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# ADVISORY COMMITTEE COMMENT FORM
## FOR PROPOSED CODE CHANGES
(This form must be submitted electronically)

**IRC-87, R313.2**

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## Proposed Code Change - Language

**R313.2 ~~One and t~~Two-family dwellings automatic fire systems.**
An automatic residential fire sprinkler system shall be installed in ~~one and~~ two-family *dwellings*.

**Exception:** An automatic residential fire sprinkler system shall not be required for *additions* or *alterations* to existing buildings that are not already provided with an automatic residential sprinkler system.

## Proposed Code Change – Need and Reason

### Sprinklers in New Single-Family Homes Won't Reduce the Residential Fire Death Rate

This code proposal is both needed and reasonable in Minnesota because the requirement of fire sprinkler systems in all new homes will be very costly to implement and is not likely to decrease the death rate from fires in single-family residences. A Minnesotan's level of safety depends on what decade their home was built. Since April 2003 the Minnesota State Building Code has required that all single-family homes have a smoke alarm on each level, in each bedroom, and within 10 feet of every bedroom. The Minnesota Building Code also requires all of these smoke alarms be hardwired and interconnected. The smoke alarms are hardwired directly to the electrical system and only rely on batteries in the case of a power outage. The smoke alarms are also interconnected meaning if any alarm detects smoke, they all go off simultaneously. This level of protection along with other mandatory fire prevention materials and methods required by the building code has been very effective in helping prevent residential fire deaths in Minnesota.

Section 313.2 of the 2012 IRC was added on the assumption that it would make new single-family homes safer by requiring fire sprinklers. However, this assumption ignored the housing stock where fire deaths occur and ignored the substantial increase in the cost of construction required to install sprinklers in custom homes, especially those with well water. Based on the number of Minnesota civilian fire deaths in single-family homes since the code requirement for hardwired, interconnected smoke detectors in 2003 was put in place; requiring fire sprinklers will be an added cost without an added safety benefit.

BAM bases this prediction on an analysis of the fire deaths that have occurred in Minnesota homes based on when those homes were built (Attachments A and B). Since 1998 the Minnesota Fire Marshalls Office has collected addresses and other data whenever a residential fire death occurs. BAM matched each address with county or municipal taxation or assessment records to determine when each home with a

fatal fire was originally built. Of the 229 fatal residential fires, 42 had incomplete addresses or no address. The remaining fire fatalities were divided into decades when they were constructed. The histogram labeled "1998-2010 Minnesota Civilian Fire Deaths in Single-Family Homes by Decade of Construction" (Attachment A) clearly shows that in homes built since the 1980's, when battery operated smoke alarms were required by code, fire death rates have fallen sharply. Compare the falling numbers of civilian fire deaths between single family homes built in the 1980's, 1990's and 2000's in Attachment A. The drop in death rates for these decades is a direct result of stricter code requirements and advances in smoke detector technology.

In the period from 2003-2010, when hardwired, interconnected smoke alarms were required, there was only one fire death in a single-family home (Attachment B). According to Minnesota State Fire Marshal data, that fire was caused by careless smoking in which the homeowner fell asleep on a couch with a lit cigarette. If fire sprinklers would have been required in 2003 would this homeowner have survived this house fire? Likely not. According to the Coalition for Fire-Safe Cigarettes, "if the cigarette falls near the head of a sleeping smoker, the smoldering fire can produce enough carbon monoxide to kill him or her before there is enough heat from the burning chair/bed to activate the sprinkler." In addition, fire sprinklers are also not likely to prevent fire deaths caused by people smoking while connected to oxygen.

**Fatal Fires Occur in Older Homes**

Fatal fires occur overwhelmingly in older homes. Fatal fires are much more likely to occur in homes without smoke alarms or homes without working smoke alarms. Code proposals or other fire prevention measures that are targeted at homes without smoke alarms or working smoke alarms would undoubtedly save lives. According to the National Fire Protection Association the chances of surviving a house fire with at least one working smoke alarm is 99.45%; and even higher with hardwired, interconnected alarms. Adding fire sprinklers as another level of safety to new single family homes (the most fire safe homes in the housing stock) will have no effect on the civilian fire deaths in houses without interconnected or hardwired smoke alarms.

An analogy for this type of public policy is to combat low elementary reading scores by providing the top 10% of each grade's students with a personal tutor. This would be an expensive way to do nothing to help struggling students learn to read. To achieve successful public policy results the correct population has to be targeted and requiring sprinklers in new single-family homes is simply the wrong target for reducing residential fire deaths.

