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Residential Fire Sprinkler Protection Systems

Michael J. Gagnon

Derry, New Hampshire Fire Department

March, 2009

CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks do indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another. (National Fire Academy [NFA], 2008, A-1)

Signed: _____

Abstract

The problem for the Town of Derry, New Hampshire was that firefighter and civilian life safety may be compromised due to the lack of a comprehensive residential fire sprinkler protection ordinance. Research indicated that a majority of fire deaths occur in residential occupancies. The purpose of this research was to identify the issues relative to a comprehensive residential fire sprinkler protection ordinance in the Town of Derry, New Hampshire.

Descriptive research to include data collection through document review, feedback instruments and personal interviews were used to answer four research questions. a) What requirements relating to residential fire sprinkler protection systems were in effect for the Town of Derry, New Hampshire and other communities within the State? b) What were the advantages and disadvantages of a residential fire sprinkler protection system? c) What were some effective marketing campaign strategies for gaining community support for a residential fire sprinkler protection ordinance? d) What were the Town of Derry, New Hampshire stakeholder thoughts regarding a residential fire sprinkler protection ordinance?

The results showed that residential fire sprinklers reduce fire related death and injury occurrences caused by fire. The Town of Derry, New Hampshire had the initial phase of a residential sprinkler ordinance in place; however, more comprehensive language would be beneficial. Many stakeholders clearly expressed their desire to have an ordinance with more comprehensive language. The data gathered from the feedback instruments, documents reviewed and personal interviews allowed the Derry Fire Department to move forward in a productive manner. Derry Fire is far better prepared to enact more comprehensive residential sprinkler ordinance language, as an enhanced understanding of residential fire sprinklers systems, as well as, stakeholder attitudes and opinions were determined.

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Introduction

The primary fire safety public education focus for residential homes has been installation of smoke detectors, have an exit plan and an outside meeting place. In addition, residential fire sprinkler protection systems have been a recognized component of a balanced fire protection plan for many years, though not always supported by all stakeholder groups. As products and furnishings within the home are constructed or fabricated with enhanced chemical processes, flashover occurs at a much faster rate than earlier years. Flashover (Wikipedia, 2008) is the near simultaneous ignition of all combustible material in an enclosed area, this occurs when the flammable gases that are being produced from the combustible materials in the space are hot enough to ignite. Due to these factors, the need for residential sprinklers has become more essential. “Residential sprinkler systems are designed to provide for life safety by providing a larger window of opportunity for occupants to safely evacuate the dwelling and keep the fire from reaching the point of flashover” (Avsec, 2008, p. 1).

The problem for the Town of Derry, New Hampshire (the Town) is that firefighter and civilian life safety may be compromised due to the lack of a comprehensive residential fire sprinkler protection ordinance. The purpose of this research is to identify the issues relative to a comprehensive residential fire sprinkler protection ordinance in the Town. Descriptive Research will be utilized to accomplish this goal through document review, feedback instruments, and personal interviews.

Four research questions will be answered during this research. a) What current requirements relating to residential fire sprinkler protection systems are in effect for the Town and other communities within the State? b) What are the advantages and disadvantages of a residential fire sprinkler protection system? c) What are some effective marketing campaign strategies for

gaining community support for a residential fire sprinkler protection ordinance? d) What are Town stakeholders thoughts regarding a residential fire sprinkler protection ordinance?

Background and Significance

The Town of Derry (the Town) is located in southeastern New Hampshire. The Town is approximately 37 square miles, with a population of 33,995 (New Hampshire Economic and Labor Management Bureau [NHELMB], 2008). The Derry Fire Department (the Department) provides fire suppression, fire prevention, technical rescue, emergency management, and advanced life support emergency medical transport services for the community. The Department daily shift staffing consists of 18 line personnel, staffing four fire stations. Personnel work 24 hour shifts with a one day on-duty, three days off-duty rotation.

The Department responded to just under 4200 fire/EMS incidents during fiscal year 2008 (Town of Derry, New Hampshire, 2008b). The Department operates with four engine companies; two tactical companies that cross-staff medic units and truck, tanker, or rescue companies, while two additional medic units are available and cross-staffed with fire suppression personnel. The Department provides contracted advanced life support emergency medical transport services to the neighboring Towns of Chester and Auburn. The Department also provides emergency dispatch communication services for Derry, as well as contracted communication services for four other New Hampshire communities including Auburn, Chester, Hampstead, and Windham.

The researcher has direct responsibility for fire department operations to include suppression efforts. The Derry Town Council (the Council) is currently evaluating the possibility of staffing reductions to offset revenue shortfalls and increased personnel expenses required by labor union collective bargaining agreements. This factor only compounds safety

concerns for fire fighters attempting to mitigate these fire incidents. “Roughly 45% of the nation’s firefighter deaths that occur on the fire ground, occur at residential occupancies, almost always one and two family dwellings” (Imholte, 2008, p. 12). Personnel safety is always a paramount concern for any incident commander. Alternative fire suppression methods must be evaluated. Suppressing the fire while it remains small is always a better alternative if possible.

According to Fire Investigator Chris Wyman of the New Hampshire State Fire Marshal’s Office, there have been nine fire fatalities in the Town since 1972, 100% of these fatalities occurred in residential occupancies (C. Wyman, personal communication, February 12, 2009). None of the homes involved in these fatal fires had residential fire sprinklers installed. Victims of these fires did not have adequate time to escape or were not able to escape. The researcher was unable to obtain information on any fire fatalities within the Town that were not within residential structures.

The Town has recognized this issue and has made efforts to incorporate residential fire sprinklers into newly constructed homes. In 1996, the Town amended the Land Use Regulations (Town of Derry, New Hampshire, 2008a) to include language for installation of residential fire sprinklers for newly approved subdivisions or the requirement for a cistern to be installed every thousand feet with the size determined by the square footage of the largest home in the subdivision. A cistern is simply a large underground water holding tank for the purpose of fire department suppression operations. Many developers choose the cistern over the residential sprinklers for financial reasons. The difference is that residential sprinklers benefit life safety at the time the fire begins, while cisterns do not provide any real life safety benefit as they are not utilized until the fire department arrives on-scene and utilizes all water carried on the initial apparatus.

