FIRE SPRINKLER TALKING POINTS

An Overview of the Issues

- Because of changes in residential construction technology, improved building code requirements – especially for electrical and smoke alarm systems – consumer behavior and the concerted efforts of fire fighters, home builders and other safety advocates, the number of fatal fires has dropped dramatically in the last 20 years. This trend continues and the decline is even more impressive given the significant population growth and growth in housing stock our nation continues to see.

- Our population grew 36 percent between 1977 to 2006, according to the U.S. Census, while at the same time the rate of fires per 1,000 population fell 63 percent: from 14.9 in 1977 to 5.5 in 2006.

- Even more dramatic is the drop in the actual death rate per million persons from house fires. In fact, from 1979-2003, the rate dropped by more than 58 percent, based on data from the Centers for Disease Control. That trend will continue as more new housing stock is constructed and especially as the maintenance of smoke alarms by home occupants is improved. Furthermore, the fire safety features now required in our building codes will adequately protect the home throughout its life without the need for fire sprinklers.

- Proponents claim that a residential sprinkler system is reliable in 96-99 percent of the reported structure fires, where the fire was large enough to activate the system. But according to NFPA reports, the number of fires that occur in one- and two-family dwellings equipped with sprinklers are so few, that they are not shown in the studies.

- It is suggested that these sprinklered dwellings are built and maintained better than other one- and two-family dwellings and that the sprinklers often receive the credit for life saving when it was actually the result of the overall integrated system of balanced fire protection and preparedness.

- According to a national poll conducted by sprinkler advocates, 63 percent of participants indicated that they were aware of residential sprinkler systems that were available for one- and two- family dwelling. However, reports have indicated that there is a low market demand for residential sprinklers, except for those areas where sprinkler ordinances have been mandated. The number of homes built annually that are equipped with sprinklers continue to be less than 2 percent, many of which are required to be installed and not elected by the homebuyer.

- USFA and NFPA data continue to affirm that the vast majority of home fire fatalities occur when there are no operational smoke alarms.

- Thanks to widespread installation of residential smoke alarm systems in recent years, Americans are safer than they've ever been. A 2006 USFA study on the presence of working smoke alarms in residential fires from 2001-2004 showed that 88 percent of the fatal fires in single-family homes occurred where there were no working smoke alarms. The problem is not homes without sprinklers, **the problem is homes without working smoke alarms.**

- Home fire sprinklers are a significant expense. Mandates have an unreasonable impact on housing affordability and have not been demonstrated to be a practical, cost-effective assured means for reducing fire fatalities. More lives can be saved by education and other efforts to ensure every home has and maintains working smoke alarms than by mandates for home fire sprinklers.

- Most unintentional fatal residential fires can be prevented if occupants are careful of risky activities such as unattended cooking, candle burning, and smoking. Additionally, changes in smoking habits, fire-safe cigarettes and ignition resistant furnishings all help reduce the risk. As with smoke alarms, fire prevention education is a more practical, effective and proven approach to reducing home fire incidents, injury and fatalities than mandates for home fire sprinklers.

- Sprinklers are not likely to affect fire department staffing levels or the number of fire stations a community may need because in most jurisdictions, staff and facilities are necessary for quick response to EMS calls. Right now, fire fighters spend only about an average of 3 percent of their time on residential fire fighting activity. Adding fire sprinklers to new homes will not reduce fire departments' staffing or equipment needs.

- Not all fires benefit from the presence of a fire suppression system. Nearly half of all residential fires are confined fires that result in minimal smoke and fire damage and often self extinguish without any assistance from the fire department. Yet sprinklers activate at the presence of heat and cannot determine when a fire is confined or non-confined and will likely cause extensive water damage that could have been avoided.

- **Fire sprinkler mandates should remain an option for state and local jurisdictions.** The 2006 IRC Appendix-P adequately provides for this option and this approach was overwhelmingly endorsed by the ICC membership at the previous Final Action Hearings where inclusion of the appendix was approved.

Performance of Residential Sprinklers

- According to the NFIRS data collected in 1998, sprinklers were reported to have been present in 3,892 (roughly 2.5 percent) of the total 156,661 reported residential fires. The sprinklers operated in 1,246 (32 percent) and failed to operate in 2,646 (68 percent), because the fires were too small to activate the sprinkler system. Since that time the number of fires where sprinklers were present have been so miniscule, they have not been reported.

