BUILDERS ASSOCIATION OF MINNESOTA
SERVING THE HOME BUILDING AND REMODELING INDUSTRY
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June 9, 2008

The Honorable Richard C. Luis
Office of Administrative Hearings
600 N. Robert St.
P.O. Box 64620
St. Paul, MN 55164-0620

RE: Docket #7-1900-19553-1 Rules-National Electrical Code
Final Comments

The Honorable Richard C. Luis,

Thank you for the opportunity to rebut arguments regarding BAM's proposed amendment to the 2008 National Electrical Code.

Can Lighting Strikes Trip Ground Fault Circuit Interrupters?

The short answer to this question is yes. What we don't know is how often this may occur on sump pumps, sewage pumps and air-to-air exchangers if the 2008 NEC is not amended. Ms. Williamette's comments dated May 28, 2008 state that "older GFCI's didn't always work well with motor loads, and would occasionally trip during lightning storms. The problem has been remedied, as stated by Underwriter's Laboratories and several of the manufacturers."[1] BAM agrees that the nuisance problem with motor loads tripping GFCIs has been remedied. However, we believe that Mr. Dini's testimony at the May 13, 2008 hearing nor in his follow-up comments dated May 19, 2008 stated that GFCI's are impervious to false tripping during electrical storms. Nor do we believe any manufacturer warrants their GFCI products against false tripping during electrical storms. Ms. Willamette's comment also differs from the Board of Electricity's response dated May 30, 2008 which states, "Contrary to Ms. Linner's assumption, the latest model GFCI's are very unlikely to trip as a result of a lighting strike."[2]

BAM is not arguing that GFCI trips during electrical storms are rare. However, when nuisance tripping does occur the unintended consequences of a basement flooded with sewage or water or an inoperative air-to-air exchanger presents an increased health risk

[1] See OAH Public Comments, Batch 4, page 1.
[2] See Board of Electricty comments dated May 30, 2008, p. 6.

to occupants and can cause serious property damage. More importantly, Consumer Product Safety Commission (CPSC) data show that death from electrocution in a flooded basement is a much more serious health risk than having a homeowner be electrocuted or shocked by using a designated receptacle for a sump or sewage pump without GFI protection.[3] Flooded basements increase the risk of shock or electrocution from *any receptacle* in a basement, as shown by the CPSC data summarized in BAM's comments dated June 2, 2008.[4]

The Minnesota Electrical Association's (MEA) comments dated May 20, 2008 stated a very valid argument for a GFCI exemption in certain equipment:

> "In weighing the health and safety of homeowners, the potential for harm created by mold, water damage, and air quality problems caused by the failure of air exchangers or sump pumps when tripped by a GFCI outweighs the likelihood of injury and electrocution."[5]

As MEA's survey results show, 90.7% of their membership's electrical contractors who responded to a recent survey are concerned about the "safety and damage concerns" if certain GFCI requirements aren't amended out of the 2008 NEC. [6]

The Minnesota Department of Labor and Industry (Exhibit 126) and the State of Washington (Exhibit 127) were concerned enough with the possibility of GFCIs inadvertently tripping when used for sump pumps or sewage pumps that they introduced specific language to exempt this type of equipment. South Dakota, North Dakota, and Oregon also have adopted amendments to the 2008 NEC that exempt sump pumps and sewage pumps from GFCI protection. Mr. Fecteau's e-mail dated May 29, 2008 mistakenly left out the Oregon Electrical Code's exemption for GFCI protection for sewage or sump pumps. The exact code language follows and was submitted by BAM in Attachment 3 of our comments dated May 16, 2008:

> *"918-305-0130(1)(b)*
> *Exception No. 1 to (2): A single receptacle for each appliance within a dedicated space that, in normal use, is not easily moved from one place to another, that is cord and plug connected, and the receptacle is labeled as "not GFCI protected."*
>
> *Exception No. 2 to (2): Receptacle ground fault protection shall not be required for a dedicated branch circuit serving a single receptacle for sewage or sump pumps."*[7]

[3] See BAM comments from Batch ??, dated June 2, 2008.
[4] See BAM's comments dated June 2, 2008, from Batch 1.
[5] See MEA's comments dated May 20, 2008, p. 2 from Batch 3.
[6] *Ibid.*, p. 3 & 4.
[7] See BAM's comments dated May 16, 2008, Attachment 3,