The issue of obtaining support for a comprehensive residential fire sprinkler protection ordinance is related to the Executive Leadership course material as, “Influence is a strategy used to educate and involve another person about our point of view so that he/she will want what we want” (National Fire Academy [NFA], 2005, SM 12-3). Residential fire sprinklers have the ability to protect the lives of civilians and firefighters.

This topic relates to and supports the United States Fire Administrations (USFA) operational objectives, as residential fire sprinkler protection systems have the potential to allow the Town to:

Reduce the loss of life from fire in the age group 14 years old and below; reduce the loss of life from fire in the age group 65 years old and above; reduce the loss of life from fire of firefighters; to promote within communities a comprehensive, multi-hazard risk-reduction plan led by the fire service organization; to respond appropriately in a timely manner to emerging issues. (NFA, 2008, p. II-2)

The researcher used descriptive research to review this issue. The intentions of this research project are to determine the issues relative to a comprehensive residential fire sprinkler protection ordinance in the Town.

Literature Review

A comprehensive review of material relating to residential fire sprinkler protection systems was completed in an attempt to evaluate what other individuals, communities, and organizations have learned about this important subject. Substantial data exist to represent the overall fire problem in the United States. According to information published by the United States Fire Administration and National Fire Protection Association, “In 2006, there were 412,500 residential fires causing 2,620 civilian fire deaths and 12,925 civilian fire injuries and

over \$7 billion in property damage” (Federal Emergency Management Agency [FEMA], 2008, p. 1). NFPA (National Fire Protection Association [NFPA], 2008) indicates that one person was killed by fire every two and a half hours in the United States. Additional data states that fire increased in the United States in 2007 with 78% of all structure fires occurring in residential properties and 84% of all fire deaths occurred in the home. Eighty-two percent of all civilian fire deaths in 2005 resulted from home structure fires.

Smoke detectors as the sole source of protection from fire are of questionable reliability according to the non-profit organization Home Fire Sprinkler Coalition (HFSC, 2007b).

Not only do home fire sprinklers, used in combination with smoke detectors, dramatically reduce the risk of home fire deaths, they also decrease fire damage by as much as two-thirds in residences with fire sprinklers when compared to those without sprinklers. (p. 1)

The Fire Equipment Manufacturers Association (2005) believes that a well balanced fire protection approach should include design and construction of building, emergency lighting, fire extinguishers, smoke alarms, suppression systems, sprinkler systems, and most important – education and training of building occupants. “A balanced fire protection design is paramount to protecting property, and ultimately saving lives. First line of defense products such as portable fire extinguishers, interior equipments standpipe, occupant fire hose and special application pre-engineered suppression systems complement other protection systems” (Beranek & Laderoute, 2008, p. 1).

The State of New Hampshire Building Code (New Hampshire Department of Safety, 2007) adopted the 2006 edition of the International Building Code (International Code Council [ICC], 2006b) and the 2006 edition of the International Residential Code (ICC, 2006a) as published by the International Code Council, as well as other International Codes specific to

energy, plumbing, and electrical requirements. The International Building Code states that “automatic sprinkler systems in one and two family dwellings shall be installed throughout in accordance with NFPA 13D” (ICC, 2006b, p. 177). Non-mandatory language exists in the current International Residential Code, “an approved automatic fire sprinkler system shall be installed in new one and two family dwellings and townhouses” (ICC, 2006a, p. 640).

The State of New Hampshire (2004) has adopted 2003 Edition of NFPA 1 as amended by the State of New Hampshire as the Fire Code. The 2003 edition of NFPA 1 does not require residential fire sprinklers to be installed in one and two family dwellings. The 2006 edition of NFPA 1 (2006a), which has not been adopted by the State of NH as of the completion of this research project references the installation of automatic sprinklers in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems; NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including Four Stories in Height; or NFPA 13D, Standard for the Installation of Sprinkler Systems in One and Two Family Dwellings and Manufactured Homes, depending on the type of occupancy.

The State of New Hampshire (2004) has also adopted the 2003 edition of the Life Safety Code - NFPA 101 as amended by the State of New Hampshire. The 2003 edition of the NFPA 101 does not require the installation of residential sprinklers in one and two family dwellings. The 2006 edition of NFPA 101 (2006b), which has not been adopted by the State of NH as of the completion of this research project requires that all new one and two family dwellings be protected throughout by an approved sprinkler systems compliant with NFPA 13, 13R, or 13D, depending on type of occupancy.

Compliance with NFPA 13D is intended to prevent injury, life loss and property damage.

The standard requires at least 10 minutes of sprinkler water on the fire in its initial stage

of development. That controls the fire early, giving residents the time to safely escape and the fire department time to respond. A typical home fire will be controlled and may even be extinguished by the time the fire department arrives. (Home Fire Sprinkler Coalition [HFSC], 2007a)

The Town Code (Town of Derry, New Hampshire, 2008a) has adopted the State Building Code as the Town Building Code and the State Fire Code as the Town Fire Code which makes the most recently adopted editions of NFPA 1, NFPA 101, NFPA 13, NFPA 13D, and NFPA 13R applicable in the Town. The Town may exceed these standards, but may not accept a less restrictive interpretation of these standards as written. The Town Code has several references to residential sprinklers. The Town Building Code (Town of Derry, New Hampshire, 2008a) under Miscellaneous Requirements states that,

All townhouse-type construction of three units or more in which the individual living units have their own separate access and egress and are separated by fire-rated walls between both units and do not share such common areas as entries, corridors, exits, and alarm systems shall provide residential sprinkler systems as required by NFPA 13D. (Town of Derry, New Hampshire, 2008a, Chapter 36, Section 3604.1 - Amended 3/1/07)

The Town Building Code also states,

A one-hour fire separation shall be attached to the ceiling area over the heating equipment and must extend a minimum of four feet in all directions from the center of the burner and have the joints taped and finished. Exception: At the discretion of the Fire Chief or his designee, a domestic sprinkler head, connected into the domestic water

system, may be installed over the area of the burner in lieu of the one-hour fire separation in cases where installation of a one-hour fire separation is not practicable. (Town of Derry, New Hampshire, 2008a, Chapter 36, Section 3609.1 - Amended 3/1/07)

