION of "DISCIPLINARY ACTIONS" DATA REPORTED in the BOARD OF EXAMINERS of PLUMBING, HEATING, AND FIRE SPRINKLER CONTRACTORS' NEWSLETTERS 2018-2022," page 11-15; and (2) DISAGGREGATION OF "RESOLUTION AGREEMENTS" AND "ATTORNEY'S REPORTS" REPORTED UNDER "DISCIPLINARY ACTIONS" IN BOARD OF EXAMINERS OF PLUMBING, HEATING, AND FIRE SPRINKLER CONTRACTORS' NEWSLETTER 2018-2022," pages 16-36.

The numbers of heating contractors with alleged load calculation violations in this disaggregation represent "minimum" numbers of contractors, since the totals do not include the number of unidentified heating contractors listed in "Disciplinary Reports," or contractors with load calculation violations and against whom no complaints were filed with the Board. In addition, the numbers may contain repeat offenders, contractors who are listed more than once in the newsletters during those five years. Finally, violation descriptions are often sketchy or omitted all together. Consequently, the results of this disaggregation cannot be extrapolated. Nevertheless, the number of contractors with violations related to the sizing of HVAC systems and equipment is concerning, since each number represents a contractor who allegedly put at least one North Carolinian

homeowner at risk for substantial financial and personal losses, extreme emotional distress, and long term health issues. A discussion of some of the data in this disaggregation is as follows:

a. Of the 439 heating contractors listed in "Resolution Agreements" under"Disciplinary Actions" in the Board's newsletters during these five years, 207 (47%) had "alleged" load calculation violations. Of these 207 heating contractors, 196 (94.7%) allegedly failed to perform or properly perform load calculations. It was shocking to find so few of the 207, only 8, were reported to have installed either an oversized or undersized unit. In my opinion, comparing this small number with the large number of contractors who failed to perform or properly perform load calculations indicates the 196 contractors who failed to perform or properly perform load calculations are either extremely adept at performing non-code-compliant load calculations or are exceptional in making, what may be considered, "educated" guesses.

b. Of the 391 heating contractors identified in "Attorney's Reports" under "Disciplinary Actions" in the Board's newsletters during these five years, 377 (96.4%) had alleged violations that were related to load calculations. Of these 377 heating contractors, 363 (96%) allegedly contracted "without a valid license" and "without a license." Since 21 NCAC 50.0505 requires load calculations to be performed by licensees, the load calculations performed by these contractors were not code compliant.

c. The large number of violations committed by several individual heating contractors in the Board's newsletters seems to indicate little to no fear of the consequences for not following code. One contractor admitted to not performing load calculations for 100 installations, and another said he did not perform calculations for more than 15 replacements. One contractor actually said he did not think about it. Some of the consequences of these violations, referred to as "resolutions" in the newsletters, were severe and included license suspension and revocation, as well as returning to homes, performing code compliant load calculations, and, at contractors' expense, installing properly sized systems and equipment. However, the most common "resolution" was to "Enroll, Attend, and Complete" one or more of the Board's special courses. None of the "resolutions" required the contractor to compensate homeowners for financial and personal losses, emotional stress, and health issues, including medical bills, which resulted from improperly sized HVAC systems and equipment. (See Table 3, pages 21-30.)

d. An addendum to this disaggregation indicates a significant number of the 439 heating contractors listed in "Resolution Agreements" failed to obtain permits before commencing work (n=191); failed to request inspections within 10 days of substantial completion of work (n=157); and failed to request final inspections (n=133) (See Table 6, page 37.). If this data truly reflects reality, these violations will prevent these code revisions from reducing the number of HVAC contractors who do not perform code compliant load calculations.

In the 2023 article, "Engineers Get an Earful on Load Calculations," published by the Air Conditioning|Heating|Refrigeration of America's newsletter, *the News,* Glenn Hourahan, engineering vice president of the Air Conditioning Contractors of America (ACCA), states in part:

> **"One of the biggest problems in getting contractors to run load calculations…is their lack of incentive to do so, both from the market and enforcement officials. An HVAC load calc requirement is now included in most residential codes; however, building inspectors and code officials don't enforce it." https://www.achrnews.com/articles/82381-engineers-get-an-earful-on-load-calculations.**

These code revisions to NCMC 312.1 and NCRC M1401.3 will provide much needed incentive for contractors to perform code compliant load calculations, especially those contractors who view performing these calculations as a waste of time and money. They will eliminate the current practice of self-regulation among HVAC contractors, and discourage the use of non-code-compliant methods of performing load calculations, including "rules of thumb" and "eye balling it." These revisions will also serve to level the playing field between HVAC contractors who take the time and effort to perform code compliant load calculations and tend to charge more, and contractors who do not and give lower quotes.

5. TO PREVENT NORTH CAROLINA HOMEOWNERS FROM EXPERIENCING FINANCIAL, EMOTIONAL, AND HEALTH PROBLEMS WHICH RESULT FROM IMPROPERLY SIZED HVAC SYSTEMS AND EQUIPMENT

The ACCA pamphlet *Manual J Residential Load Calculation* states, "Oversized equipment results in…degraded humidity control and increase in the potential for mold growth, allergic reactions, and respiratory problems" (https://deq.mt.gov/files/Energy/EnergizeMT/Conservation/Energy%20Code/ACCAManual-J-Brochure.pdf).

The short cycling of oversized equipment, can lead to high humidity and the creation of the perfect environment for mold to grow and thrive. From

personal experience, mold infestation from oversized units is indescribably devastating. In addition to the loss of large sums of money, irreplaceable items, and peace of mind, a mold infestation can cause many types of health problems, including severe allergic reactions, respiratory problems, fatigue, chronic sinusitis, and Chronic Inflammatory Response Syndrome.

The stories of four North Carolina families, who have suffered from the results of improperly sized HVAC systems and equipment, are included in this documentation. They are:

- **a. Christine and Michael Macke's story, pages 38-43.**
- **b. Michael and Filomena Ferri's story, page 44.**
- **c. Damon and Tracy Davis's story, pages 45-46.**
- **d. Justin and Lori Biers's story, pages 47-50.**

Neither of these families filed a complaint against their HVAC contractor with the Board. and all hired professionals to assess their HVAC problems.

Average North Carolina homeowners without the financial means are often hard pressed to prove high humidity and mold discovered in their houses were caused solely by improperly sized HVAC systems and equipment, even when it was. Providing proof was complicated on February 4, 2022, when the NC Appeals Court of Appeals "effectively determined that in all but the most obvious cases expert testimonies required to establish a failure to perform construction in a workmanlike fashion" (https://www.jdsupra.com/legalnews/court-of-appeals-clarifies-that-expert-9693476/)
(I assume this requirement applies to performing load calculations in the replacement and installation of HVAC systems and equipment.)

The astronomical cost of hiring "experts" to assess HVAC systems and equipment and testify of their findings make it almost impossible for average homeowners to gain any sense of justice in cases where improperly sized HVAC systems and/or equipment were in fact the cause of problems, including mold infestations. The absence of justice in many of these cases makes it imperative that the codes in the NC Building Code be biased in favor of the citizens of North Carolina. However, as currently written, by not requiring HVAC contractors to submit code compliant load calculations for, at least, permitting, NCMC 312.1 and NCRC M1401.3 appears to be biased in favor of HVAC contractors and place every citizen at risk for substantial financial loss, loss of irreplaceable items, extreme emotional distress, and the possibility of long term health problems.

These revisions to NCMC 312.1 and NCRC M1401.3 will provide a critical LINE OF DEFENSE to prevent improperly sized HVAC systems and equipment from being replaced and installed in North Carolina homes.