**Minnesota Fire Fighters Haven't Died Fighting Single-Family Fires**

If fire sprinklers had been installed in every single-family home in Minnesota the firefighter fatality rate would still stand at 16 for the years 1989 – 2010.[1] This is because there has never been a Minnesota fire fighter killed in the line of duty fighting a residential fire dating back to 1989 when detailed records are available.[2,3] Firefighter fatalities have occurred in Minnesota because of vehicle strikes, vehicle accidents when traveling to a fire call or fire station, training accidents, commercial/industrial fires, and heart attacks before or after fire calls.[4]

**Residential Fire Sprinklers Are Expensive**

According to a report by the Minnesota Fire Chiefs Association the average Minnesota homeowner will pay $4,000 for a residential sprinkler system. (Attachment C, p. 6) However, actual estimates of installed systems are much more expensive. Rural homeowners with well water will pay the highest costs since these systems will require the addition of expansion tanks in a heated area of the house. Most rural homes

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[1] U.S. Fire Administration's Firefighter Fatalities in the United States Annual Reports (1986-2010).
[2] Ibid.
[3] Minnesota Fallen Firefighters Memorial Association website, Line of Death Duty Report at http://www.mffma.org/memorial/MNFallenFireFighters.htm .
[4] Ibid, footnotes 1 and 3.

will also require a booster pump. In some areas of Minnesota there is a serious lack of ground water and some homeowners in these areas may require an additional well drilled. These costs may be justifiable if there were a proven need for this safety equipment in new single-family homes. An analysis of the type of housing where fire deaths occur does not justify adding a residential sprinkler requirement for new homes.

The cumulative effect of raising the cost of construction by a sprinkler mandate will be that 21,000-24,000 Minnesota families will be priced out of the market for a new home based on a study by the National Association of Home Builders (Attachment D). These homeowners are likely to currently live in homes that do not have hardwired, interconnected smoke alarms.

**27 States Have Already Approved This Code Change**

27 states around the country have already determined that section R313.2 is not a necessary requirement in their residential building codes. Minnesota's neighboring states are included in this list: Iowa, North Dakota, South Dakota and Wisconsin. It is reasonable to have a Minnesota specific amendment to delete one-family dwellings (single-family homes) from section R313.2. The requirement to install a fire sprinkler system in all one-family dwellings was first added to the 2009 International Residential Code which Minnesota did not adopt. Minnesota is the first state that is in the process of adopting the 2012 IRC. Of the 29 states that have considered adoption of the 2009 IRC national model code, all but two have deleted the requirement for requiring fire sprinklers in one-family dwellings. Maryland allows local municipalities to opt out of requiring fire sprinklers in their communities. Only the State of California has adopted the 2009 IRC with the sprinkler requirement statewide. The other 21 states have not adopted statewide building codes or have yet to adoption the 2009 or 2012 IRC.

**Homeowners Can Still Choose to Install a Fire Sprinkler System**

This proposed amendment would not prohibit ANY Minnesota homeowner from building a home with a residential sprinkler system. This code proposal would keep a homeowner's decision to install a sprinkler system a choice instead of a mandate. Most of BAM's members have never been asked by a homeowner or potential buyer to price out or install a fire sprinkler system. If a homeowner decides to have a fire sprinkler system installed in their single-family home, section R313.2.1 of the 2012 IRC requires the system be installed to the NFPA 13D standard. This proposal does not amend this section of the code.

## Proposed Code Change – Cost/Benefit Analysis

Removing the mandate for a NFPA 13D fire sprinkler system in all homes will decrease the cost of construction by at least $4,000 for the average Minnesota homeowner based on a report by the Minnesota Fire Chief's Association (Attachment C, p. 6). According to the National Groundwater Association 29% of all Minnesota homeowners receive their water from private wells. Removing the mandate for a NFPA 13D fire sprinkler system for a Minnesota homeowner with well water will decrease the cost of construction by at least $6,000 for the average homeowner based on the cost of installing the sprinkler system, expansion tank and a booster pump.

Sprinkler proponents often cite an installation cost of $1.61 per square foot for installing a NFPA 13D fire system in a single-family home (Attachment C, p.3). This cost is far too low for Minnesota homes. Why?

(1) The National Fire Protection Association established this cost by gathering three bids for a single-family home model in 10 national cities (Attachment C, p. 3). The costs gathered for temperate climates do not apply to Minnesota homes because water pipes cannot be run in the attic without insulated soffits to protect them against freezing.

(2) Costs for townhomes are also not comparable to single-family sprinkler systems because custom house plans require a unique design.

(3) Sprinkler installation cost estimates for the 29% of rural homeowners on private wells require more equipment and some even require an additional well be drilled if ground water supply is scarce.

4) The actual installed home buyers cost of a sprinkler system on a municipal water supply in the City of Minnetonka is $5.78 per square foot, not $1.61 per square foot. In November 2010 Hans Hagen Homes, a Minnesota home builder requested a bid from three contractors for residential fire sprinklers for a 3,086 sq. ft. house in Minnetonka. The city was requiring the homeowner to install fire sprinklers as a trade off for a non-conforming lot variance. Only one, out of three of the sprinkler contractors provided a formal bid, the other two did not submit bids. The contractor quoted a price of $9,600 to install the sprinkler system but this did not include "soffits in attic for pipes to run in heated attic space as required" (Attachment E). The builders additional cost to incorporate, insulate & seal the soffits is estimated at $3,815. This brings the total hard cost to $13,415.

In addition to the hard costs, a homeowner can expect to pay an additional $4,426 in soft costs. Which include marketing, commission, design, field overhead, G&A expense, financing, closing costs, and builder profit (Attachment F). The total installed cost to the homeowner is $17,841 or $5.78 per square foot. The homeowner can expect an annual expense of $1,120 in increased real estate taxes, mortgage interest and a $50 yearly maintenance fee (Attachment F).

(5) BAM was unable to obtain a single bid for a fire sprinkler system installed on a private well since none of our members have been asked by homeowners to price out or install this type of system.