When developers are attempting to gain Town approval for construction projects, a point system is utilized for scoring each project. With regards to developer point scoring against the Towns Residential Development Special Permit System - “Any occupancy with access to appropriate fire suppression water storage and with installation of residential sprinklers compliant with NFPA 13D or within 1,000 feet of a fire suppression storage cistern compliant with NFPA 1231: one point” (Town of Derry, New Hampshire, 2008a, Chapter 165-115, Section C-2, Paragraph G5). Land Development Regulations state that “in the event that the Public Works Department deems the extension of the water main technically unfeasible; the developer will be required to install fire cisterns or individual residential sprinkler system as specified” (Town of Derry, New Hampshire, 2008a, Chapter 170-30, Section A, Paragraph 1 - Amended 3/28/07). “Residential sprinkler systems, installed in accordance with the most recent edition of Standards 13D and 13R of the National Fire Protection Association, may be installed in each residence in lieu of fire cisterns” (Town of Derry, New Hampshire, 2008a, Chapter 170-30, Section A, Paragraph 3 - Amended 3/28/07). The final existing Town Code reference is that “subdivisions and developments containing three or fewer single-family residences shall be exempt from the requirement for fire cisterns provided that new dwellings constructed within these subdivisions or developments are protected with residential sprinkler systems” (Town of Derry, New Hampshire, 2008a, Chapter 170-30, Section A, Paragraph 4 - Amended 3/28/07).

“Millions of Americans have installed smoke alarms in their homes in the past few decades, but a smoke alarm can only alert the occupants to a fire in the house...it cannot contain or extinguish a fire; residential sprinkler systems can” (FEMA, 2004, p. 1). The advantages (FEMA, 2004) of a newly designed home sprinkler system are fast response from sprinkler heads; they react to lower heat levels and extinguish the fire in the initial phase. These systems are low cost, systems are physically small in size, require minimal work to install, and have a low water requirement. Residential sprinkler systems protect family members with special needs such as children, senior citizens, and the handicap. Firefighters will be able to operate in a safer environment due to the fire being of a lesser intensity with less potential for flashover. Also, communities can better allocate fire department resources if these systems are installed, potentially fewer assets and personnel.

Both the firefighter and the automatic fire sprinkler work a 24-7-365 schedule (24 hours a day, 7 days a week, 365 days a year). The difference is that a fire sprinkler is located directly over the area of fire origin and can operate as soon as the temperature in that area reaches the activation temperature of the sprinkler head. (National Fire Sprinkler Association, Inc., [NFSA], 2003, pp. 2-9)

“The Insurance Service Office (ISO) recommends a 13% discount for a one or two family residence with a sprinkler system meeting NFPA 13D standards and an additional 2% more if smoke detectors are also present” (Binaski, 2005, p. 22). Allstate Agent Gerry Rowan states that “many customers have a concern regarding accidental activation of the system and associated water damage; Allstate covers the expenses for this damage” (G. Rowan, personal communication, January 6, 2009).

Residential fire sprinklers (National Fire Sprinkler Association [NFSA], 2003) may allow fire departments to modify operational procedures as these systems have the potential to provide for acceptable increases in response times, better and safer utilization of staffing and equipment, reduce out of service time while on-scene at fire incidents, reduced workman's compensation and injury expenses, and more flexibility with location of fire stations allowing for more focus on emergency medical service requirements. Water usage may also be reduced as a firefighter operating a fire suppression hose line may discharge 175-gallons per minute for the time it takes to extinguish a fire that has had ample time to advance, versus a fire sprinkler head that discharges 18 gallons per minute for the time it takes to extinguish a small fire in the incipient phases. Dmuchowski (2004, p. 19) acknowledges that potential advantages exists for developers and home buildings such as reducing street width requirements, increasing distance requirements between fire hydrants, reducing water main size requirements, allowing more homes in a subdivision, and reducing the cul-de-sac turn radius requirements are some examples.

The Residential Fire Safety Institute (2008) has noted that residential fire sprinklers also have advantages with regards to being environmentally friendly, which are often referred to as "green" initiatives. One of the major benefits is the reduction in water usage as sprinkler heads have the potential to require significantly less water to extinguish a fire than a firefighters hose line. Reduced toxins are released into the atmosphere as the fire is extinguished faster and fewer by-products of the combustion process are released. Also – if the fire causes less damage to the structure, less debris is required to be transported to the local landfill.

The National Association of Home Builders notes that New York has recently rejected a proposal that would have recommended that residential fire sprinklers be required in one- and

two-family dwellings in the 2009 state residential code. Some of the reasons for this decision are,

Installation costs can be high as \$5 to \$7 per square foot; homes in rural areas without municipal water connections may require extra pumps, a generator and water storage tank for the fire sprinklers to work effectively; and maintenance requirements can be onerous for many home owners. (National Association of Home Builders [NAHB], 2007, p. 1)

Following the IRC vote in September in Minneapolis, the NAHB stated,

It seems clear that these particular officials were focused on one issue only – residential fire sprinkler mandates – without any benefit of perspective regarding how such mandates jibe with the hundreds of other code proposals considered at this hearing.

That's unfortunate, because such reasoned discussion is what the model code process was designed to accomplish. (NAHB, 2008b, p. 1)

The Home Fire Sprinkler Coalition (2005) provides information relative to addressing common concerns with sprinkler systems, concerns such as: sprinklers operate all at once, flooding every room in the house; sprinklers will leak; smoke alarms are all you need; sprinklers cost too much; water damage from sprinklers is worse than the fire; sprinklers are ugly; and sprinklers will freeze in the winter. The Home Fire Sprinkler Coalition notes that only the sprinkler head near the fire area will discharge water onto the fire, other sprinkler heads will not activate unless required. Sprinkler heads have no additional leakage issues than routine plumbing installations. Nationally, a conservative estimate is that sprinkler system installation cost one to two percent of total building cost, and some of this is off-set by insurance premium reductions. Sprinkler heads are inconspicuous, often concealed behind ceiling color matching

plates. Finally, sprinkler systems installed correctly should not freeze; anti-freeze additives are also available to address this concern to a greater degree of satisfaction.