- USFA reported similar findings, showing that in 57 percent of the reported fires the fire was too small to activate the fire sprinklers in residential properties. In 39 percent of the reported fires, the sprinkler did operate and were effective, while in 3 percent the sprinkler activated and was not effective.

One- and two-family fire incidents, injuries and death continue to decline without the installation of fire sprinklers or the need to mandate fire sprinklers in new homes.

- Because of changes in residential construction technology, improved building code requirements - especially for electrical and smoke alarm systems, as well as consumer behavior and the concerted efforts of fire fighters, home builders and other safety advocates, the number of fatal fires has dropped dramatically in the last 20 years without the installation of sprinklers or the need to mandate them. This trend continues and the decline is even more impressive given the significant population growth and growth in housing stock our nation continues to see.

- In fact, the latest NFPA data clearly demonstrates this progressive annual decline.

- From 1980 to 2005, while the existing one- and two-family housing stock grew by more than 45 percent, the number of one- and two-family fires decreased by more than 51 percent.

1980: One- and two-family fires = 590,500
Existing one- and two-family homes in the U.S. = 58,255,000

2005: One- and two-family fires = 287,000
Existing one- and two-family homes in the U.S. = 84,749,000

- From 1980 to 2005, while the population grew by over 30 percent, fire fatalities in one- and two-family homes decreased by over 38 percent. The decline is actually greater as these fatalities include those that resulted from manufactured (HUD Code) home fires.

1980: Loss of life from one- and two-family fires = 4,175
U.S. population = 227,224,000

2005: Loss of life from one- and two-family fires = 2,570
U.S. population = 296,507,000

- In 2005, fires occurred in less than four tenths of one percent (0.35%) of the existing one- and two-family homes. Of those fires, substantially less than percent (0.86%) resulted in fatalities.

- Even more dramatic is the drop in the actual fire death rate per million persons from house fires. In fact, from 1979 to 2003, the rate dropped by more than 58 percent, based on data from the Centers for Disease Control. That trend will continue as more new housing stock is constructed and especially as maintenance of smoke alarms by home occupants is improved. Furthermore, the fire safety features now required by building codes will adequately protect the home throughout its life without the need for fire sprinklers.

- According to data in the U.S. Experience With Sprinklers, of all the reported fires in one- and two-family dwellings from 1980-2003, less than 1.3 percent were reported occurring in dwellings equipped with sprinklers. It was also reported that less than 2 percent of all new residences were equipped with sprinklers at the time. During that same time frame, the number of residential fires dropped by 50 percent and the number of fire fatalities dropped by 35 percent. This demonstrates that there were other contributing factors leading to the decrease in the number of fires and fire fatalities, such as improvements to the building code and the use of smoke alarms.

Smoke alarms work, consumers feel safe without sprinklers and demand is not there.

- According to the most recent NFPA report on smoke alarms, it is estimated that over 890 lives could be saved annually if every home had working smoke alarms. 65% of the fire fatalities reported from 2000- 2004 occurred in homes where smoke alarms were not present or smoke alarms were present and did not operate.

- The International Residential Code requires hard-wired, interconnected smoke alarms to be installed in all bedrooms, outside of them and on each additional story, including basements. When one alarm activates, all other alarms are activated as well. This effective early warning system is the most important way to protect occupants from fire. Over 90 percent of the occupants survived fires that were reported to have occurred in homes equipped with hard-wired, interconnected smoke alarms from 2000-2004.

- Smoke alarm technology is always changing and improving. Innovations in wireless technology and alternate signal noises that are easier for children and for seniors to hear will further improve the already overwhelming success of smoke alarm systems.

- Another study published in the Journal of the American Medical Association found that when public health strategies to reduce residential fire-related injuries and deaths include information about smoke alarm installation, monthly testing of smoke alarms, reduction of residential fire hazards, design and practice of fire escape plans, fire safety education, and implementation of smoke alarm ordinances, residential fire-related deaths will continue to decline. Again, resources should be focused on ensuring every home has and maintains working smoke alarms rather than pushing for mandatory home fire sprinklers.