## Other Factors to Consider Related to Proposed Code Change

1. Is this proposed code change meant to:

   ☒ change language contained in a published code book? If so, list section(s).
   2012 International Residential Code, Section R313.2

   ☐ change language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ delete language contained in a published code book? If so, list section(s).

   ☐ delete language contained in an existing amendment in Minnesota Rule? If so, list Rule part(s).

   ☐ neither; this language will be new language, not found in the code book or in Minnesota Rule.

2. Is this proposed code change required by a Minnesota Statute or new legislation? If so, please provide the citation to the Statute or legislation.
   No

3. Will this proposed code change impact other sections of a published code book or of an amendment in Minnesota Rule? If so, please list the affected sections or rule parts.
   No

4. Will this proposed code change impact other parts of the Minnesota State Building Code? If so, please list the affected parts of the Minnesota State Building Code.
   No

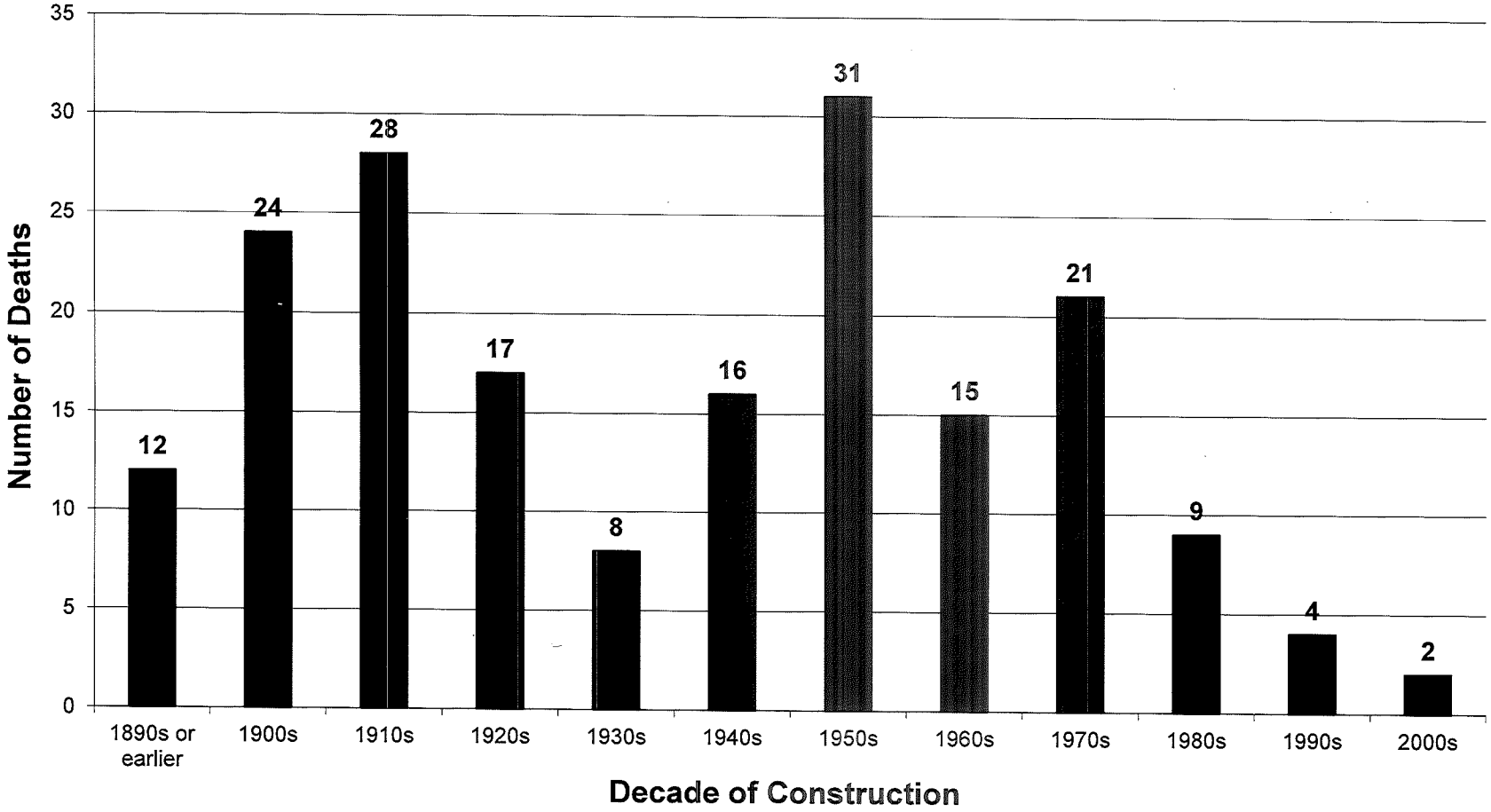
5. Who are the parties affected or segments of industry affected by this proposed code change?
   Future homeowners, home builders, building code officials

6. Can you think of other means or methods to achieve the purpose of the proposed code change? If so, please explain what they are and why your proposed change is the preferred method or means to achieve the desired result.
   No

7. Are you aware of any federal requirement or regulation related to this proposed code change? If so, please list the regulation or requirement.
   No