The Home Fire Sprinkler Coalition (HFSC, 2007a) has published an informational marketing packet of material relative to residential sprinklers. The mission of the Home Fire Sprinkler Coalition (HFSC, 2007a) is “to save lives by increasing awareness of the benefits and availability of residential fire sprinkler systems, ultimately increasing the number of installations in new one- and two-family dwellings”. Information is provided for consumers,

Fire kills more people in the United States annually than all natural disasters combined. In fact, more than 4,000 people perish in fires each year, and ironically, most fire deaths occur in the very place where we feel safest — our own homes. Home fires often happen at night when people are sleeping. In only three minutes, a room can become engulfed in flames before anyone awakens. Those at highest risk are the very young and older adults, who may have difficulty making a quick escape. Smoke alarms are essential in every household. They're designed to detect, not control a fire. Home fire sprinklers complement the alarm's work, providing a way to fight flames immediately. In less time than it would take most fire departments to arrive on the scene, home fire sprinklers can contain and even extinguish a fire. There's less damage, and less chance of deadly smoke and gases reaching your family. (HFSC, 2007a)

Information is provided for builders,

Knowing what your customers want and delivering it is good business. That's why smart builders are putting sprinklers in the homes they build more often than ever before. Your customers value safety and security. Offering peace of mind is priceless. So whether you

cater to families or retiring couples or communities of all ages, put sprinklers in the homes you build and save lives, one family at a time. (HFSC, 2007a)

Information is also available for real estate professionals,

If you're marketing a home with a fire sprinkler system, you've got a great selling feature. Each year, fires kill or injure tens of thousands of people, 80% of them in homes. Among those most at risk are young children and older adults. What better selling feature could you offer than a home equipped with a firefighter on duty 24 hours a day. (HFSC, 2007a)

With regard to home insurer organizations,

Savvy homebuyers are increasingly choosing to build homes with the options they want and need – including home fire safety. A national poll conducted by Harris Interactive® found that over two-thirds (69 percent) of U.S. homeowners say having a fire sprinkler system increases a home's value. (HFSC, 2007a)

The International Residential Code Fire Sprinkler Coalition (2007) has produced a digital video disc (DVD) to promote the importance of residential fire sprinklers and provide information to all stakeholder groups regarding these systems. Information is provided relative to the myths of sprinkler systems, the U.S. fire problem, inspection and maintenance, costs, and community success stories. This DVD is available for use with local media outlets. The Fire Equipment Manufacturers' Association has produced a document to assist businesses with fire safety. This document can easily apply to residential occupancies as well. "Fire suppression systems provide fast, on-site protection at the earliest stage of a fire" (Fire Equipment Manufacturers' Association, 2005, p. 8). Allstate Agent Gerry Rowan states that,

I always encourage customers to install fire detection and fire protection in new homes; I have had clients that have had their homes saved with much less damage due to automatic alarms. Currently, no such experience with fire sprinklers saving a home, but I have the highest confidence that they will significantly reduce overall damage.

(G. Rowan, personal communication, January 6, 2009)

“During last month’s hearings in Minneapolis, local building code officials largely sided with home builders to oppose the sprinkler requirements, citing technical concerns and their added, unjustified expense” (NAHB, 2008a, p. 1). Many system installation vendors are attempting to get business from the residential market. “Residential services – You get one chance to install a life-saving fire protection system and just because we work on major commercial projects each day doesn’t mean that you cannot afford our services” (Sprinklerfitters and Apprentices - Local 550, 2008, p. 1).

An interview with Investigator Chris Wyman of the NH State Fire Marshal’s Office was conducted due to their record keeping process and extensive knowledge of fire prevention. This interview provided further information to support this research as it was discovered that the Town has had nine fire fatalities since 1972. All of these fatalities occurred in residential occupancies; none of these residential homes had residential sprinklers installed (C. Wyman, personal communication, February 12, 2009).

In summary, the literature review finds a significant fire problem continues to exist in this country. Smoke alarms and exit plans are an important part of public fire education, but they do not assist with extinguishing the fire. Residential fire sprinklers extinguish most fires while they remain in the initial phase, which greatly may enhance life safety for homeowners and firefighters. The State of New Hampshire has a comprehensive arrangement of building and fire

codes in existence with plans to further improve these codes to allow for safer structures. The advantages of residential fire sprinklers are numerous; while the disadvantages exist, they can often be reduced to myths or lack of accurate information.

Several organizations exist with the primary goal of increasing public education regarding residential sprinklers. Marketing material is available to assist fire departments at little or no cost; this information is targeted specifically for real estate agents, insurance agents, home builders, home buyers, and fire departments. Several stakeholder groups support residential sprinklers, while some continue to resist having them as a requirement. The research conducted as part of this literature review greatly enhanced the researchers overall knowledge of the subject matter, and encouraged forward progress toward a more comprehensive residential fire sprinkler ordinance for the Town.

Procedures

The initial process for this descriptive research consisted of a literature review at the Learning Resource Center (LRC) while attending the National Fire Academy (NFA) between October 6 -17, 2008. This research proved extremely valuable as the foundation for this applied research project was established. The procedures utilized to review each of the research questions are described in this section.

The first research question evaluates what current requirements relating to residential fire sprinkler protection systems are in effect for the Town and other communities in the State of New Hampshire. A review of the Town Code (Town of Derry, New Hampshire, 2008) was conducted with “residential sprinklers” as the search parameter. The Town Code is located online in electronic format, and can be accessed through the Town website at www.derry.nh.us. In addition, an interview was conducted with Derry Fire Chief George Klauber. Chief Klauber was

chosen for this interview due to his position within the Fire Department and extensive knowledge of Town Codes with regards to the fire department. The researcher will refer to these interview questions while reviewing other listed research questions as well. Chief Klauber was electronically mailed several questions on December 27, 2008, and formally interviewed in his office on January 11, 2009 (G. Klauber, personal communication, December 27, 2008). a) What are the advantages of residential fire sprinklers? b) What are the disadvantages of residential fire sprinklers? c) How will the recent International Residential Code vote affect the Town Fire Code? d) What are the current Town requirements regarding residential fire sprinklers? e) Would you recommend the fire department introducing more comprehensive ordinance language regarding residential fire sprinklers in the future?