6. TO ADVANCE ENERGY CONSERVATION

According to the U. S. Energy Information Administration, "heating and cooling uses the greater percentage of household energy" (https://www.eia.gov/tools/faqs/faq.php?id=1174&t=1). One source states around 46% of the electricity use of the average house is for heating and cooling; and Improperly sized systems, both oversized and undersized, use more energy (https://www.directenergy.com/learning-center/what-uses-most-electricity-in-my-home).

The US Department of Energy article "Residential HVAC Installation Practices: A Review of Research Finding," June 2018 states:

> **"… some studies show proper sizing can significantly reduce peak demand, which has benefits for the electricity grid and consumers by lowering overall energy costs. Under current industry practice, however, the majority of systems—especially those installed as emergency replacements—are installed without performing detailed load calculations." (https://www.energy.gov/eere/buildings/articles/residential-hvac-installation-practices-review-research-findings).**

Given these bits of data, responsible energy conservation demands that properly sized HVAC systems and equipment be replaced and installed in all North Carolina homes. This, in turn, requires strict adherence to the parameters, procedures, and methods specified in NCMC 312.1 and NCRC M1401.3 for performing load calculations. This adherence is especially true for today's energy efficient homes, since load calculations performed for these homes are more sensitive to any manipulation of the input data than in years past, when energy codes did not assign precise levels of energy efficiency.

Therefore, since the use of the parameters, procedures, and methods specified in NCMC 312.1 and NCRC M1401.3 to perform load calculations is vital to energy conservation, the revisions to these codes are also vital.

SUMMARY of
DISAGGREGATION of "DISCIPLINARY ACTIONS" DATA
REPORTED in the
BOARD OF EXAMINERS of PLUMBING, HEATING, AND FIRE SPRINKLER CONTRACTORS' NEWSLETTERS
2018-2022

A disaggregation was performed to determine the number of complaints the Board of Plumbing, Heating, and Fire Sprinkler Contractors (Board) received against heating (HVAC) contractors with alleged violations involving load calculations (i.e. load calculations, duct design, and equipment sizing). The source of the data was the "Disciplinary Reports" published in the Board's Newsletters from 2018 through 2022. These reports list plumbing, heating, and fire sprinkler contractors against whom complaints have been filed under four disciplinary action categories, "Letter of Caution Reports; "Consent Agreement Reports;" "Resolution Agreements," and "Attorney's Reports." No licensure or alleged violation information was given for contractors listed under Letter of Caution and Consent Agreement Reports; therefore, this disaggregation delineates only heating-contractor data from "Resolution Agreements" and "Attorney's Reports." A summary of this disaggregation is as follows:

The Board's newsletters reported 2,352 contractors in "DISCIPLINARY ACTIONS" from 2018-2022*.

I. **278 (11.8%)** of these **2,352** contractors were listed under **"LETTER OF CAUTION REPORTS", with** no licensure or violation indicated.

II. 548 (23.3%) of these 2,352 contractors were listed under **"CONSENT AGREEMENT REPORTS**", with no licensure or violation indicated.

III. 706 (30%) of the 2,352 contractors were listed under **"RESOLUTION AGREEMENTS."**

439 (62%) of these 706 contractors were designated as **"HEATING CONTRACTORS."**

207 (47%) of these 439 "HEATING CONTRACTORS" had **ALLEGED VIOLATIONS INVOLVING LOAD CALCULATIONS.**

*** The numbers shown in this disaggregation may contain heating contractors against whom complaints were filed more than once during these five years.**

Continued

Of these 207 "HEATING CONTRACTORS":

138 (66.7%) Failed to Perform Load Calculations
1 of these 138 contractors admitted to installing 100 HVAC systems, and another replacing more than 15 systems, without performing a single load calculation

31 (15%) Failed to Perform Proper Load Calculation

18 (8.7%) Failed to Properly Design System and/or Duct System

10 (4.7%) Failed to size equipment properly

8 (3.9%) Installed an Oversized or Undersized an HVAC system
6 of the 8 contractors installed grossly oversized systems, and one of the 8 contractors installed a "slightly" oversized one.

2 (1%) Failed to prove load calculations were performed

and

Of these 207 "HEATING CONTRACTORS"

93 received **Unsupervised Probation** (12-24 months).

71 were **to perform one or all of the following: return to structure and correct all code violations, redo load calculations, hire an engineer to perform the load calculations, install correctly sized systems and equipment; and return money to the homeowner.**

50 received **Supervised Probation (**9-36 months).

24 had their **License Suspended** (3 months-3 years).

7 were asked to **Surrender Licensed** or voluntarily did so.

2 had their **License Revoked.**

289 had to "**Enroll, Attend, and Complete"** one of the Board's Special Courses, including the Board's Laws and Rules Course, Series of Mechanical Code Courses; Series of Special Mechanical Design Courses; Special Fuel and Gas Code and Design Courses; and Special Contractor Business Management Courses.

Continued

IV. **820** **(34.8%) of the 2,352 contractors** were listed under **"ATTORNEY'S REPORTS."**

391 **(47.7%) of these 820** contractors were designated as **"HEATING CONTRACTORS."**

377* **(96.4%)** of these **391** **"HEATING CONTRACTORS"** had **ALLEGED VIOLATIONS INVOLVING LOAD CALCULATIONS.**

Of these 377 "HEATING CONTRACTORS",

242 (63.5%) Contracted Without a Valid License.*
121 (31.8%) Contracted Without a License.*
7 (1.8%) Installed System with Duct Design Issues.
3 (0.8%) Failed to Perform Load Calculation.
2 (0.5%) Failed to Perform a Proper Load Calculation.
1 (0.3%) Installed an Undersized Unit.
1 (0.3%) Installed Undersized Duct Work.

***Any load calculation performed by an unlicensed HVAC contractor is not code-compliant.**

and

Of these 377 "HEATING CONTRACTORS"

363 (96.3%) ALLEGEDLY CONTRACTED WITHOUT A LICENSE OR WITHOUT A VALID LICENSE.

Of these 363,

319 (87.9%) received a **"Permanent Injunction Enjoining the Defendant from Engaging in Business of Heating Contractor until Properly Licensed.**"
27 (8%) had to **Pay a Fine** ($500 to $1000; 21 of the 27 paid $500).
23 (7%) received **Suspended Jail Time.**
9 (2.8%) had to **Pay Homeowner Restitution.**
8 (2.5%) received **Jail Time** (20 to 150 days).
7 (2.1%) received **Active Jail Time** (2 to 60 days).
2 (0.6%) received **Supervised Probation.**

Continued

and

Of these 363,

19 (5%) HAD ALLEGED VIOLATIONS IN WHICH LOAD CALCULATION WAS SPECIFICALLY REFERENCED.

Of these 19,

- **6 r**eceived **Supervised Probation** (6 to 24 months).
- **4 r**eceived **Probation** (12 to 18 months).
- **3** had their **License Suspended** (6 to 24 months).
- **2** received **Unsupervised Probation** (12 months).
- **2** had **License Revoked.**
- **1 Surrendered License.**
- **1** received **Jail Time** (30 Days).
- **1** had to attend the **Mechanical Code classes and Board Laws and Rules Course.**
- **1** had to **Perform Proper Manual N and Q Load Calculations and Duct Design** (Manuals N and Q have to do with commercial systems and equipment).

Notes:

1. There was not a one-to-one correspondence between contractor and alleged violation in the data; some heating contractors committed the same violation multiple times, and some committed multiple violations during the same replacement or installation.
2. There was no consideration given to repeat offenders in this disaggregation.

Addendum

The following discovery from the disaggregation is significant, since the code revisions to NCMC 312.1 and NCRC M1401.3 involve both permitting and inspection.