If GFCI's could not inadvertently trip during electrical storms why have states that have adopted the 2008 NEC already amended Section 210.8 before adopting the 2008 NEC? And why would Oregon, North Dakota, South Dakota and Washington specifically amend Section 210.8 to exclude GFCI protection for sump pumps and sewage pumps? Other states have made a risk benefit analysis and have found that the 2005 NEC did not present a potential danger that was greater than the potential danger the 2008 NEC added to homeowners and homes. These states have determined that an amended Section 210.8 of the 2008 NEC, does a better job of "practical safeguarding of persons and property form hazards arising from the use of electricity."[8]

Hardwiring Sump Pumps, Sewage Pumps & Air-to-Air Exchangers

Ms. Willamette and the Board of Electricity's comments both indicated that contractors could simply hardwire sump pumps, sewage pumps and air-to-air exchangers to avoid installing GFCI's. As Mr. Wilson testified on May 13, 2008 there are no air-to-air exchangers available for the residential market that are manufactured to be hardwired. This practice would require an electrician to cut off the cord on the cord and plug appliance and modify it to hardwire an air-to-air exchanger, sump pump or sewage pump. Modifying cord and plug appliances to hardwire them is not a normal installation practice and certainly is not considered a "code minimum" installation.

Ms. Williamette's comments dated May 28, 2008 also state that, "sump pumps are required by the manufacturer to be plugged into a GFCI-protected circuit." This statement contradicts Exhibit 152, the installation instructions from the Zoeller Pump Co. that was submitted into evidence by the Board of Electricity. These installation instructions state that "the receptacle may be protected with a ground-fault circuit interrupter." If this were a manufacturer's requirement the installation instructions would say the receptacle must be protected with a ground-fault circuit interrupter. The MEA's survey results indicate that the majority of their members are not comfortable installing GFCI protection on sump pump receptacles, regardless of manufacturer's installation suggestions.[9]

Reciprocity for Electrical Licenses in Minnesota

Mr. Fecteau's e-mail dated May 29, 2008 stated that since Minnesota has a licensing reciprocity agreement with other states it is important not to have state-specific amendments added to the National Electrical Code. According to the Minnesota Department of Labor and Industry's website document called, *Obtaining a Personal Electrical License Through Reciprocity*, "applicants may obtain a Minnesota master electrician license without examination if they obtained their master license by examination in any of the following states: North Dakota, South Dakota, and Nebraska."[10] (See Attachment A). Nebraska has yet to adopt the 2008 NEC[11] (see Attachment B)

[8] 2008 National Electrical Code, Article 90.1(A).
[9] See MEA's comments dated May 20, 2008, p. 3 & 4, from Batch 3.
[10] http://www.electricity.state.mn.us/pdf/ReciprocalLicense.pdf

and North Dakota and South Dakota have already adopted the 2008 NEC with amendments to Section 210.8.[12] Obviously anyone seeking a reciprocal Minnesota Master Electrician license from one of the allowed states would have to learn the specific code amendments required under the each state's specific building code.

Residential Fires and Arc Fault Circuit Interrupters

Attachments A, B, C & D of Ms. Williamette's comments dated May 28, 2008 include pictures from "electrical fires that occurred in St. Paul in April of this year."[13] Like most data on electrical fires, the year or estimated year of construction for these residences is not given. Ms. Williamette's states that:

> "These fires probably would have not happened if they had AFCI protection for those circuits. A fire sprinkler system would have put the fire out, but it would not have prevented the fire from starting."[14]

Because no further description of these fires is given it is impossible to assess whether or not AFCI protection in these homes would have prevented these fires. However, these pictures couldn't make BAM's point more clearly: residential electrical fires are most common in one or two-unit dwellings and happen overwhelming in older construction.

Not all electrical fires can be prevented by AFCIs. Mr. Fecteau's comments dated May 29, 2008 confirms that, "the CPSC believes that AFCIs, if installed in all homes, could prevent more than 50 percent of the 28,300 electrical fires that occur annually."[15] This statement also means that 14,150 electrical fires would not be prevented by AFCIs. The interesting policy question is how many of these 14,150 electrical fires could be prevented if AFCIs were installed in homes built before modern wiring materials and codes were required? None of the sets of electrical fire pictures submitted by Ms. Williamette indicate these houses were built within the last twenty years and most were built many, many decades earlier. Other clues to the age of the dwellings include architectural styles of the home exteriors and low clearances of the basements. The type of wiring, old circuit boards, examples of bad wiring splices, and other electrical system components shown in these pictures are simply are not allowed in new construction. One picture indicates supplemental heat had been used, a potential electrical fire source that is not required due to modern construction methods.