Further, the New Hampshire Department of Safety (2007) website was reviewed for statewide language relative to residential sprinklers. The State of New Hampshire Building Code and State of New Hampshire Fire Code were reviewed for information. Interview questions were electronically mailed to Investigator Chris Wyman of the New Hampshire State Fire Marshal's Office (C. Wyman, personal communication, December 27, 2008). Investigator Wyman was chosen for this interview because of his vast knowledge of fire prevention, fire investigation, and knowledge of the State Fire Code in general. Questions were sent electronically on December 27, 2008 and returned electronically on January 11, 2009; a follow-up interview was conducted in his office on February 12, 2009 to clarify any outstanding questions. The researcher will refer to these interview questions while reviewing other listed research questions as well. Investigator Wyman was asked several questions by the researcher (personal communication, December 27, 2008). a) What are the advantages of residential fire sprinklers? b) What are the disadvantages of residential fire sprinklers? c) How will the recent

International Residential Code vote affect the State Fire Code? d) Fire fatality numbers for State of New Hampshire in the past three years? e) Fire fatality numbers in Derry, New Hampshire for as many years as electronic records exist regarding this information? f) What is the New Hampshire State Fire Marshal's Office overall position regarding residential fire sprinklers? g) Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive local ordinance language were introduced? h) Effective marketing campaigns that you are aware of regarding residential fire sprinklers?

A feedback instrument (Appendix A) was developed by the researcher in an attempt to determine how other communities in New Hampshire were addressing this most important issue. This electronic feedback instrument was developed utilizing an internet based survey tool, www.SurveyMonkey.com. This feedback instrument was created on February 5, 2009. This instrument was sent via electronic mail to the President of the New Hampshire Fire Chiefs Association (NHFCA) for immediate electronic mail distribution to the membership on February 9, 2009 with an electronic link attached. In relation to Derry, the NHFCA includes representatives from New Hampshire communities that are larger communities, smaller communities, all career fire departments, all volunteer fire departments, and combination departments. The purpose of this feedback instrument was not to exhibit statistical significance; this was done to reveal the level of interest in residential fire sprinklers within the State of New Hampshire. The researcher terminated data collection from this feedback instrument on February 14, 2009 as no responses were received during the previous twenty-four hours. This electronic mail message and feedback instrument is located in Appendix A.

The second research question evaluates the advantages and disadvantages of a residential fire sprinkler protection system. An internet search was completed utilizing "residential fire

sprinklers” as the search parameter. Several of these references can be found within the literature review section of this applied research project. Many of the references were obtained from the Learning Resource Center on-line card catalog using “residential sprinklers” as the search parameter while attending the National Fire Academy.

An interview was conducted with Derry Code Enforcement Officer Robert Mackey (R. Mackey, personal communication, December 27, 2008). Mr. Mackey was chosen for this interview due to his position within the community and extensive knowledge of the Town Codes with regards to the building construction. The researcher will refer to these interview questions while reviewing other listed research questions as well. Mr. Mackey was electronically mailed several questions on December 27, 2008, and formally interviewed in his office on January 5, 2009. a) What are the advantages of residential fire sprinklers? b) What are the disadvantages of residential fire sprinklers? c) How will the recent International Residential Code vote affect the Town Code? d) What are the current Town requirements regarding residential fire sprinklers? e) Would you support the fire department recommending more comprehensive ordinance language regarding residential fire sprinklers in the future? f) Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced?

The third research question assesses effective marketing campaign strategies for gaining community support for a residential fire sprinkler protection ordinance. This was also accomplished by performing an internet search with “residential fire sprinklers” as the search parameter. The Home Fire Sprinkler Coalition material located at the National Fire Academy Learning Resource Center was reviewed and much information regarding this research question was obtained from this material.

Further, an interview was conducted with Derry Planning Director George Sioras (G. Sioras, personal communication, December 27, 2008). Mr. Sioras was chosen for this interview due to his position within the community and extensive knowledge of short and long range community planning processes. The researcher will refer to these interview questions while reviewing other listed research questions as well. Mr. Sioras was electronically mailed several questions on December 27, 2008, and formally interviewed in his office on January 5, 2009. a) How much residential land remains available to be developed within the Town? b) What are your general feelings regarding residential fire sprinklers? c) Do you feel that the Planning Board is supportive of Town Code language regarding residential fire sprinklers? d) Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced? e) Who are some builders/developers that you feel may be interested in doing an interview regarding this subject?

The final research question reviews the thoughts of stakeholders within the Town regarding a residential fire sprinkler protection ordinance. The Office of the Battalion Chief for the Derry Fire Department was provided with a feedback instrument relative to residential fire sprinklers (Appendix B). The researcher is a Battalion Chief in this Office and did not participate. The Battalion Chiefs who did participate were David Hoffman, Jack Webb, and Michael Doyle. Each of the Battalion Chiefs was chosen for their perspective regarding residential fire sprinklers as they are the shift commanders for the Department. They are responsible for command and control on emergency incidents and also for the safety of their personnel. The researcher will refer to these questions while reviewing other listed research questions as well. The Battalion Chiefs were electronically mailed the following feedback instrument on December 27, 2008, and each responded via electronic mail by January 18, 2009. The Battalion Chiefs were asked

several questions by the researcher (D. Hoffman, personal communication, December 27, 2008) (J. Webb, personal communication, December 27, 2008) (M. Doyle, personal communication, December 27, 2008). a) Have you responded to any incidents where residential fire sprinklers activated? b) Are you aware of any disadvantages regarding residential fire sprinklers? c) What are your feelings regarding the effectiveness of cisterns? d) Would you support the fire department recommending more comprehensive language regarding residential fire sprinklers in the future? e) Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced?