Of the 439 "HEATING CONTRACTORS" listed in **"RESOLUTION AGREEMENTS,"**

191 Failed to obtain a permit before commencing work
One of these contractors failed to obtain a permit for from 20 to 30 installations, another for 25, and another for 2. Therefore, the number of contractors do not represent the number of installations.

157 Failed to request inspection within 10 days of substantial completion of work.

133 Failed to request a final inspection.

DISAGGREGATION OF "RESOLUTION AGREEMENTS" AND "ATTORNEY'S REPORTS" REPORTED UNDER "DISCIPLINARY ACTIONS" IN BOARD OF EXAMINERS OF PLUMBING, HEATING, AND FIRE SPRINKLER CONTRACTORS' NEWSLETTERS 2018-2022

The purpose of this disaggregation was to determine the number of complaints the Board of Plumbing, Heating, and Fire Sprinkler Contractors (Board) received against heating (HVAC) contractors with alleged violations involving load calculations (i.e. load calculations, duct design, and equipment sizing). The source of the data in this disaggregation was the "Disciplinary Reports" published in the Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors' Newsletters from 2018 through 2022 (https://nclicensing.org/newsletter/). These reports list plumbing, heating, and fire sprinkler contractors against whom complaints have been filed under four disciplinary action categories, "Letter of Caution Reports; "Consent Agreement Reports;" "Resolution Agreements," and "Attorney's Reports." No licensure or violation information was given for contractors listed under Letter of Caution and Consent Agreement Reports; therefore, for the purpose of this disaggregation, only heating-contractor data from "Resolution Agreements" and "Attorney's Reports" were delineated. No consideration was given for heating contractors against whom more than one complaint was filed over this five-year period; and a one-to-one correspondence between contractor and alleged violation cannot be assumed, since some heating contractors committed the same violation multiple times and some committed multiple violations during the same replacement or installation.

This disaggregation is presented in the following tables:

I am a 78-year old with poor eyesight, who often must use a magnifying glass and the enlargement function on my iPhone and computer to distinguish between certain numbers (e.g. 6 and 8). Therefore, some numbers in this disaggregation may have been recorded in error. Nevertheless, it should be considered a fairly accurate account of the heating contractors identified as such in "Resolution Agreements" and "Attorney's Reports" published by the Board in their 2018 through 2022 newsletters.

Annette S. Powell

Table 1
Contractors Reported in "Disciplinary Actions" 2018-2022*

("≥" is used, since the numbers represent "minimums.)

TYPE OF DISCI-PLINARY ACTION	GROUP OF CONTRACTORS	2018	2019	2020 COVID**	2021	2022	TOTAL	PERCENT OF ALL DISCIPLINARY ACTIONS REPORTED
		CONTRACTORS RECEIVING DISCIPLIARY ACTION						
Letter of Caution	Total Contractors	62	68	57	53	38	278	11.8%
	HEATING CONTRACTORS	Unknown. No licensure designation.						
Consent Agreement	Total Contractors	114	97	87	89	161	548	23.3%
	HEATING CONTRACTORS	Unknown. No licensure designation.						
Resolution Agreement (See Tables 2, 3, 4, and 5)	Total Contractors	155	159	127	131	134	706	30%
	Contractors with Undesignated Licensure	1	-	-	-	2	3	Heating contractors made up at least 62% of contractors reported in Resolution Agreements. Heating contractors with alleged load calculation, duct design, and equipment sizing violations made up at least 46% of the Heating Contractors reported in Resolution Agreements
	HEATING CONTRACTORS	111	90	75	79	84	≥ 439	
	HEATING CONTRACTORS with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations***	52	40	26	38	48	≥ 202	

Continued

* No consideration was given to contractors against whom more than one complaint was filed.

** COVID lockdowns were in effect in 2020.

*** This group of contractors includes those contractors whose alleged violations did not include explicit references to load calculations, duct design, or equipment sizing; however, the recommended "Resolution Agreement" resolutions included tasks related to these issues. My reasoning was these contractors would not be asked to perform or correct load calculations, duct design, or equipment sizing, if their violations did not involve these alleged violations.

TYPE OF DISCI-PLINARY ACTION	GROUP OF CONTRACTORS	2018	2019	2020 COVID	2021	2022	TOTAL	PERCENT OF ALL DISCIPLINARY ACTIONS REPORTED
		CONTRACTORS RECEIVING DISCIPLIARY ACTION						
Attorney's Report (See Tables 5 and 6)	Total Contractors	152	155	173	158	182	820	34.9%
	Contractors with Undetermined Licensure	12	4	10	10	16	52	
	HEATING CONTRACTORS	80	73	89	74	75	≥ 391	Heating contractors made up at least 47.7 % of all contractors reported in Attorney's Reports.
	HEATING CONTRACTORS with Alleged Load Calculation, Duct Design, and/ or Equipment Sizing Violations	The actual number is unknown, since very little violation details were reported. However, the overwhelming majority of alleged violations reported in "Attorney's Reports" were "contracting without a license" and "contracting without a valid license." These violations imply that any load calculation, duct design, or equipment sizing performed was done by an unlicensed contractor, which is a violation of 21 NCAC 50.0505. (See Table 4.)						
TOTAL DISCIPLINARY ACTIONS		483	479	444	431	515	2352	100%

Table 2
"Resolution Agreements":
HEATING CONTRACTORS with
Alleged Violations Involving Load Calculation, Duct Design, and/or Equipment Sizing*

("≥" is used, since the numbers represent "minimums.)

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	≥ 439
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**CONTRACTORS IN "RESOLUTION AGREEMENTS" WITH ALLEGED VIOLATION**					
FAILED TO:						
PERFORM LOAD CALCULATION	**34 + 1 (100 in-stalls)**	**18 + 1 (2 com-plaints)**	**14 + 1 (>15 HVAC replace-ments)**	**25**	**35**	**≥ 129**
Perform a Manual D duct system	**-**	**1**	**-**	**-**	**-**	**≥ 1**
Perform a room-by-room load calculation	**-**	**1**	**1**	**-**	**1**	**≥ 3**
Perform Manual J and Manual D	**2**	**-**	**-**	**-**	**-**	**≥ 2**
Perform or properly perform a block load calculation	**1**	**-**	**-**	**1**	**-**	**≥ 2**
PERFORM A PROPER LOAD CALCULAITON	**7**	**11**	**2**	**5**	**6**	**≥ 31**
Size equipment properly	**1**	**3**	**4**	**-**	**2**	**≥ 10**
Properly design system	**-**	**-**	**1**	**-**	**1**	**≥ 2**
Properly design or properly design duct system	**6**	**3**	**2**	**2**	**3**	**≥ 16**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	≥ 439
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**CONTRACTORS IN "RESOLUTION AGREEMENTS" WITH ALLEGED VIOLATION**					
INSTALLED:						
Oversized system	**-**	**-**	**2 (both grossly; 1 by 58%)**	**1 (gross-ly)**	**4 (1, slightly; 2 grossly; and 1 by 40%)**	**≥ 7**
Undersized system	**-**	**-**	**-**	**1**	**-**	**≥ 1**
FAILED TO:						
Handle all contracting of licensed work, load calculations	-	-	1	-	-	≥ 1
Provide a copy of load calculation to confirm one had been performed	-	-	1	-	-	≥ 1
Provide evidence that a proper load calculation was performed	-	-		1	-	≥ 1

Table 3
"Resolution Agreements":
Recommended Resolutions for HEATING CONTRACTORS with Alleged Violations Involving Load Calculation, Duct Design, and/or Equipment Sizing

("≥" is used, since the numbers represent "minimums.)