ATTACHMENT A

# 1998-2010 Minnesota Civilian Fire Deaths in Single Family Homes by Decade of Construction (187 total*)




[*BAM was unable to determine year of construction for 38 SF homes (and 42 additional deaths) due to insufficient addresses from State Fire Marshal data. see 2nd page for details]. Data do not include fire deaths caused by explosions, arson/homocide or suicide in single family homes; or those in mobile homes , duplexes, multi-family, apartments, commercial, and other residential uses such as motels, hotels, and nursing homes.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ATTACHMENT A

# UNKNOWN YEAR OF CONSTRUCTION FOR SINGLE FAMILY HOMES WHERE 42 CIVILIAN FIRE DEATHS OCCURRED 1998 – 2010

*Data from Minnesota Fire Marshal

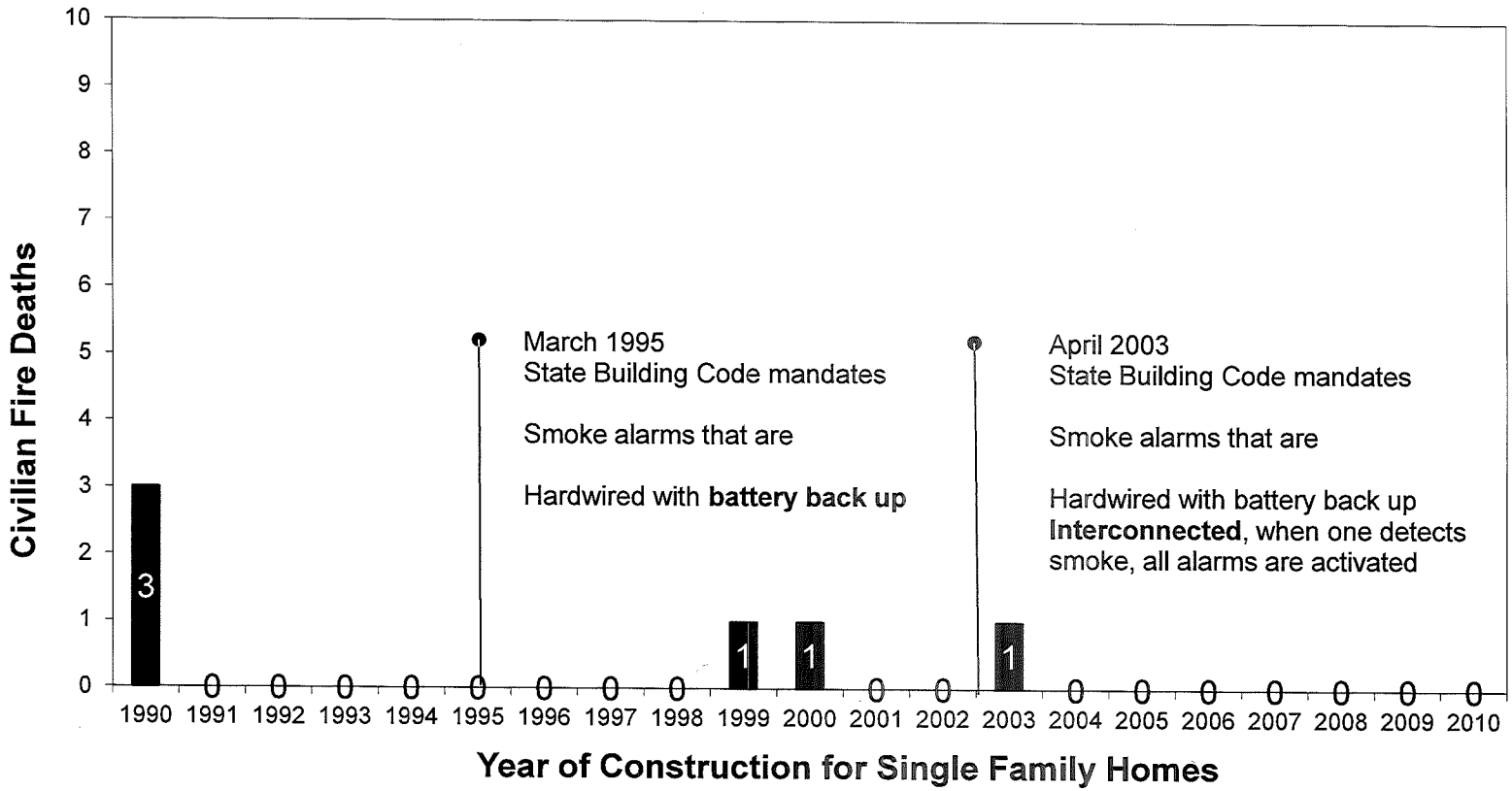
** Unable to establish if structure was a mobile home, single family detached home or duplex