Many electrical fires happen in older homes because they have older wiring systems that are being overloaded by modern appliances. The *Residential Building Electrical Fires* report that was submitted as an attachment with Mr. Fecteau's comments dated May 29,

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[11] NEMA Code Alert Nebraska, 24 April 2008 at http://www.nema.org/stds/fieldreps/codealerts/20080424ne.cfm
[12] See Fecteau comments dated May 29, 2008, p. 2 & 3, Batch 5.
[13] See Willamette comments dated May 28, 2008, p. 2, Batch 4.
[14] *Ibid.*
[15] Fecteau comments dated May 29, 2008, p. 2, Batch 5??.

2008 clearly states that electrical fires are far more common in older homes with inadequate electrical systems. (emphasis mine):

> "While new construction is not immune from electrical fires caused by faulty wiring, there are many older homes with outdated wiring that is deteriorating, inappropriately amended, or insufficient for the electrical loads of a typical household in the 21st Century.
>
> According to Underwriters Laboratories (UL), over 30 million homes—more than one-third of all US housing—are more than 50 years old. Consider the expansion in the number of appliances used by residents in the past half-century, and it is quickly obvious that overloaded wiring and circuitry is likely in these structures. Overloading will heat up wiring that already could be deteriorating, crumbling and no longer a good insulator.
>
> Just how big this problem is remains to be seen. The Residential Electrical System Aging Research project was launched by the Fire Protection Research Foundation to study how the age of wiring, outlets, junctions, and other connectors affects the pattern of electrical fires in homes. One objective of the study is to make improvement to the National Electrical Code® (NEC) (National Fire Protefction Association (NFPA 70) and through the building codes adopted by local and State jurisdictions around the country. Already, changes in wiring practices dictated by better electrical codes and the required use of smoke alarms have made new construction safer.
>
> Residents demand higher levels of electrical energy to power their homes and appliances than they did in the past, and new homes are built to meet this demand for multiple televisions, phones, hairdryers, microwaves, washers and dryers, etc. As the consumers' electrical demands increase, so does their expectation that their homes will supply adequate power to meet these. They meet their needs by adding more circuitry (and circuit breakers in black spots on the breaker panel, or even another circuit breaker box) and outlets to accommodate their purchases. If an outlet is added to an existing circuit, then the load easily can be more than the wiring originally was designed to conduct—perhaps decades ago."[16]

For all of the reasons spelled out by the FEMA report, the best defense against electrical fires would be to eliminate the cause of these fires in residences with outdated electrical components. Minnesota builders are not allowed to build homes that are at risk for overloaded circuitry, unsafe extension cord use from inadequate outlets, insulated wiring subject to deterioration, and wiring installed before modern requirements.

[16]"Residential Building Electrical Fires", US Department of Homeland Security, US Fire Administration, National Fire Data Center, Volume 8, Issue 2: March 2008, p. 2.

Electrical fires will likely increase in the coming decades. However, the increase will continue not because the housing being built now will age but because already at-risk housing with existing electrical problems will age even more. The dangerous 50+ year old housing stock cited by the CPSC will become 60+, 70+ and 80+ year old houses.

BAM's proposal to amend Section N210.12 to exempt AFCI protection would only occur in new dwellings where fire sprinklers have been installed. The first line of defense against electrical fires has already been all but assured through safety measures required by strict and safe construction techniques. The second line of defense has been provided by mandated fire sprinklers. As state fire statistics summarized in Table 1 indicate, from 2004-2-006 there have been no fire deaths attributed to electrical fires in multi-family units.

Table 1: Electrical Fires in Dwellings in Minnesota, 2002 – 2006[17]

Reporting Year	**Fire Deaths in Dwellings**	**Fire Deaths in Dwellings Attributed to Electrical Fires**	**Fire Deaths in Single Family Dwellings (One – Two Units) Attributed to Electrical Fires**	**Fire Deaths in Multi Family Dwellings (At least 3 Units) Attributed to Electrical Fires**
2004	28	0	0	0
2005	30	3	3	0
2006	37	3	3	0

Source: 2004 – 2006 Fire in Minnesota: Fire Reporting System, Minnesota Department of Public Safety, State Fire Marshal Division. Unpublished reports: 2002 Fire Death Listing and 2003 Fire Death Listing Minnesota Department of Public Safety, State Fire Marshal Division.