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	≥ 439
HEATING CONTRACTORSin "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
SUPERVISED PROBATION FOR:						
9 months	**-**	**-**	**1**	**-**	**-**	**≥ 1**
12 months	**3**	**-**	**1**	**2**	**6**	**≥ 12**
18 months	**3**	**2**	**3**	**7**	**5**	**≥ 20**
24 months	**7**	**5**	**5**	**2**	**4**	**≥ 23**
30 months	**2**	**1**	**-**	**-**	**-**	**≥ 3**
36 months	**-**	**-**	**-**	**-**	**1**	**≥ 1**
UNSUPERVISED PROBATION FOR:						
12 months	**20**	**18**	**5**	**6**	**10**	**≥ 59**
18 months	**11**	**5**	**1**	**5**	**4**	**≥ 26**
24 months	**2**	**1**	**1**	**3**	**1**	**≥ 8**
LICENSE SUSPENSION FOR:						
Until condition is met	**1**	**1**	**-**	**-**	**-**	**≥ 2**
3 months	**1**	**-**	**-**	**-**	**-**	**≥ 1**
4 months	**-**	**-**	**-**	**1**	**-**	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS i "Resolution Agreements"	111	90	75	79	84	≥ 439
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
LICENSE SUSPENSION FOR (Continued):						
3 months	**-**	**-**	**-**	**-**	**3**	**≥ 3**
6 months	**-**	**-**	**1**	**1**	**2**	**≥ 4**
9 months	**-**	**-**	**-**	**-**	**1**	**≥ 1**
12 months	**-**	**-**	**4**	**2**	**-**	**≥ 6**
18 months	**-**	**-**	**-**	**-**	**1**	**≥ 1**
24 months	**-**	**-**	**1**	**1**	**1**	**≥ 3**
3 years	**1**	**-**	**-**	**1**	**-**	**≥ 2**
SURRENDER LICENSE	-	**1**	**-**	**2**	**4**	**≥ 7**
LICENSE REVOKED	-		1	-	1	≥ 2
ENROLL, ATTEND, AND COMPLETE:						
Special Board Law and Rules Course	**45**	**35**	**24**	**30**	**35**	**≥ 169**
Series of Special Mechanical Code Courses	**22**	**18**	**6**	**8**	**8**	**≥ 62**
Series of Special Mechanical Design Courses	**7**	**7**	**3**	**3**	**5**	**≥ 25**
Special Fuel and Gas Code and Design Courses	**3**	**4**	**-**	**3**	**3**	**≥ 13**
Special Contractor Business Management Courses	**4**	**1**	**4**	**1**	**2**	**≥ 12**
Refund money to homeowner	**3**	**-**	**3**	**2**	**1**	**≥ 9**
Obtain a permit, return to structure and correct any and all code violations that still exist	1	-	-	-	1	≥ 2
Return to home, obtain permit, correct any and all code violations that still exist, and obtain final inspection.	-	-	-	-	1	≥ 1

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home and correct any and all code violations that still exist.	-	-	-	1	-	**≥ 1**
Obtain a permit for all work performed at apartments (about 25 to 30 installs) perform load calculations, and correct any and all code violations that exist.	1	-	-	-	-	**≥ 1**
Return to job. Correct any code violations and repair any operational issues and obtain a final inspection.	-	-	-	-	1	**≥ 1**
Return to home. Assure that the properly sized equipment is installed for the downstairs heat pump per engineer's load calculation	-	-	-	-	1	**≥ 1**
Return to home, correct all existing code violations, perform an additional calculation and assure that the equipment installed is properly sized and installed. If the load calculation reveals that the equipment is under oversized replace the equipment with the properly sized equipment.	1	-	-	-	-	**≥ 1**
Return to home and perform performance testing to assure that the system is properly cooling the house to the code and Manual J prescribed temperatures. If the system is not properly cooling the structure, then return to job and make all necessary corrections (equipment sizing, duct changes, etc.) to assure the system meets proper design criteria.	-	1	-	-	-	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Obtain a permit, return to home and install a properly sized HVAC system (to include duct work) and request and obtain a final inspection	-	-	1	-	-	**≥ 1**
Perform an accurate load calculation with appropriate ACCA Manual J design criteria	-	-	-	1		**≥ 1**
Return to home, perform flow hood balance to assure that the proper CFMs are being delivered to each room as per Manual J CFM requirement.	-	1	-	-	-	**≥ 1**
Return to home, perform a thorough Manual J load calculation. If the calculations reveal that the equipment is improperly sized, then obtain a permit, replace the undersized or oversized equipment with properly sized air handlers and condensing units and obtain final inspection	**2**	**-**	**-**	**1**	**-**	**≥ 3**
Return to home, perform a thorough Manual J load calculation. If the calculations reveal that the equipment is improperly sized, then obtain a permit, replace the improperly sized equipment with properly sized equipment and obtain final inspection	1	-	-	-	-	**≥ 1**
Return to job, perform a load calculation and a duct design to cover additional ductwork for the closet and if calculation and/or design reveal any issues (with sizing), then, return to job and correct the equipment sizing and/or duct work issues.	-	-	-	1	-	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home, obtain permit for replacement and modification of duct work and obtain final inspection	-	1	-	-	-	**≥ 1**
Perform a through room-by-room load calculation and duct design for both houses. If the load calculations indicate that the equipment installed is oversized or undersized, replace the undersized or oversized with proper sized equipment and assure the work is permitted and receive a final inspection	-	-	-	1 (2 houses)	-	**≥ 1 (2 houses)**
Return to home, perform load calculation and duct design and if the calculations and/ or design reveal any issues (with sizing), then return to this job and correct the equipment sizing and/or duct design issues and shall include correcting all existing code violations…to assure that the complete installation meets or exceeds the minimum standard of code	-	-	-	1	-	**≥ 1**
Return to home, perform a thorough Manual J & D load calculations. If the calculations reveal that the equipment and or duct work is improperly sized, then obtain a permit, replace the improperly sized equipment and duct work with properly sized equipment and ductwork and obtain final inspection.	**1**	**-**	**-**	**-**	**-**	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home, perform a thorough Manual J load calculation and a Manual D duct design calculation. If the calculations reveal that the equipment and duct work is improperly sized, replace the improperly sized equipment and duct work, assure the installation has been performed in compliance with the NC Building Code, and obtain final inspection	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Return to home, perform a thorough Manual J load calculation and a Manual D duct design. If the calculations reveals that the equipment is improperly sized, or the duct work is improperly sized, then obtain a permit, replace the oversized or undersized equipment with properly sized air handler(s) and condensing units(s), and/or properly size and install new duct work, address code violations, and obtain a final inspection.	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Return to home, preform a detailed and thorough Manual J load calculation and Manual D duct design calculation. If the calculations reveal that the equipment or duct work is improperly sized, then obtain a permit, replace the improperly sized equipment and duct work with properly sized equipment and duct work, and obtain a final inspection.	-	1	-	-	-	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home, perform a detailed and thorough Manual J load calculation and Manual D duct design calculation. If the calculations reveal that the equipment or ductwork is improperly sized, then obtain a permit, replace the undersized or oversized equipment with properly sized air handler and or duct work, and install new ductwork, address code violations, and obtain a final inspection obtain final inspection	1	-	-	-	-	**≥ 1**
Return to home and perform a thorough Manual J load calculation to current construction conditions, Manual D duct design and a Manual S equipment sizing calculation. If the calculations reveal the currently installed equipment and/or duct work is improperly sized, then obtain a permit, replace improperly sized equipment and duct work with properly sized equipment and duct work and obtain a final inspection.	-	-	-	1	-	**≥ 1**
Return to home, perform a thorough Manual J load calculation, a Manual D duct design and a Manual S equipment sizing calculation. If the calculations reveal that the equipment or ductwork is improperly sized, then obtain a permit, replace the improperly sized equipment and ductwork with properly sized equipment and duct work and obtain final inspection.	**3**	**2**	**-**	**-**	**3**	**≥ 8**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home, perform a thorough Manual J load calculation, a Manual D duct design and a Manual S equipment sizing calculation for the lower and upper floors. If the calculations reveal that the equipment or ductwork for either or both floors are improperly sized, then obtain a permit, replacer the improperly sized equipment and duct work with properly sized equipment and duct work with properly sized equipment and duct work and obtain a final inspection.	-	1	-	-	-	**≥ 1**
Return to home, perform a thorough Manual J load calculation, Manual D duct design and Manual S equipment sizing calculation, obtain a permit return to structure and correct any and all code violations that exist.	-	1	-	-	-	**≥ 1**
Return to home, perform a thorough Manual J load calculation and Manual S equipment sizing calculation. If the calculations reveal that the equipment is improperly sized, then obtain a permit, replace the improperly sized equipment and obtain final inspection,	**-**	**1**	**-**	**2**	**-**	**≥ 3**
Return to home, perform a through Manual J load calculation and a Manual S equipment sizing and correct any and all violations that exist.	-	-	1	-	-	**≥ 1**
Return to home, perform a thorough Manual J load calculation, a Manual D duct design, and Manual S equipment sizing calculation	**-**	**1**	**7 + (1 had 3 homes)**	**3**	**2**	**≥ 14 (1 had 3 homes)**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Return to home, perform a thorough room by room Manual J load calculation, a thorough Manual D duct design, and a Manual S equipment calculation. If the calculations reveal that the equipment and/or duct work is improperly sized, assure a permit has been obtained, replace the improperly sized equipment and/or duct work, and obtain final inspection.	1	-	-	1	-	**≥ 2**
Return to home, correct this system to assure it is properly sized and delivering the proper amount of conditioned throughout the house per Manual D. Manual J, and Manual S.	-	-	-	1	-	**≥ 1**
Redo load calculation with the appropriate ceiling height. If the new load calculation number indicates that the size of the equipment is undersized (sensible & latent), then obtain permit, replace the equipment to assure it is compliant with the load calculation, and obtain final inspection.	-	1	-	-	-	**≥ 1**
Choose from three options: (1) **Refund total contractural amount**: (2) Hire licensed heating contractor, who shall gain permit, **perform room by room Manual J**, **Manual D**, and **Manual S** calculation, install proper sized equipment; and duct system; or (3) Return to home, obtain permit, **perform** a thorough room by room **Manual J**, **Manual D**, and **Manual S** calculation, install proper sized equipment; and duct system;	1	-	-	-	-	**≥ 1**
Hire a licensed heating contractor which shall **perform a load calculation**, obtain a permit, correct any and all violations and obtain final inspection.	-	1	-	-	-	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
HEATING CONTRACTORS in "Resolution Agreements"	111	90	75	79	84	**≥ 439**
HEATING CONTRACTORS in "Resolution Agreements" with Alleged Load Calculation, Duct Design, and/or Equipment Sizing Violations	**52**	**40**	**26**	**38**	**48**	**≥ 202**
RECOMMENDED RESOLUTION FOR ALLEGED VIOLATION INVOLVING LOAD CALCULATION, DUCT DESIGN, AND/OR EQUIPMENT SIZING	**HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" RECEIVING RECOMMENDED RESOLUTION**					
Hire North Carolina licensed professional engineer who specializes in residential HVAC design to **perform Manual J** load calculation, **Manual D** duct design, **and Manual S** equipment sizing calculation	-	1	-	-	-	**≥ 1**
Retain a professional engineer who shall **perform a thorough room by room load calculation and duct design** for this building. If the load calculations reveal the equipment sized or duct work is improperly sized or the duct work is improperly designed, obtain a permit, replace improperly sized equipment or duct system, and obtain final inspection.	-	-	1	-	-	**≥ 1**