| *Date of Fire | *Address | *Location | Status researched by BAM staff | *Civilian Deaths |
|---|---|---|---|---|
| 3/4/1998 | 1141 S Eagle Drive | BAXTER | NO LISTING AT CO/CITY | 1 |
| 3/8/1998 | CO RD 57 (now Driftwood St) | MCGREGOR | INCOMPLETE ADDRESS | 1 |
| 7/28/1998 | P O BOX 36 PONEMAH | PONEMAH (DIST.) | INCOMPLETE ADDRESS | 1 |
| 9/4/1998 | Bad Medicine Lake | PONSFORD | NO ADDRESS | 1 |
| 9/9/1998 | 8625 EAST RIVER RD | COON RAPIDS | NO LISTING AT CO/CITY | 1 |
| 1/7/1999 | RT 2 BOX 48 | GLYNDON | INCOMPLETE ADDRESS | 2 |
| 1/21/1999 | RR 1, BOX 158 ZUMBRO | ZUMBRO FALLS | INCOMPLETE ADDRESS | 1 |
| 1/30/1999 | RR 3 | ELLENDALE | INCOMPLETE ADDRESS | 1 |
| 4/9/1999 | | BLUE EARTH | NO ADDRESS | 1 |
| 4/13/1999 | | WINDOM | NO ADDRESS | 1 |
| 10/19/1999 | 215 BOUNDARY ST/HY220 | ALVARADO | NO LISTING AT COUNTY | 2 |
| 10/30/1999 | RR 1,BX86,DAKOTA,MN | DAKOTA | INCOMPLETE ADDRESS | 1 |
| 12/13/1999 | rt.1 | PINE CITY | INCOMPLETE ADDRESS | 1 |
| 4/16/2000 | 3655 E CO RD 10 | CHASKA | NO LISTING AT CO/CITY | 1 |
| 10/12/2000 | RR 2,BX 211 C,CASS LK | CASS LAKE | INCOMPLETE ADDRESS | 1 |
| 1/1/2001 | RR | SHEVLIN | INCOMPLETE ADDRESS | 2 |
| 1/8/2001 | 403 3RD ST,AITKIN,MN | AITKIN | NO LISTING AT COUNTY | 2 |
| 2/14/2001 | Rt 2 | RED LAKE FALLS | INCOMPLETE ADDRESS | 1 |
| 5/8/2001 | HC3 Box 155A | MAHNOMEN | INCOMPLETE ADDRESS | 1 |
| 4/17/2002 | 511 E Main Street | LE ROY | NO LISTING AT CO/CITY | 1 |
| 5/5/2002 | RR 2,BX 142,TRACY,MN | TRACY | INCOMPLETE ADDRESS | 1 |
| 8/18/2002 | 9747 HWY 101 | SAVAGE | NO LISTING AT CO/CITY | 1 |
| 9/19/2002 | | GRANADA | NO ADDRESS | 1 |
| 9/19/2002 | 865 Main St | LINO LAKES | NO HISTORICAL DATA AT COUNTY OR CITY | 1 |
| 11/5/2002 | | ELIZABETH | NO ADDRESS | 2 |
| 12/8/2002 | 10151 Lynwood blvd | MOUND | NO LISTING AT CO/CITY | 1 |
| 12/14/2002 | | DETROIT LAKES | NO ADDRESS | 1 |
| 5/13/2003 | CTY ROAD 2 | MADISON LAKE | INCOMPLETE ADDRESS | 1 |
| 12/21/2003 | | LITTLE FALLS | NO ADDRESS | 1 |
| 11/23/2004 | 808 6TH ST SW,IRONTON | IRONTON | NO LISTING AT CO/CITY | 1 |
| 2/18/2006** | 4177 TOWN RD 98,LOMAN | LOMAN | NO LISTING AT COUNTY | 1 |
| 2/26/2006** | | STARBUCK | NO ADDRESS | 1 |
| 10/6/2006** | BAGLEY,MN | BAGLEY | NO ADDRESS | 1 |
| 7/27/2007** | P O BOX 408 REDBY | REDBY (DIST.) | INCOMPLETE ADDRESS | 1 |
| 5/24/2008** | 13536 N HORSESHOE LK RD | CROSS LAKE (MISSION TWSP) | NO LISTING AT CO/CITY | 1 |
| 4/17/2009** | 19552 420th | MCGREGOR | NO LISTING AT CO/CITY | 1 |
| 5/7/2009 | 288 91ST ST | BEAVER CREEK | NO LISTING AT CO | 1 |

BUILDERS ASSOCIATION OF MINNESOTA

ATTACHMENT B

# Civilian Fire Fatalities in 431,000+ Single-Family Homes Built between 1990 - 2010 and Housing Over 1,086,000# Minnesotans




+Based on U.S. Census number of single amily home permits issued in Minnesota from 1990-2010.
#Based on Minnesota State Demographic Center 's estimate of the average number of persons per household.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ATTACHMENT C

# Minnesota State Fire Chiefs Association

## White Paper on Residential Sprinkler Systems

**Background:**
At the September, 2008 International Code Council hearings conducted in Minneapolis, Minnesota, a proposal to require residential fire sprinklers for one and two family homes was approved (see below) for homes built under the 2009 version of the International Residential Code (IRC).

***SECTION R313***
***FIRE SPRINKLER SYSTEMS***

*R313.1 General. Effective January 1, 2011, an approved automatic fire sprinkler system shall be installed in new one-and two-family dwellings and townhouses in accordance with NFPA 13D.*

The IRC is a model code that each state, or in some cases, local jurisdictions, can adopt as their model building code. Minnesota has historically adopted the International Building Code, International Fire Code, and the International Residential Code on a state-wide basis and there is currently no effort underway to change this.