What this whole argument comes down to is whether we are saving more lives by increasing the cost of construction in multi-family homes by requiring AFCI protection. As Mr. Minn testified, every increase in the cost of construction caused by code requirements directly decreases safe housing options for rent-assisted Minnesotans and first time homebuyers.

Ms Williamette's May 28th letter speculates that:

> "If we only consider the final cost to the homeowner, the sprinkler system is far more expensive than the AFCI breakers. If the homeowner is going to install a sprinkler system at $2000 more, the additional $300 - $400 for AFCI breakers, to prevent the fire from starting, is probably not going to be a hardship."

[17] Data are summarized by previously submitted exhibits: 139(2), 139(3), 139(4).

The decision to install a fire sprinkler in a multi-family unit has already been decided for the homeowner. The $2000+ expenditure for a sprinkler is not an option. The State Building Code requires the installation of the fire sprinklers in multi-family units.[18] The additional cost of the AFCI breakers will not be a hardship because they have already been priced out of the unit by previous safety requirements. Mr. Minn testified that increased costs ensure that less affordable housing is built which assures that potential tenants will remain in substandard housing.

In closing BAM believes that the amendments proposed to the 2008 NEC clearly meet the intent of Minnesota Statute 16B.59 in providing, "reasonable safeguards for health, safety, welfare, comfort, and security….at the least possible cost consistent with recognized standards of health and safety." Thank you for the opportunity to submit additional comments in support of BAM's proposed amendments.

Sincerely,

Karen Linner
Director of Codes and Research

Attachment A
Attachment B

[18] See Exhibit 125, Attachment A.

Obtaining a Personal Electrical License Through Reciprocity

A Journeyman License

Minnesota participates in the Multi-State Reciprocal License Agreement and applicants may obtain a Minnesota journeyman electrician license without examination if they obtained their journeyman or master license by examination in any of the participating states. The states participating with Minnesota in the multi-state agreement include: Alaska, Arkansas, Colorado, Idaho, Montana, Nebraska, New Hampshire, New Mexico, North Dakota, Oklahoma, South Dakota, Utah, Washington, and Wyoming.

A Master License

In addition, applicants may obtain a Minnesota master electrician license without examination if they obtained their master license by examination in any of the following states: North Dakota, South Dakota, and Nebraska.

Qualifying conditions for either class of license include the following:

1. The applicant must not have failed the same or greater class of license examination in Minnesota.

2. The applicant must have obtained the same or greater class of license in the first state by examination at the state level (the license must not have been obtained through a reciprocal agreement with a city or other political subdivision).

3. The applicant must have held the license for at least one year in the first state.

4. The applicant's license must be current and in good standing in the first state.

5. The applicant must not be under any order to deny, suspend, or revoke any class of electrical license in Minnesota.

6. The applicant must submit an application and examination fee of $35 with the application.

7. Upon approval, the applicant must submit the required license fee to be issued the license applied for.

8. Upon obtaining the license, the applicant (licensee) must meet all continuing education and renewal requirements to maintain the license.

A personal license application may be obtained from the Department Web site at:
http://www.electricity.state.mn.us/Elec_lic/Pers_lic/Pl_form/Forms/LicenseExamAppl_Original.pdf

Attachment B

National Electrical Manufacturers Association (NEMA): Setting Standards for Excellence

Code Alert: Nebraska, 24 April 2008

NEMA > Standards > Field Representative Program > Code Alerts > Code Alert: Nebraska, 24 April 2008

The State of Nebraska has scheduled a special meeting to delete the 2005 National Electrical Code amendment 210.12 Arc Fault Circuit Interrupters.

May 9, 2008 - 9:30 am
Nebraska State Office Building
Lower Level "B"
14th and "M" Street
Lincoln, NE

The Nebraska State Electrical Board will hear testimony in reference to deleting the state amendment to the 2005 NEC section 210.12. To date no one has asked to testify against deleting the amendment. However walk in testimony will be allowed at the end of scheduled testimony.

Letters of testimony can be sent to the below address to be filed the day of the public meeting;

Nebraska State Electrical Board
c/o Randy Anderson
Executive Director
Nebraska State Electrical Division
800 South 13th, Suite 109
PO Box 95066
Lincoln, NE 68509-5066

Contact: Jeffrey A. Fecteau: Jeff.Fecteau@nema.org