Table 4
"Attorney's Reports"
Alleged Violations Involving Load Calculations by HEATING CONTRACTORS

("≥" is used, since the numbers represent "minimums.)

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors in "Attorney's Reports"	152	155	173	158	182	**820**
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
ALLEGED VIOLATION INVOLVING LOAD CALCULATIONS IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY'S REPORTS" WITH ALLEGED VIOLATION**					
Contracting Without a License	**22**	**26**	**42**	**18**	**13**	**≥ 121**
Contracting Without a Valid License	**50**	**40**	**40**	**50**	**62**	**≥ 242**
Failure to Perform a Load Calculation	1	2	-	-	-	**≥ 3**
Failure to Perform a Proper Load Calculation	-	-	2	-	-	**≥ 2**
Installed an Undersized Unit	1	-	-	-	-	**≥ 1**
Installed an Undersized Duct Work System	1	-	-	-	-	**≥ 1**
Design Issue	1	3	2	1	-	**≥ 7**
Permit Issue	**2**	**5**	**1**	**2**	**-**	**≥ 10**

Table 5
"Attorney's Reports"
Disciplinary Judgements for Heating Contractors with Alleged Violations Involving Load Calculations

("≥" is used, since the numbers represent "minimums.)

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors in "Attorney's Reports"	152	155	173	158	182	**820**
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
JUDGEMENT IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY REPORTS" ISSUED THE JUDGEMENT**					
VIOLATION: CONTRACTING WITHOUT A LICENSE OR VALID LICENSE						
Permanent Injunction Enjoining the Defendant from Engaging in Business of Heating Contractor until Properly Licensed	**61**	**57**	**75**	**59**	**63**	**≥ 318**
Permanent Injunction	**-**	**-**	**-**	**1**	**-**	**≥ 1**
Told to Reframe from Perform Unlicensed Work	**-**	**-**	**-**	**-**	**1**	**≥ 1**
Placed on Unsupervised Probation						
24 months	**-**	**-**	**1**	**-**	**1**	**≥ 2**
Serve Active Jail Time						
2 days	**-**	**-**	**-**	**1**	**-**	**≥ 1**
6 days	**1**	**-**	**-**	**-**	**-**	**≥ 1**
10 days	**-**	**-**	**1**	**-**	**-**	**≥ 1**
15 days	**1**	**1**	**-**	**-**	**-**	**≥ 2**
26 days	**-**	**-**	**-**	**1**		**≥ 1**
60 days	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Jail Time						
20 days	**-**	**-**	**-**	**-**	**1**	**≥ 1**
30 days	**-**	**-**	**3**		**2**	**≥ 5**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors "Attorney's Reports"	152	155	173	158	182	**820**
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
JUDGEMENT IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY REPORTS" ISSUED THE JUDGEMENT**					
VIOLATION: CONTRACTING WITHOUT A LICENSE OR VALID LICENSE (Continued)						
Jail Time (Continued)						
60 days	**-**	**1**	**-**	**-**	**-**	**≥ 1**
150 days	**-**	**1**	**-**	**-**	**-**	**≥ 1**
Suspended Jail Time						
24 days	**1**	**-**	**-**	**-**	**-**	**≥ 1**
28 days	**-**	**-**	**-**	**1**	**-**	**≥ 1**
30 days	**5**	**2**	**6**	**1**	**3**	**≥ 17**
60 days	**-**	**1**	**-**	**-**	**-**	**≥ 1**
90 days	**-**	**-**	**1**	**1**		**≥ 2**
24 months	**-**	**-**	**-**	**-**	**1**	**≥ 1**
House Arrest						
30 days	**-**	**-**	**1**	**-**	**-**	**≥ 1**
Pay a Fine						
$500	**4**	**1**	**8**	**2**	**6**	**≥ 21**
$1000	**-**	**2**	**1**	**-**	**-**	**≥ 3**
$1200	**-**	**1**	**-**	**-**	**-**	**≥ 1**
$1500	**-**	**1**	**-**	**-**	**1**	**≥ 2**
Pay Court Costs	**-**	**-**	**-**	**-**	**1**	**≥ 1**
Pay Homeowner Restitution	**1**	**-**	**2**	**4**	**2**	**≥ 9**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors in "Attorney's Reports"	152	155	173	158	182	820
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
JUDGEMENT IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY REPORTS" ISSUED THE JUDGEMENT**					
FOR ALLEGED VIOLATION: FAILURE TO PERFORM OR COMPLETE LOAD CALCULATION						
Probation						
12 months	**-**	**-**	**1**	**-**	**-**	**≥ 1**
Supervised Probation						
24 months	1	-	-	-	-	**≥ 1**
Suspended License						
6 months	**1**	**-**	**-**	**-**	**-**	**≥ 1**
12 months	**-**	**-**	**1**	**-**	**-**	**≥ 1**
FOR ALLEGED VIOLATION: FAILURE TO PERFORM LOAD CALCULATION AND INCOMPETENCE IN DESIGN						
Unsupervised Probation						
12 months	**-**	**1**	**-**	**-**	**-**	**≥ 1**
VIOLATION: POOR DESIGN and UNDERSIZED EQUIPMENT						
Unsupervised Probation with Requirement for proper Manual N and Q load calculations, duct design, manufacturer letter regarding Freon line more than 100 feet, Mechanical Code classes and Board Laws and Rules class	**-**	**-**	**1**	**-**	**-**	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors in "Attorney's Reports"	152	155	173	158	182	820
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
JUDGEMENT IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY REPORTS" ISSUED THE JUDGEMENT**					
VIOLATION: FAILED TO PERFORM LOAD CALCULATION, OBTAIN PERMIT, AND INSPECTION						
Supervised Probation						
24 months	-	-	**1**	-	-	**≥ 1**
VIOLATION: FAILED TO PERFORM LOAD CALCULATION. OBTAIN A PERMIT, INSTALL PROPER DUCT WORK, AND OTHERS						
Licensed Revoked	**-**	**1**	**-**	**-**	**-**	**≥ 1**
24 months	-	-	**1**	-	-	**≥ 1**
VIOLATION: FAILURE TO OBTAIN A PERMIT AND INSPECTIONS						
Probation						
12 months	**-**	**1**	**-**	**-**	**-**	**≥ 1**
18 months	**-**	**-**	**-**	**1**	**-**	**≥ 1**
Supervised Probation						
12 months	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Jail Time						
30 days	**1**	**-**	**-**	**-**	**-**	**≥ 1**