The Department of Labor and Industry (DOLI) is tasked with adoption of the model codes and has issued a letter on June 1, 2009 stating the adoption of all codes; Building, Fire and Residential would be temporarily placed on hold due to the combination of economic conditions and lack of any significant changes in any of the model codes.

The letter states DOLI's intention of beginning the adoption process with the formation of advisory committees to begin sometime in 2010 or at the latest, the early part of 2011.

**Effective Date:**
The IRC provision calls for an effective date of no sooner than January 1, 2011. If the state adopts the IRC by January 1 the provision will apply. If adoption occurs after January 1, 2011 then only those homes built after adoption will be required to comply. There is no retroactive provision in the code.

**NFPA 13D:**
The National Fire Protection Association is a non-profit 100+ year old organization specializing in fire related issues. Amongst their many activities are the development of education materials, standards, and codes. The "13" series of their product line are specific to automatic sprinkler systems with the NFPA 13[1] standard for

[1] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems*

commercial applications, 13R[2] applicable to multi-family structures such as apartments and town homes, and the 13D[3] applicable to one and two family residences.

NFPA 13D standard is the least prescriptive, thus, the most economical. The following table illustrates some of the differences:

| **Item** | **13 System** | **13D System** |
|---|---|---|
| Pipe | Steel Pipe 1" to 8" diameter | Plastic typically 1" diameter |
| Coverage | 100% of building | Small closets, bathrooms, storage areas exempted if under 55 sq. ft. |
| Pressure Test | Required | Not Required |
| Fire Department Connection | Required | Not Required |
| Alarm | Required | Not Required |

There are numerous myths and inaccurate statements about the requirements of 13D, many of these surround water supply and electrical power. The facts are 13D is a performance standard in which the installer must calculate flow requirements based upon the water supply. Your certified system designer will obtain water supply information and calculate supply needs and possible pump requirements based upon the structure.

FACT – 13D has no requirement for a water reservoir or pump unless the water supply is inadequate. In most municipal cases the water supply should be adequate; however, in rural areas with wells, a slightly larger pump (1/4 to 1/3 more horsepower) will adequately supply a single family system. New sprinkler head technology specific for13D systems allow operation at flows as low as 8 gallons per minute. NFPA requires a minimum supply of at least two heads, thus 16 gallons per minute. For comparison, a 5/8" garden hose flows at 17 gallons per minute.

FACT – 13D has no requirement for back-up electrical power of the pump. If there is a power failure at the same time a fire occurs there is a greater likelihood of significant fire damage.

[2] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height*

[3] National Fire Protection Association, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*

ATTACHMENT C

**Cost:**
A recent report issued by the Fire Protection Research Foundation[4] which is comprised of fire groups, home builders, and water supply agencies details the cost to install a NFPA 13D compliant system ranges from $.38 per square foot to $3.66 per square foot. The average cost was $1.61 per square foot. The Report determined this number by selecting ten representative cities from around the nation and soliciting and acquiring three bids.

Minnesota, with its cold winter climate eliminates certain efficiencies in installation as few circumstances allow any pipe in the attic area. Cities such as Blaine, Plymouth and Maple Grove have thousands of systems installed in town homes and close to a hundred one and two single family homes.

Their experience reflects the Minnesota Fire Chiefs member's average of $1.61 for the townhomes and approximately $1.80 for one and two single family homes.

**Reductions/Insurance Savings/Financing Costs:**
Depending upon the community, there may be certain trade-off or alternatives to other building code requirements if sprinklers are installed. These are more typical for town homes where street width can be narrowed, lot size reduces, and hydrant spacing increased. However, these same trade-offs can and have been used in single family housing developments.

Additionally, most community building and fire officials will accept a sprinkler system as an alternate to egress windows from basement locations. Depending upon your situation, the installation of a sprinkler system would partially or wholly offset the cost of egress window installation.

At least thirteen insurance companies now provide a discount on their homeowner policy ranging from 5% to 15%. While this is becoming more widely known, the consumer still must shop on the open market to achieve the greatest savings[5].

If one were to finance a $3,500 system (average cost for a 2,000 sq. ft. home); at a 6.5% interest rate the additionally monthly cost in your mortgage would be just under $5 per month.

**Operation:**
All sprinkler heads including residential sprinkler heads are activated by heat. Meaning that only those heads closest to the fire will activate. Most residential heads are designed to activate at 155 degrees. In close to 90% of fires in which a sprinkler head activates, a single head will control or extinguish the fire[6].

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[4] Fire Protection Research Foundation, *Home Fire Sprinkler Cost Assessment*, 2008, http://www.nfpa.org/assets/files//PDF/Research/FireSprinklerCostAssessment.pdf
[5] Insurance Services Office, Inc., *Residential Sprinklers ISO Fact Sheet,* www.isomitigation.com
[6] NFPA, *Fast Facts About Home Fire Sprinklers*

Accidental discharge of sprinkler heads is rare. Factory Mutual, a nationally recognized testing laboratory reports the chance of an accidental discharge from a sprinkler is "the odds that rival winning the California State Lottery." Water filled sprinkler heads and pipes are subject to freezing, however, no more or less than your domestic water supply. No evidence or data exists indicating more water damage due to frozen sprinkler pipes versus frozen water pipes.