Additionally, local insurance companies that provide homeowners insurance were polled to determine if they provided premium reductions to customers that have residential sprinkler systems installed in their insured homes. The insurance companies contacted were Allstate Insurance, State Farm Insurance, and Brownell Insurance Companies. Each of the insurance companies was chosen because they are well established in the greater Derry, New Hampshire area. An authorized representative from each of these companies was contacted on the telephone by the researcher on January 6, 2009. Three questions were asked by the researcher (G. Rowan, personal communications, January 6, 2009) (J. Darak, personal communications, January 6, 2009) (R. Brownell, personal communications, January 6, 2009). a) Does your insurance company provide a premium reduction for homes with residential fire sprinklers installed and operating? b) If yes, what is the average insurance premium reduction you allow? c) Does your insurance company encourage policy owners to install residential fire sprinklers in new and existing homes?

The researcher also contacted and polled local residential home builders in the greater Derry, New Hampshire area to include Jemco Builders, Mountain Home Builders, Adelphi Homes, and

Gold Leaf Homes. Each of these home builders was recommended by Town Officials as being cooperative with participating in this research. An authorized representative from two of these builders was contacted by the researcher on the telephone on January 6, 2009. Four questions were asked by the researcher (R. Hutchkins, personal communications, January 6, 2009) (D. Lauza, personal communications, January 6, 2009). a) Has your company ever constructed a single-family residential home with residential fire sprinklers systems installed? b) Do you feel that your customers view residential fire sprinklers as a value added to their new homes? c) Estimated cost by square footage to install into new single-family construction? d) Are you aware of any disadvantages with the installation of residential fire sprinklers?

The researcher contacted and polled local fire sprinkler installation contractors in the greater Derry, New Hampshire area to include Tri-State Sprinkler, Superior Fire Protection, and Difava Fire Protection. Each of these installers was recommended by Town Officials as being cooperative with participating in this research. An authorized representative from each of these builders was contacted by the researcher on the telephone on January 6, 2009. Four questions were asked by the researcher (D. Nintean, personal communications, January 6, 2009) (E. Caron, personal communications, January 6, 2009) (B. Difava, personal communications, January 6, 2009). a) Does your company routinely install residential fire sprinklers in new and existing homes? b) What is the approximate number of installations in your career? c) What is the average cost per square foot to install residential fire sprinkler systems? d) Are you aware of any disadvantages with the installation of residential fire sprinklers?

Limitations:

The researcher attempted to review as much material as prudently possible to assure a broad overview of this subject matter, as well as, specific information when appropriate. Some material may have been inadvertently overlooked by the researcher while assembling information for this applied research project. The researcher made an attempt to gather information from as many stakeholders as practical for the purposes of this research; some stakeholder groups may have been inadvertently overlooked. Also, the companies chosen and their agency representatives may not represent the views and opinions of all within a stakeholder group.

Results

Descriptive research produced valuable information relative to residential fire sprinklers. The researcher was surprised to learn how much progress has been made around the country, the State, and within the local community with regards to residential fire sprinklers. Answers to each of the four research questions were derived from document review, internet research, feedback instrument response, and personal interviews.

The first research question evaluates what current requirements relating to residential fire sprinkler protection systems are in effect for the Town and other communities in the State of New Hampshire. A comprehensive review of the Town Code discovered a significant amount of information. The primary national code development organization is the International Code Council. “The International Code Council (ICC), a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings, including homes and schools” (ICC, 2009, p. 1).

The Town Code (Town of Derry, New Hampshire, 2008a) states that the Town has adopted the State Building Code as the Town Building Code and the State Fire Code as the Town Fire Code which makes the most recent National Fire Protection Association (NFPA) editions of NFPA 1, NFPA 101, NFPA 13, NFPA 13D, and NFPA 13R applicable in the Town. The Town may exceed these standards, but may not accept a less restrictive interpretation of these standards as written. The Town Code has several references to residential sprinklers. It is important to understand what language currently exists within the Town Code to get a better perspective as to how various stakeholder groups will respond to potential language enhancements. A detailed reference guide to existing ordinance language is located in Table 1.

Table 1: Existing Town Code language regarding residential fire sprinklers

Title	Chapter	Section	Paragraph	Amended	Language
Building Code Fire Protection	36	3604.1	N/A	3/1/07	All townhouse-type construction of three units or more in which the individual living units have their own separate access and egress and are separated by fire-rated walls between both units shall provide residential sprinkler systems as required by NFPA 13D
Building Code Fire Protection	36	3609.1	N/A	3/1/07	A one-hour fire separation shall be attached to the ceiling area over the heating equipment

					Exception: A sprinkler head, connected into the domestic water system, may be installed over the area of the burner in lieu of the one-hour fire separation
Residential Development Special Point System	165-115	C-2	G5	N/A	For any occupancy with access to appropriate fire suppression water storage and with installation of residential sprinklers compliant with NFPA 13R and 13D or within 1,000 feet of a fire suppression storage cistern compliant with NFPA 1231: one point
Land Development Regulations	170-30	A	1	3/28/07	The developer will be required to install fire cisterns or individual residential sprinkler system as specified
Land Development Regulations	170-30	A	3	3/28/07	Residential sprinkler systems, installed in accordance with the most recent edition of Standards 13D and 13R of the National Fire Protection Association, may be

					installed in each residence in lieu of fire cisterns
Land Development Regulations	170-30	A	4	3/28/07	Subdivisions containing three or fewer single-family residences shall be exempt from the requirement for fire cisterns provided that new dwellings constructed within these subdivisions are protected with residential sprinkler systems

An interview conducted with Derry Fire Chief George Klauber (G. Klauber, personal communication, January 11, 2009). Chief Klauber states that the primary advantage to residential sprinkler systems is that they can extinguish most fires while they remain small, which saves lives and reduces property loss. The Chief also notes that these systems are beneficial for fire departments that do not have adequate staffing or acceptable response times. “The advantages outweigh any disadvantages for sure”. Cost of installation and maintenance of the systems are concerns for many homeowners, but life safety is far more important (G. Klauber, personal communication, January 11, 2009).

With regards to the recent International Residential Code vote, Klauber states that, “in that the Town enforces the State of New Hampshire building code and the State has yet to adopt the most recent International Residential Code, I do not expect there to be a change in the near future for the Town” (G. Klauber, personal communication, January 11, 2009). Klauber notes

that he would like to propose a more comprehensive residential sprinkler ordinance, but he does not have much confidence in the ordinance being considered. Klauber recognizes that for this ordinance enhancement to become a reality, the Derry Fire Department must educate the public, real estate agents, and firefighters. The Town must also consider tax incentives for home owners and builders who install these systems (G. Klauber, personal communication, January 11, 2009).