VIOLATION: FAILURE TO OBTAIN A PERMIT AND UNDERSIZED LOAD CALCULATION						
Permanent Revocation of License	**1**	**-**	**-**	**-**	**-**	**≥ 1**
VIOLATION: FAILURE TO OBTAIN PERMIT AND FINAL INSPECTION AND PROPERLY DESIGN DUCT WORK						
Supervised Probation	**-**	**-**	**1**	**-**	**-**	**≥ 1**

Continued

	2018	2019	2020 COVID	2021	2022	TOTAL
Total Contractors in "Attorney's Reports"	152	155	173	158	182	820
HEATING CONTRACTORS in "Attorney's Reports"	**80**	**73**	**89**	**74**	**75**	**≥ 391**
JUDGEMENT IN "ATTORNEY'S REPORTS"	**HEATING CONTRACTORS IN "ATTORNEY REPORTS" ISSUED THE JUDGEMENT**					
VIOLATION: POOR DESIGN						
Probation						
6 months	**-**	**1**	**-**	**-**	**-**	**≥ 1**
Supervised Probation						
6 months	**-**	**-**	**-**	**1**	**-**	**≥ 1**
12 months	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Licensed Suspended						
24 months	**1**	**-**	**-**	**-**	**-**	**≥ 1**
Surrender License	**-**	**-**	**1**	**-**	**-**	**≥ 1**

ADDENDUM

Table 6
"Resolution Agreements":
HEATING CONTRACTORS with
Alleged Violations Related to Permits and Inspections

("≥" is used, since the numbers represent "minimums.)

	2018	2019	2020 COVID	2021	2022	TOTAL
Heating Contractors in "Resolution Agreements"	111	90	75	79	84	≥ 439
ALLEGED VIOLATION RELATED TO PERMITS AND INSPECTIONS	HEATING CONTRACTORS IN "RESOLUTION AGREEMENTS" WITH ALLEGED VIOLATION					
Failure to obtain a permit before commencing work or obtain a mechanical permit	45 + 1 (20-30 in-stalls)	37 + 1 (25 in-stalls)	29	39	39 + 1 (3 in-stalls)	≥ 191
Failure to request inspection within 10 days of substantial completion of work	43 + 1 (20-30 in-stalls)	29	23	32	29	≥ 157
Failure to obtain final inspections	34 + 1 (20-30 in-stalls)	25 + 1 + (of long list) 1 (mul-tiples)	26	29	16	≥ 133

Macke Moldy House Horror Story

by Michael and Christine Macke
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cmackenc@gmail.com

Christine and Mike Macke are ready to share their story. They're determined to educate others so the nightmare they had to live through is never experienced by another unsuspecting homeowner.

In March 2014, we moved into our newly constructed, $1.2 million, 7,800 square foot, dream home in the Coastal area of NC. This home had been a long time in the making and was to be our forever home. Our Virginia home sold, and we paid off the mortgage on our new home. We were very excited, a dream come true! Retired, debt free, and a comfortable portfolio to pay for our retirement activities.

However, a short 2 months after moving we noticed an unpleasant odor coming from the master bedroom and bathroom area. Our daughter came to visit and found the source of the smell. The domed ceiling above our beautiful Jacuzzi jetted garden tub was turning black with Mold!

How did that much mold establish itself in 2 months' time? How do you even get rid of Mold once it establishes itself? Who is responsible?

We immediately started looking for answers to these questions. Logically, we called the builder, who called the HVAC contractor. The builder cleaned and painted over the black spots on the ceiling. The HVAC contractor tinkered with the vents. And both parties stated the "problem was fixed'', although they never mentioned what they thought the problem was.

As you can imagine, the problem was far from fixed. We could no longer visually detect, or smell the mold, and had no knowledge that the problem had in fact been masked. For an entire year We believed the mold was gone until We returned home from a vacation in June 2015 to find the ceiling black with Mold again. We called our builder a second time, after all, he was the one who allegedly knew how to fix building material issues. This time the builder claimed that with the domed ceiling in the master bath, it was impossible to get proper ventilation. He dropped the ceiling height by 3 feet to eliminate the unconditioned air pocket, painted the ceiling, and called it good.

The summer of our third year was a repeat of years one and two with the bathroom ceiling growing mold. Only this time, three bathrooms in the upstairs were growing Mold and there was Mold coming from most of the canned light fixtures on the second floor. We again contacted the builder, and he and the HVAC Company added a dedicated humidistat in the ceiling above the Jacuzzi tub.

I had been having health issues with bursitis, tendonitis and arthritis in my hips and legs. Although I was only 59, these issues led to bilateral hip replacements. We were not aware that the inflammation might be caused by the Mold exposure.

The fourth year in our home brought a return of the mold. The Builder admitted defeat and called a meeting of the contractors that had assisted with building the home. Represented were the HVAC Company, The insulation contractor, the builder, and an environmental specialist. Imagine my surprise and dismay when I was told the mold was our fault. The “experts” claimed that the mold was because we had too many pets, too many house plants, kept too many doors closed, and, like most people coming to NC from the North, we kept our thermostat too cold (at 72 degrees). They also indicated that the fact that the Jacuzzi tub was used at least once a week was problematic and recommended that the Jacuzzi tub be “off limits” from June to October. The environmental specialist also mentioned that “mold won’t hurt you”.