Water damage from sprinklers is minimal given that one to two sprinklers typically control the fire. This equate to 15 to 20 gallons per minute. Comparatively, upon arrival the fire department will employ a minimum of two firefighting lines discharging 150 to 200 gallons per minute each or a total of 300 to 400 gallons of water per minute.

Unlike most other systems in your home; lawn sprinklers, heating and cooling and plumbing; there is virtually no maintenance for residential systems. A periodic check of the pressure gauge and ensuring the main valve is never turned off is typically all that is required.

In their 100+ year history, sprinklers have proven to be extremely effective in controlling and extinguishing fire. There are few other examples of technologies more effective in minimizing death and destruction as sprinklers.

Comparatively, traditional fire suppression is the least effective method of controlling fire and the United States, despite having some of the best training, equipment, and technology, ranks amongst the worst when compared to the world in fire property and death statistics.

**Fire Facts:**
According to the United States Fire Administration for the calendar year 2007;

- There were 399,000 structure fires in the United States
- 2,865 civilians were killed, a disproportionate number of them young children and elderly people.
- There were 13,600 civilian injuries.
- Over $7.4 billion worth of property was destroyed.
- Over 100 firefighters were killed.
- According to a National Institute of Standards and Technology study, a family had 17 minutes to escape a residential fire in the 1970's[7]. Today, due to changes in construction, finishing materials, and the large amount of synthetics and plastics in the contents of the home, that time has been reduced to as few as 3 minutes[8]!

[7] NIST, *Technical Note 1455*
[8] NIST, *Technical Note 1455*

ATTACHMENT C

**Policy Issues:**
Communities can significantly reduce their overall fire protection costs through the adoption and use of codes requiring the use of automatic sprinkler systems. A community using this approach transfers the responsibility directly to the property owner who receives the benefits of reduced insurance costs, a vastly improved response in the event of a fire, significantly reduced loss of personal property, and reduced infrastructure costs (taxes). In communities where sprinklers are an integral part of the overall fire protection plan, it is possible to save millions of dollars per year of property tax dollars via the use of a combination, volunteer, or smaller career department. Minnesota cities such as Bloomington, Plymouth, Woodbury Eden Prairie, and Maple Grove are just a few of many examples of cities who have been able to maintain predominantly volunteer departments at significant cost savings in large part due to sprinkler requirements.

Lightweight construction, specifically the dominate use of trusses and floor trusses are emerging as a firefighters greatest threat. First introduced about twenty years ago, they are almost exclusively used in all new home construction. Any fire that penetrates and impinges on the truss assembly almost immediately weakens the assembly and has resulted in a greater frequency of firefighter injuries and fatalities as they have fallen through the floor.

Numerous scientific studies have been completed on this issue with two of the more recent ones being; National Institute of Standards and Technology in January of 2007 and Uderwriters Laboratories in conjunction with Michigan State University in November of 2008. Both studies reported results of significant failure of the truss assembly when exposed to fire, sometimes within minutes of the fire starting[9].

Opponents argue that smoke detectors are more than sufficient to protect a family in a residential occupancy. However, statistics again reveal that while smoke detectors have a marvelous record in having helped to reduce the number of deaths over the years, they simply are not adequate or effective in all cases. Disabled, disconnected and poorly maintained detectors are present in over 25% of residential structures. Furthermore, as mentioned earlier, the young and old are especially vulnerable and given the speed at which fire grows, smoke detector activation has proven to be inadequate.

Finally, the Insurance Services Office (ISO) just released a Residential Sprinkler ISO Fact Sheet stating:

- Premium credit of 13% for fully sprinklered homes and 8% for partial
- Leakage coverage is included in the basic policy, there is no extra charge.
- If the requirement of the International Residential Code (2009) for automatic sprinkler protection is removed by legislative or local ordinance the ISO Building Code Effectiveness Grading Schedule would not provide full recognition for adoption of the code.

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[9] NIST, *A Study of Metal Truss Plate Connectors When Exposed to Fire*
UL, *Fire Test Report: Wood Truss Members with Steel Plate Connectors Used in Floor-Ceiling Assemblies*

ATTACHMENT C

**Summary:**
Installing residential sprinklers in newly constructed one and two family homes will have a profound impact on the fire service, local governments, and society.

An average homeowner will pay less than $4,000 for the installation of the system and will, in most cases, recoup that investment through the combination of insurance savings, possible construction trade offs, and reduced property taxes.

The same homeowner will enjoy an immeasurably greater level of safety, with respect to fire, as compared to reliance on traditional fire suppression response which has proven time and time again to be woefully inadequate due to the speed at which fire grows.