An interview was conducted with New Hampshire State Fire Marshal's Office Investigator Chris Wyman (C. Wyman, personal communication, February 12, 2009). Investigator Wyman reflects a similar advantage to residential sprinklers systems. Wyman states that "if the fire is extinguished early, it reduces the amount of toxic gases produced, which increases chances of victim survival" (C. Wyman, personal communication, February 12, 2009). Wyman notes that with the enhanced life safety benefit of sprinkler systems and insurance premium reductions, there are no real disadvantages to these systems. Wyman does recommend installing the system during construction versus after construction as a way to reduce costs. Wyman states that the State Fire Marshal is looking to have the New Hampshire State Legislature adopt the 2006 Life Safety Code - NFPA which requires residential sprinklers in all new one and two family dwellings. This is the same language proposed and adopted at the 2008 International Code Council conference with regards to the 2009 International Residential Code.

Wyman states that the State had 32 fire related deaths in 2008, 19 of these were directly caused by the fire, and greater than 95% of these deaths occurred in residential occupancies. Wyman also notes that the Town has had nine fire deaths since 1972, with 100% of these deaths occurring in residential occupancies. Wyman indicates that the Fire Marshal's position on residential sprinklers is that they should be installed in every home, just like smoke detectors. With regards to marketing campaigns for garnering stakeholder support, Wyman suggests

referring to online material provided by the Home Fire Sprinkler Coalition (C. Wyman, personal communication, February 12, 2009).

Feedback Instrument (Appendix A) results were obtained from New Hampshire Association of Fire Chief members regarding which communities currently have ordinance language regarding residential fire sprinklers. The results demonstrate that many New Hampshire communities have some residential sprinkler ordinance language; however, only some communities have comprehensive language and enhancements are desired. A total of 36 communities responded to the feedback instrument request for assistance (Appendix A). Residential sprinkler ordinance language currently exists in 15 of the communities that responded, while only one of the respondents have ordinance language that require residential sprinklers in all newly constructed one and two family dwellings. Enhancement of current ordinance language or development of initial ordinance language is desired in 61% of the respondents, while 11% do not desire language enhancement or development; 28% are unsure if they desire language enhancement or development. Detailed analysis of this feedback instrument can be found in Appendix A.

The second research question evaluates the advantages and disadvantages of a residential fire sprinkler protection system. Previous thinking was that smoke detectors were a sufficient method of fire protection, but smoke detectors can only detect the fire and alarm the occupants while the fire progresses unimpeded. The primary benefit of a residential sprinkler system is the fact that it has the capability of extinguishing the fire during the initial phase, prior to the fire advancing to the flashover phase. According to the Federal Emergency Management Agency (2004), the advantages of a newly designed home sprinkler system are fast response from sprinkler heads; they react to lower heat levels and extinguish the fire in the incipient phase.

These systems are low cost, physically systems are small in size, minimal work to install, and have a low water requirement. Residential sprinkler systems protect family members with special needs such as children, senior citizens, and the handicap. Also, communities can better allocate fire department resources if these systems are installed, potentially fewer assets and personnel.

Having a residential sprinkler system is similar to having a firefighter on-duty in every room of your home at all times. No fire department response is required prior to beginning of extinguishment operations. Due to this fact, “the Insurance Service Office (ISO) recommends a 13% discount for a one or two family residence with a sprinkler system meeting NFPA 13D standards and an additional 2% more if smoke detectors are also present” (Binaski, 2005, p. 22). Allstate Insurance Agent Gerry Rowan states that Allstate provides at least a 10% premium reduction if residential sprinkler systems are installed. The life safety value alone, not to mention the reduction of the insurance claim make these system extremely valuable (G. Rowan, personal communication, January 6, 2009).

Residential fire sprinklers (National Fire Sprinkler Association [NFSA], 2003) have the potential to reduce the need for additional fire stations and potentially reduce firefighter staffing requirements. Other benefits may include reduction in firefighter injuries and overall enhanced firefighter safety as the fires will remain in the initial phase. Water damage is also significantly reduced as the gallons discharged from a single sprinkler head is far less than an operational fire suppression hose line. Dmuchowski (2004) points out that advantages may exist for developers and home buildings such as reducing street width requirements, increasing distance requirements between fire hydrants, reducing water main size requirements, allowing more homes in a subdivision, and reducing the cul-de-sac turn radius requirements are some examples of such. The Residential Fire Safety Institute (2008) has noted that residential fire sprinklers also have

advantages with regards to being environmentally friendly. Water usage reduction, reduced combustion by-product toxins into the atmosphere, and less building debris in the landfill are all definite advantages of residential sprinkler systems.

Some disadvantages to residential sprinkler systems that are highlighted by the National Association of Home Builders (2007) are the cost of installation, which they state can be as high as \$7 a square foot. Also, homes on private wells will require a pump and holding tank; a generator may be necessary in an area prone to power failures. Maintenance is also a major concern for home builders from all areas.

Following the International Residential Code vote in September in Minneapolis, the National Association of Home Builders (NAHB) stated,

It seems clear that these particular officials were focused on one issue only – residential fire sprinkler mandates – without any benefit of perspective regarding how such mandates jibe with the hundreds of other code proposals considered at this hearing.

That's unfortunate, because such reasoned discussion is what the model code process was designed to accomplish. (2008a, p. 1)

The National Association of Home Builders appealed this vote and after review, their appeal was denied; there were no findings of inappropriate voting by the fire service representatives with authority to cast their vote.

The Home Fire Sprinkler Coalition (2005) provides information which is listed in Table 2 relative to common concerns with fire sprinkler systems from people who do not understand how fire sprinkler systems operate in relation to factual information regarding fire sprinkler systems.