The builder refused to take any more responsibility. Although he admitted that we hadn’t been mold free since taking occupancy, he indicated he had already spent too much money trying to fix the issue. We finally realized that we had a problem. We had a moldy home and no clear idea as to the cause, and a builder that didn’t have answers, couldn’t seem to find a solution, and that had abdicated responsibility.

We didn’t think that this should be our responsibility, so we started searching for legal help. Although we reached out to several attorneys, we were advised that without knowledge of the causative factors it was unclear as to how to proceed. In addition, the three-year statute of limitations had expired as the builder tried to fix the problem and that would cause an uphill battle. We were being blocked at every turn.

We hired LRC Indoor Testing & Research, from Raleigh, who performed an Air Sample Spore Test to verify that, yes, we did have proof of a Mold issue. We had six different HVAC companies look at the issue and all said there was nothing wrong with the current HVAC install, but they could fix the problem. How do you fix something without acknowledging that there is a problem to be fixed?

It was the holiday season and while sitting in church on Dec 31st, 2018, my arms and legs started tingling and then went numb. I was also nauseated. I am

a retired Registered Nurse so was able to quickly rule out a stroke but wondered if I was having a heart attack. We went to the Emergency Room where the doctor determined that I had probably pinched a nerve in my neck. He recommended I follow up with my primary care doctor.

As I waited for an appointment with my Internal Medicine Dr., I made an appointment to have a chiropractor do neck manipulation. The chiropractor took an extensive health history and then asked if she could ask (what might seem like) an unrelated question. She asked if I had been exposed to Mold. She indicated that my symptoms were classic for Chronic Inflammatory Response Syndrome (CIRS) specific to Mold exposure. She gave me a list of lab work to get done and referred me to the office of Dr. Natasha Thomas, M.D.

Dr. Thomas knew to look deeper into other seemingly unrelated symptoms. I had been experiencing brain fog so bad at times that I feared I was developing Alzheimer's, I had digestion issues and bizarre new food sensitivities, and strange pains throughout much of my body. Dr. Thomas was able to see the missing Mold link between all these issues. To determine the severity of my Chronic Inflammatory Response, she ordered an MRI accompanied by NeuroQuant® 3D Image Processing. She explained that if I had CIRS, there were specific regions in the brain that would show signs of atrophy. My test was positive for atrophy in 7 areas that are specific to Mold exposure.

Dr. Thomas was also able to explain that my 4 years of Mold exposure had caused a tremendous amount of inflammation. The inflammation was the cause of my Tendonitis, Bursitis, and Arthritis that led to bilateral Hip replacements. I had gained 50 pounds since moving into our new home. Dr. Thomas indicated that the inflammation had caused an elevation in my Leptin levels leading to heightened appetite but that I also had leaky gut syndrome that was preventing my body from absorbing nutrients. Dr. Thomas told me to move out of the house before it killed me.

My husband, Mike, refrained from complaining about his issues (and will not be discussed at length here), he finally agreed to see Dr. Thomas as well. Mike's health had turned out to be affected even worse than mine!

In March of 2018, we moved out of our house and moved into a rented apartment, taking nothing with us that hadn't been thoroughly cleaned. Unable to find a rental that would allow pets, the garage was repurposed as an animal holding area for our cats and parrots. Over the next 17 months, we moved five times. I had incorrectly looked for a short term rental and our need was much longer.

Fortunately, Dr. Thomas was not only trained in remediating a body with Mold toxicity, she also knew who to call to diagnose a problem (Sick) house. She referred us to Energy Innovations by Harry Boody, Inc. Mr. Boody arrived in April

2018 and tested and evaluated our home for six straight days. The result was a 420-page forensic analysis. What he found was shocking! Our home was in violation of 65 mechanical codes!

Mr. Boody explained that although the builder had successfully built a very Energy Efficient tightly constructed house, the HVAC Company did not install an HVAC system that was able to handle the high performance tight building envelope. The construction drawings of the home showed that the builder had wisely ordered an Energy Recovery Ventilation (ERV) system, but the HVAC Company COMPLETELY FAILED to have the ERV installed. When asked, the builder stated that since we had upgraded our insulation by using spay cell foam, it was decided that it was not necessary to use an ERV. Harry explained that the tightening of the building envelope with upgraded insulation made the installation of an ERV even more critical.

To make matters worse, the HVAC Company installed duct work that was too small for the volume of air needed to ventilate the home, rendering the house deficient in both air flow and ventilation. Harry Boody' Forensic Analysis also showed that the 3 Heat Pumps (2 three ton and one two ton) were ducted to the wrong areas of the home. The small 2-ton unit serviced the larger 3-ton area of the home, and the larger 3-ton unit serviced the smaller 2-ton area of the home.

The Master bathroom with the Mold issue happened to be in the larger 3-ton area that was receiving the negligent air flow from the smaller 2-ton unit. The bathrooms were found to have large Exhaust Fans running continuously which pulled a negative pressure inside the house thus injecting large amounts of Humidity. The HVAC equipment was installed without a means of removing condensation. Our Air Conditioning units had operated with dried Coils since the house was built.

Mold spores that had likely landed on the raw building materials of the home while in the construction phase were able to grow and proliferate inside a home that had mistakenly been designed and built to foster Mold growth.

I know, this is the part where you're probably thinking this HVAC Company sounds TERRIBLE! They must have been a small, no name company, possibly with a poor reputation. The opposite is true. The HVAC Company that we hired is the largest, most popular, and most well-known HVAC company in the area. They have been in business for many years.

We hired Mr. Boody to redesign our HVAC systems so that they would meet the needs of our home, but before we could implement a new design, we had to eliminate the Mold contamination which by this time had entered the entire house. First I had to find a mortgage company willing to finance a home renovation that was due to Mold contamination. Yes, you heard right, we are no longer debt free. We hired an industrial hygienist to develop a remediation protocol and a remediation Company to implement the plan. We also had to find

a floor specialist because due to the excess humidity, our hardwood floors had buckled. They had to be sanded and refinished.

Mike and I had our own part in remediation which required some tough and expensive decisions. Since it is nearly impossible to remove mold spores from upholstered furniture, the couches and chairs had to go. And don't forget the largest piece of upholstered furniture, the mattresses in 3 bedrooms would need replacing. The blinds on all the windows would have to go. Clothes and shoes were washed or dry cleaned or they went into the trash. Anything that might be contaminated with Mold was disposed of.

Then, the entire home was fogged using a special antimicrobial solution, and every surface of the home was washed down with 150 proof vodka to kill any lingering Spores. The floors were refinished, and the entire home was repainted. It took over six months for the remediation and rebuild to be completed. Then we hired an HVAC Company to install the Harry Boody re-designed HVAC system with properly sized ductwork to enable Air Distribution to the appropriate areas of the home. The redesign included 2 ERV systems and 3 Air Purification units.

We moved back home in the fall of 2019. We just celebrated our third summer being Mold free. But what about the price tag…$450,000!!! And that's not including ANY of our doctors' bills, relocation expenses, or the replacement cost for refurnishing our home. *We* hired a lawyer and filed a lawsuit. After all, it was through the negligence of the HVAC Company, and

the Builder that supervised them, that this had happened. We eventually went to mediation and were forced into a settlement simply because our lawyer was not willing to take the issue further. It is my opinion that the mechanical intricacies of HVAC design were beyond the scope of knowledge for our lawyer who struggled to communicate the depth of the issue and appropriately defend our rights as a homeowner. We settled for $200,000 and had to take out a mortgage to pay for the remaining remediation costs of $250,000.