- When the firm Public Opinion Strategies asked 800 likely voters if fire sprinklers should be required in new homes, an overwhelming 89 percent said that smoke detectors already do an adequate job of protecting them in their homes and 28 percent would not want sprinklers at all, even if they were provided *free of charge.*

- Sprinkler costs vary depending on the climate, whether the house is on a public water line, and of course by the size and layout of the house. A conservative cost of $2 per square foot for the average 2,400-square-foot house means that a residential fire sprinkler system would cost $4,800. The same survey results show that only 15 percent of consumers in the sample are willing to pay that much.

- According to a Harris public opinion poll, only 38 percent of those surveyed said they would likely purchase a home that included residential fire sprinklers, leaving 62 percent indicating they would likely not purchase one. The poll also showed that 55 percent of survey participants responded that a home with fire spinklers was *less* desirable compared to the 45 percent who thought that a sprinklered home was more desirable.

- NFPA claims that it has no record of a fire killing more than two people in a completely sprinklered public assembly, educational, institutional, or residential building -- where the system was properly operating. This allows sprinkler proponents to exclude those fire fatalities that have occurred in sprinklered structures where the system failed due to an explosion, where the system was not properly maintained, or the system was rendered in operable due to human intervention.

- In fact, multiple fire fatalities are rare regardless of the presence of sprinklers, and NFPA reports that most fire deaths occur in ones and twos both inside and outside of the home.

- According NFIRS data collected for single-family dwellings equipped with fire sprinklers, 57 percent of reported fires were too small to cause the sprinkler to operate. In 39 percent of the reported fires the system operated and were effective, in 3 percent the system operated and was in effective, and in the remaining 1 percent the system failed to operate.

- A 2004 USFA report lists situations when the sprinkler system will not be able to prevent the loss of life:

    - When the victim is too close to the source of ignition.
    - When the system is damaged by the fire or an accompanying explosion.
    - When the fire originates in concealed combustible locations.
    - When foreign objects shield the fire from the effective coverage area of the sprinkler.

The effectiveness of sprinklers is based on estimates from laboratory test data, a panel of fire researcher,s and statistics of various fire scenarios and the location of the fire victim in those fires.

Due to the rare presence of fire sprinklers in one- and two-family dwellings (less than 1 percent) and the few fires reported annually, researchers must use other methods to estimate the effectiveness that sprinklers would have in preventing the loss of life and damage.

New homes are safer than ever before.

- Technological innovations introduced in the last 50 years make homes far safer. Even as today's homes get older, they continue to offer fire protection because of previous code provisions for fire separation, fire blocking and draft stopping, emergency escape and rescue openings, electrical circuit breakers, capacity and outlet spacing, reduced need for space heaters in energy efficient homes, and many other improvements.

- These features will protect the home and occupants for the life of the home, unlike older homes that were not constructed with these important design features. New homes do not become more hazardous as they age.

- Little data is collected on the age of homes experiencing a fire, although there is anecdotal evidence that age of the structure is an important factor. Existing fire data showing the continued decline in the rate of fire incidents and fatalities is consistent with the retirement of homes not built to today's stringent code requirements. This trend continues.

Fire sprinklers are not cost effective, and costs are far greater than what advocates say they are.

- Proponents of mandatory requirements claim that cost concerns are exaggerated, often citing figures from Scottsdale, Ariz. ("the Scottsdale study"). However, these concerns are well founded and not exaggerated. Even in Scottsdale where installation costs are considered among the lowest, they are still more than what proponents say.

- There, builders told NAHB that typical costs were just under $1 per square foot, much higher than that+ cited by some proponents. More importantly, the cost is in no way representative of the rest of the country where costs are substantially higher. It would be irresponsible for officials in jurisdictions around the country to rely upon Scottsdale costs as a determinant of what the true costs are to home buyers in their jurisdiction.

- In fact, in August 2006, the NAHB Research Center surveyed home builders in jurisdictions where fire sprinklers have been mandated. Survey results from over 1,500 installations in homes on public water systems in jurisdictions other than Scottsdale show that the costs are substantially higher than what proponents of mandatory fire sprinklers would lead you to believe. The truth? Builder costs of those installations were $2.66 per square foot on average and ranged as high as $6.88 per square foot. When overhead and any other factors are added in, installation costs to home buyers escalate further.