ATTACHMENT D

**Minnesota Households Priced Out of the Market by an Increase in House Prices**

| Area | Mortgage Rate | House Price | Monthly Mortgage Payment | Taxes and Insurance | Minimum Income Needed | Households That Can Afford House |
|---|---|---|---|---|---|---|
| Minnesota | 4.50% | $171,000 | $821 | $220 | $44,640 | 1,292,724 |
| Minnesota | 4.50% | $175,000 | $841 | $225 | $45,685 | 1,271,701 |
| Difference | | $4,000 | $19 | $5 | $1,044 | -21,023 |
| Minnesota | 4.50% | $171,000 | $821 | $220 | $44,640 | 1,292,724 |
| Minnesota | 4.50% | $175,580 | $843 | $226 | $45,836 | 1,268,653 |
| Difference | | $4,580 | $22 | $6 | $1,196 | -24,071 |

Calculations assume a 10% down payment and a 45 basis point fee for private mortgage insurance.
A Household Qualifies for a Mortgage if Mortgage Payments, Taxes, and Insurance are 28% of Income

| Minnesota Household Income Distribution for 2012 | | | | |
|---|---|---|---|---|
| Income Range: | | | Households | Cumulative |
| $0 | to | $10,469 | 123,858 | 123,858 |
| $10,470 | to | $15,705 | 107,585 | 231,443 |
| $15,706 | to | $20,940 | 107,051 | 338,494 |
| $20,941 | to | $26,175 | 105,573 | 444,066 |
| $26,176 | to | $31,410 | 103,124 | 547,191 |
| $31,411 | to | $36,645 | 108,311 | 655,502 |
| $36,646 | to | $41,881 | 99,387 | 754,888 |
| $41,882 | to | $47,116 | 105,399 | 860,287 |
| $47,117 | to | $52,351 | 86,973 | 947,260 |
| $52,352 | to | $62,821 | 178,713 | 1,125,973 |
| $62,822 | to | $78,527 | 236,263 | 1,362,236 |
| $78,528 | to | $104,703 | 291,268 | 1,653,504 |
| $104,704 | to | $130,879 | 181,371 | 1,834,875 |
| $130,880 | to | $157,055 | 98,177 | 1,933,052 |
| $157,056 | to | $209,407 | 93,760 | 2,026,812 |
| $209,408 | to | More | 76,346 | 2,103,158 |

Analysis conducted by the National Association of Home Builders based on a sprinkler increasing the cost of construction by of a single-family home by $4,000 when connected to a municipal water supply and $4,580 when connected to a private well.

**National Association of Home Builders**, based on data from the 2007 American Community Survey, U.S. Census Bureau.

ATTACHMENT E

# LIFESAVER FIRE PROTECTION

*Sprinkler Installation & Service • Est. 1991*

# Proposal

PRESENTED BY SEAN SABERY
MAIN 763-473-9010
FAX 763-475-9076
CELL 612-990-7930
PO BOX 583533 MINNEAPOLIS, MN 55458

| PRESENTED TO: | DATE: |
|---|---|
| Jon Peterson<br>Hans Hagen Homes | 11-3-10 |
| PHONE: FAX: CELL:<br>763-566-7200 | JOB NAME: |
| ADDRESS:<br>941 N.E. Hillwind Rd. Suite 300<br>Fridley, MN 55432 | JOB LOCATION: |

Dear John,

We appreciate the opportunity to work with you on this project! Lifesaver Fire Protection proposes the following work based on the information that was provided:

**Scope:**
Installation of new sprinkler system per City of Wayzata regulations, NFPA 7, 2002 & NFPA 20, 2007 guidelines, and the State of Minnesota.

Per plans dated 9-25-07
(1) Wet-Type System
Builder to supply soffits in attic for pipes to run in heated attic space as required
Concealed Heads

**Design, Engineering and Permits:**
Lifesaver Fire Protection shall complete working drawings per NFPA guidelines prior to fabrication of materials and submit plans for permitting. All applicable permit fees have been included.

**Price:**
The budget price for the above-specified work including general consulting, design, engineered drawings, submittals to state, permit fees, materials, and labor is $9,600.

**Proposal Date: November 3, 2010**
**By:**

_____ and

**Lifesaver Fire Protection**
This proposal will remain in effect for 20 days.

**Accepted this Day**
**By:**

_____

**Name** **Title**

ATTACHMENT F

Homeowner Cost Analysis
Fire Sprinkler System Cost

Based on fire sprinkler installation bid (ATTACHMENT E)
and home builder's hard and soft costs (shown below)
for a 3,086 square foot single-family home on a municipal water supply

| | | | |
|---|---|---|---|
| **Hard Cost** | | | |
| Direct Cost from Vendor | | $ | 9,600.00 |
| Soffit Attic (360 lf @ $8.25) | | $ | 2,970.00 |
| Soffit Insulation (Celotex Sealed) | | $ | 800.00 |
| Foam Penetrations | | $ | 45.00 |
| **Total Hard Cost** | | **$** | **13,415.00** |
| | | | |
| **Soft Cost** | | | |
| Marketing Expense | 3% | $ | 402.45 |
| Commission | 6% | $ | 804.90 |
| Design - Bid -Plans | 1.25% | $ | 167.69 |
| Field Overhead | 8% | $ | 1,073.20 |
| G & A Expense | 3.25% | $ | 435.99 |
| Financing | 2.75% | $ | 368.91 |
| Homeowner Closing Cost | 2.25% | $ | 301.84 |
| Builder Profit | 6.50% | $ | 871.98 |
| **Total Soft Cost** | | **$** | **4,426.95** |
| **Homeowner Total Direct Cost** | | **$** | **17,841.95** |
| | | | |
| **Homeowner Additional Cost** | | | |
| Annual Real Estate Taxes | 1.25% | $ | 223.02 |
| Interest on 95% Mortgage | 5% | $ | 847.49 |
| Repair and Maintenance | | $ | 50.00 |
| **Homeowner Annual Cost** | | **$** | **1,120.52** |