Where were the Building Code Enforcement Officials who were supposed to perform the Inspections for Code Compliancy for our home?

There are no Code Enforcements. No responsibility; no liability. It all falls on the homeowner. This must be changed and soon!

Michael and Filomena Ferri's Story
as told to Annette Powell
in
December 2022

Michael and Filomena Ferri
741 Kemp Road, Mooresville, NC 28117
336-254-3680; filnotes@icloud.com

During my conversation with Filomena, she told me she and Michael,

-Purchased their 2-million dollar house, which was built in 2012-2013;

-High humidity and mold problems were discovered shortly after they moved in;

-Requested many service calls to fix the problems;

-Hired an architect to assess the problem; she recommended a forensic analysis be done on her house.

-Discovered NO LOAD CALCULATIONS WERE PERFORMED BY THE ORIGINAL CONTRACTOR;

-Consulted a doctor due to mold sensitivity; her daughter could not come home from college due to severe mold allergy and continues to receive treatment for mold exposure;

-Experienced extreme emotional distress; and

-Have spent around $100,000 to fix their HVAC problems and repair damage to their home and contents.

Damon and Tracy Davis's Story
as told to Annette Powell
in
December 2022

Damian and Tracy Davis
2177 Starfall Drive, Colfax, NC 27235
336-235-5261; tracy_gokey@triad.rr.com

During my conversation with Tracy, she told me she and Damon,

-Moved into a newly constructed house in 2020;

-Had issues with high humidity right away;

-Discovered black particles, like shoot, coming out of an air supply vents and on blinds;

-Are concerned about the effects of mold on her 4 small children;

-Conducted a DIY mold test; sent it off for analysis, which indicated mold most likely caused by high humidity;

-Hired a professional engineer, after their HVAC contractor could not fix the problem;

-In October 2021, the professional engineer informed them their gas furnace was 84.5% oversized and air conditioner was 20.6% oversized; and the air distribution system was undersized for the required air flow;

-Had an energy analysis performed on their house, which showed, in part, "…the system was not designed per the ACCA Manual D or any approved method…";

-Stated that, after receiving the professional engineer and forensic analysis reports, the HVAC contractor hired his own professional engineer, who confirmed the home owner's professional engineer's evaluation of their system was correct;

-have spent thousands of dollars to correct their HVAC problems;

Continued

-Found <u>NO LOAD CALCULATIONS WERE PERFORMED ON THEIR HOUSE</u>; and

-Shared their neighbors are outraged and anxious, since their neighbors' houses were built by the same builder and HVAC systems and equipment were sized and installed by the same HVAC contractor.

Note: Documentation from the professional engineer and forensic analysis are available upon request.

904 Barmouth Court,
Raleigh, NC 27614
February 27, 2023

Re: The Real Damages of Mold

Dear NC Building Code Council Members,

My name is Lori Biers and here is my family's very recent story of mold injury. We are all greatly impacted by the illness and financial burden of it, and knowing how easily it could've been avoided is infuriating — it should be criminal.

My mother has been suffering from acute mold toxicity in her bloodstream for more than 5 years now. She got it from her home in Pennsylvania, and she is entirely unable to drive the 6 hours from there to visit her two small grandbabies here in Raleigh due to her daily vertigo, nausea, and swirling brain fog. Her memory is shot, and her anxiety is physically crippling. This woman was a Computer Science and Medical Technology double major, warrior single mother of two very small children after her husband was killed by a drunk driver, and yet now, after THIS, she can barely function let alone drive. The mold that was in her home 5 years ago was fully remediated under advisement of some of the top mold experts in the country, but the lasting effects have been a persistently low white cell count, lower than many of her doctor's cancer patients. No amount of treatment (Western or allopathic), diet, or lifestyle change has afforded her any relief. The best doctors in DC and Baltimore are unable to help her. So we, my husband and I, convinced her to buy a home here in Raleigh to be near to us. We implored her that we would take care of her and get her well; get her some semblance of a life again, get her time with her grandchildren, and a few more (good) years on earth. She only just turned 70 — has never smoked or drank a solitary day in her life, eats healthier than anyone you've ever met, and she is an utter shell of a human being.

The home we found for her here in Raleigh is seemingly lovely. The inspector that came through gave us a “nothing bad or unusual to see here” stamp on his report, so we put down a rather sizable due-diligence. However, due to her illness and mold exposure history, I brought in a mold expert to be certain of it’s safety. Danny Gough is recognized by the State of North Carolina as an authority on instructing ACCA HVAC members on our codes here; he is the expert I was fortunate enough to obtain.

What he found was enough to fill a 300 page report with myriad different kinds of mold, one of which had a count so high that it exceeded lab reporting limit. This is largely due to the fact that the HVAC system is oversized and creating constant moisture in the ductwork. There are also clear and major violations with the entire house duct design (nothing resembling the requirements of ACCA Manual D, which is REQUIRED by Chapter 14 of the NC Residential Code). Here is a small excerpt from Danny Gough’s report, displaying only a sliver of the damage these violations have yielded us:

The lab reported greater than 74,667 spores per meter^3 of Aspergillus/ Penicillium and Cladosporium. These counts were so overwhelming, they exceed the reporting limit for the lab.

Aspergillus mold is a large, diverse fungal genus containing about 300 species. A small number of these species are known to produce mycotoxins which are associated with critically serious health issues.

Aspergillus share their habitat and compete with species from genera such as Penicillium. Penicillium has over 300 species as well. Some Penicillium species can produce microbial volatile organic compounds (MVOCs) and toxins that can be harmful, especially upon long-term exposure. Both genera have the potential for high economic and health impacts.

These are two of the genera already in her blood, so we are all too familiar with how serious they are. She was healthy prior to a remodel in her home 5 years ago, which released this hell we've been living in since.

The Financial Burden

I've spent the last two months figuring out how to make this home healthy for my mother. To date, for mold remediation and those repairs only, our ticket stands at $109,000. We have to entirely re-engineer the HVAC system; two units were improperly oversized, and the flow of air through the home nurtured the mold growth further. We had to gut the crawl space, rip out walls, cabinets, floors, all carpet and padding, and every ounce of ductwork in the home. We know there are more costs coming, but these are the concrete, final cost, paid for HVAC violation related damages.

The Kicker

The HVAC permits on our newly purchased home show VOID. Meaning they were not obtained, and never inspected. So this all would've been avoided if someone had been forced to DO THEIR JOB. To run load calculations as they're ALREADY REQUIRED, to file them in order to obtain permits, and to get them signed off on. And if the failure to do this resulted in an infraction that followed a contractor's license, like violations against a doctor follow them beyond the convenience of business name change, wouldn't they start to DO THEIR JOBS?

The Final Straw

Before hiring our HVAC engineer, I had a different, very highly rated HVAC company in town come to give me an estimate on replacing our entire mold-filled HVAC system. It was the owner who came to my home, as he wanted personal

oversight given the level of the problem. He gave me quotes on new units, in the exact same sizes as the existing. When I told him our report said those were too big, he said I was wrong; that was based off of data pertaining to newer, more energy efficient homes. I asked what the Manual J Load Calculation said. What he told me then said EVERYTHING I needed to know — he didn't actually have the ability to run an official Manual J Load Calculation, but he knows a guy that can. He can ask him.

An hour later, this very gentleman (again, *the owner of the company*) called me and said, yes in fact my mold expert's load calculations were correct, and the units he himself had recommended were oversized. So before my insistence on a subject matter I should have ZERO layman's knowledge of, he not only wasn't going to run a Manual J Load Calculation, he didn't have the ability within his own company to do so.

This needs fixed. And the public deserve to be protected.

Sir, I ask of you — if that isn't your job, who's is it?

Most respectfully and sincerely,

Lori Biers