- For homes on wells, the results show that the typical costs are even higher because of the need for additional components such as storage tanks and larger pumps.

- Any jurisdiction considering mandatory sprinklers needs to determine and thoroughly consider what the true total cost to home buyers will be in their community (including additional fees that may be charged by water purveyors) and what their constituents will pay collectively, before making any decision to mandate sprinklers.

- Sprinkler costs do have a dramatic negative impact on housing affordability. For each $1,000 added to the price of a home, another 217,000 potential home buyers are forced to remain on the sidelines. We cannot afford to deny needed housing for the sake of new requirements that are not necessary.

- Costs also vary significantly depending on a home's location, layout, number of stories, and other factors – especially access to water.

- Owners of homes on well water need to consider how the sprinklers will operate if the power goes out or if water pressure is a problem – and solutions, like extra water tanks, pumps and generators, are costly.

- Requiring fire sprinklers will not decrease taxes or fees and has a negligible effect on insurance rates, resulting in almost no payback, if any. For example, using conservative cost estimates of $1.50 per sq/ft in a 2,300 sq/ft home with an annual property insurance premium of $1,000, it would take approximately 35 years even for a 10 percent discount to pay for a system that will most likely never be needed. That does not take into account maintenance costs incurred over the same period.

- The average size of homes built in 2005 was 2,434 square feet, according to the U.S. Census Bureau. Even if an estimate of $2 per square foot is used as the average price, which is conservative, fire sprinklers in that average-sized home would have cost more than $4,800, which could hardly be characterized as inexpensive. Whole-house interconnected smoke alarm systems are now being installed for around $50 per alarm.

- Fire sprinkler manufacturers state that the net cost may be very low per household and cite the possibility of development tradeoffs, like narrower streets and fewer fire hydrants. However, negotiating for those tradeoffs is difficult because local ordinances and planning rules are not consistent from community to community. Furthermore, allowing reductions in passive fire safety provisions if sprinklers are mandated is further evidence that fire safety provisions in building codes and planning are already adequate.

- There is no demonstrable savings in infrastructure costs for local jurisdictions. When as little as 3 percent of a fire fighter's time is spent battling house fires, installing fire sprinklers in new homes cannot have a significant impact.

- Annual sprinkler installation costs (not including maintenance costs) new homebuyers will be forced to pay will greatly exceed property loss nationwide or in any jurisdiction where they are required.

    - For example, if all new homes built in 2005 were required to have sprinklers, the installation cost to builders (would have been $10,183,118,400 based the average square foot of those homes and the average cost of sprinkler installations in jurisdictions where they are currently required ($2.66 sq. ft).
    - NFPA reported the total home property loss due to fire in 2005 was $5,781,000,000. That means that installations costs born by homebuyers would have been nearly *double* the loss.
    - The difference between installation costs and property loss will continue to grow as the number of new homes built annually increases and the number of fires and property loss continues to decrease, which is not a result of sprinklers or sprinkler mandates.

- Furthermore, NFPA has reported as little as an average of a 19 percent reduction in property loss in home fires with sprinklers vs. those without them. With this reduction or even a substantially higher reduction, total installation costs will always greatly exceed total property loss savings because the vast majority of homes where sprinklers are installed will never need them.

Significant technical problems still exist.

- Unlike smoke alarms, there is no way to test sprinklers other than applying heat. Occupants must press the test button or use products that simulate smoke to verify that the smoke alarm is properly functioning and ready to alert occupants. Sprinkler manufacturers must rely on test sampling to see if the sprinkler will react to the presence of heat and activate. Defects with the sprinkler will not be known until the sprinkler fails to activate in a fire and reports are issued later for the recall of the defective sprinkler.

- The fire sprinkler valves must be checked periodically to verify the system is activated. Sprinkler heads must be checked to make sure they are clear of obstacles. Homeowners must be careful not to block them or paint over them. Also, if a backflow prevention device is installed as can be required, an expensive annual inspection may be mandated by the local water purveyor. Standards also specify that sprinkler pipes in the antifreeze-type systems installed in colder climates should be emptied and then refilled with an antifreeze solution every winter, and that monthly inspections and tests of all the water flow devices, pumps, air pressure and water level be performed.

- Having sprinklers provides no guarantee that fire hoses will not be used, flooding even more water into the house. Sprinklers will discharge water until the fire department has been notified, arrives on the scene, evaluates and determines the structure is safe, and then locates and turns off the water supply. Claims that less damage will be caused by a sprinkler than a fire hose are unsubstantiated.

- Additional home flooding risks come from the vulnerability of the pressurized sprinkler heads. They can activate if they are dislodged or disturbed, when there's horseplay or other types of negligence. Local requirements for water storage tanks and additional plumbing in the home open up the specter of frozen, pressurized pipes in some parts of the country. Adequately protecting against these problems adds further to the cost of sprinkler systems.

- Studies have shown those at greatest risk of residential fire injury or death include those who live in substandard housing, where preventive maintenance is less likely. Poorer, less educated Americans are more likely to live in substandard housing than wealthier, educated Americans who are in a position to buy a new home. **Residential fire sprinklers mandated in wealthier communities where their cost is less of a barrier are least likely to protect those who could benefit by them the most.**

- The reliability of residential fire sprinklers is also questionable. There is no study that shows how long sprinkler systems will last. After smaller recalls by other companies in 1998 and 1999, a major fire sprinkler manufacturer recalled 35 million fire sprinkler heads in 2001. By now, any requirements that the manufacturer notify owners of homes where these defective heads have been installed have expired.

- Accidental discharge of sprinkler systems is another major concern. While accidental discharge due to a manufactured defect is rare, there have been several reported incidents where sprinklers

have discharged when fire was not present or the cause of the discharge. Typically the sprinkler activated due to overheating, freezing, mechanical damage, corrosion, and deliberate sabotage.

- Sprinkler systems are expected to work in the event of the fire, but like any system maintenance is required to ensure it will operate when a fire is detected. Proponents claim that a NFPA 13 D requires no maintenance and that the system can be installed and forgotten. The fact is that all sprinkler systems, whether they are commercial or residential, require routine maintenance and inspection. NFPA 13 D states that it is the responsibility of the installer to provide the owner all the maintenance information and educate the owner how the fire suppression system works. If homeowners are led to believe that no precautions are necessary and no preventive maintenance needs to be performed, this will lead to a false sense of security.

Fire sprinklers mandates should remain an option for state and local jurisdictions. This option is already adequately provided for in the appendix of the IRC.

- Should a jurisdiction wish to mandate residential sprinkler systems, a provision for them to do so is now available in the IRC via adoption of Appendix P. Allowing state and local jurisdictions to decide for themselves based on the specific needs and concerns of their communities is the most appropriate approach. That approach was overwhelmingly endorsed by the ICC at the previous Final Action Hearings, where inclusion of the appendix was approved for that very reason -- even by the building officials who do believe sprinklers should be mandated – and that action should be honored and upheld.

- The IRC clearly states, "The purpose of this code is to provide minimum requirements to safeguard life or limb, health and public welfare." The IRC Commentary states that the IRC is intended to provide reasonable minimum standards that reduce the factors of hazardous and substandard conditions that would otherwise put the public at risk to damaging their health, safety or welfare. Any imposition of a mandated sprinkler requirement is excessive and is not a reasonable minimum standard for meeting the "purpose" of the code. It is important to remember that the code is composed of many life-safety standards that have been proven to meet the "purpose" of the code. Proposals to mandate sprinklers as a requirement in the body of the IRC rather than an adoptable appendix exceed this "purpose" and should not approved.

These talking points are based on data from the U.S. Fire Administration (USFA), National Fire Protection Association (NFPA), National Association of Home Builders (NAHB), NAHB Research Center, Public Opinion Strategies, and the U.S. Census Bureau. Please contact NAHB Codes & Standards staff Steve Orlowski at sorlowski@nahb.com or 800-368-5242, ext. 8303, if you have questions on any of these talking points. Additional information is also available on www.nahb.org/sprinklers.