Table 2 - Sprinkler Concerns versus Factual Information

Area of Concern	Factual Information
All sprinklers activate at once, flooding the entire house	Only the sprinkler head above the fire will activate, additional heads will only activate if needed
Sprinklers will leak	Sprinklers don't leak any more than routine plumbing
Sprinklers cost too much	The cost is often offset by the insurance premium reductions
Smoke alarms are sufficient protection	Smoke alarms only detect the fire, they do not extinguish the fire
Water damage is worse than the fire	Damage is far less than fire department hose lines
Sprinklers are ugly in appearance	Sprinkler heads often recess into the ceiling with matching cover plates; don't drop down unless activated
Sprinkler will freeze in the winter	Proper installation and anti-freeze additives can prevent freezing

An interview conducted (R. Mackey, personal communication, January 5, 2009) with Derry Code Enforcement Officer Robert Mackey notes that a major advantage is that sprinklers keep the fire suppressed and may prevent flashover from occurring, which allows residents a longer time to safely escape the fire. While a disadvantage continues to be the expense to install the systems, Mackey states that "it all depends what the values of the home owner are and what

is important to them”. Maintenance and testing are frequent concerns of homeowners regarding sprinklers systems. An item which has not been addressed is the question of whether the Town is going to require this maintenance and testing to be completed according to NFPA requirements.

With the recent vote regarding the 2009 International Residential Code, residential sprinklers will be required in one and two family dwellings; however Mackey points out that the State of NH may choose to not adopt the updated International Building Code with the International Residential Code changes. Mr. Mackey states that he would be supportive of the fire department recommending more comprehensive ordinance language regarding residential fire sprinklers in the future because they provide for fire safety, which is beneficial for the home owner as well as the firefighters. With regards to obtaining stakeholder support, Mr. Mackey stressed the fact that the added expense for installation is not that high compared to the potential alternative. The fire department should stress the life safety factor and insurance premium reductions. If it becomes mandatory, highlight the fact that the more customers requiring these systems will reduce the overall installation costs. Incentives to builders and developers are also options that could be evaluated further (R. Mackey, personal communication, January 5, 2009).

The third research question assesses effective marketing campaign strategies for gaining community support for a residential fire sprinkler protection ordinance. The Home Fire Sprinkler Coalition (2005) has developed an informational packet reviewing the benefits of residential fire sprinklers. Information is provided for fire departments, code enforcement officials, elected officials, home builders, insurance companies, real estate agencies, sprinkler installation contractors, and home buyers. Prior to the International Residential Code vote in September of 2008, the Fire Sprinkler Coalition (International Residential Code Fire Sprinkler Coalition, 2007)

produced a digital video disc (DVD) to promote the importance of residential fire sprinklers and provide information to all stakeholder groups regarding these systems. Information is provided relative to the myths of sprinkler systems, the U.S. fire problem, inspection and maintenance, costs, and community success stories. This DVD is available for use with local media outlets.

Insurance Companies are also educated on the importance of fire protection features in a home and have the potential to assist with marketing residential fire sprinklers. Allstate Insurance Agent Gerry Rowan (personal communication, January 6, 2009) always encourages customers to install fire detection and fire protection in new homes; Mr. Rowan states that he has had clients that have had their homes saved with much less damage due to automatic alarms. Currently, no such experience with fire sprinklers saving a home, but he has the highest confidence that they will significantly reduce overall damage (G. Rowan, personal communication, January 6, 2009).

During an interview conducted with Derry Planning Director George Sioras (personal communication, January 5, 2009), the researcher was made aware that the Town has approximately 6000 acres available for residential construction; which could result in as many as 2500 homes depending on zoning requirements. Mr. Sioras also noted that he feels that it is beneficial for homes to have residential fire sprinklers for all the obvious reasons pertaining to life safety. The language which currently exists in the Town Code is from 1996 (Town of Derry, New Hampshire, 2008a). Former Derry Deputy Fire Chief Gary McCarraher was a member of the Planning Board at the time and introduced the language. Prior to that time, the Town had no language in the Land Development Control Regulations

The Planning Board, as recently as the Spring of 2008 had an issue with a builder who utilized an existing cistern from another nearby subdivision to meet Town regulation

requirements as opposed to installing a residential fire sprinkler. This decision was upheld by the New Hampshire Court. This may make the Planning Board more supportive of eliminating the cistern option, and require residential sprinklers for all new construction. Mr. Sioras recommends that the fire department have a workshop with the Planning Board to review draft language, they would then schedule a Public Hearing for stakeholder input and take a vote that night. The Town Council does not vote on Land Development Control Regulations, the Planning Board has final authority to approve any changes (G. Sioras, personal communication, January 5, 2009).

The fourth research question reviews the thoughts of stakeholders within the Town regarding a residential fire sprinkler protection ordinance.

It is important to understand the Battalion Chiefs' perspective regarding residential fire sprinkler systems; they are the Incident Commanders for emergency incidents and responsible for allocation of resources for fire extinguishment and establishment of water supply for this operational objective. Summarized results of Battalion Chiefs' feedback instrument are listed in Table 3.

Table 3 – Battalion Chiefs' Feedback Instrument Responses

	Response to Home with System	Disadvantages of Systems	Effectiveness of Cisterns	Support Ordinance Enhancement	Recommendations for Stakeholder Support
BC Hoffman	Yes	Cost and Freezing	Poor	Yes	Education
BC	Yes	No	Poor	Yes	Education

Webb					
BC Doyle	Yes	Freezing	Non-effective	Yes	Education

Note: Detailed responses to this feedback instrument located in Appendix B.

Results of Insurance Company polling reflects a definite trend toward premium reductions for homeowners with residential fire sprinklers installed, maintained and operating. Each of the companies contacted indicated that they provide a 10% to 15% reduction in annual premiums, and each of the companies encourages new construction homeowners to install residential sprinklers during the construction process. Allstate Insurance Agent Gerry Rowan also offered information relative to coverage, “water damage from accidental activation is covered by Allstate Insurance” (G. Rowan, personal communication, January 6, 2009).

Each of the home builders that were successfully contacted indicated that they have experience with installing residential sprinkler systems; however, this experience is limited. The researcher was only able to speak with authorized representatives from two of the four construction companies contacted; despite several attempts to make contact. Jemco Construction (R. Hutchkins, personal communication, January 6, 2009) and Gold Leaf Homes (D. Lauza, personal communication, January 6, 2009) provided feedback for this research project. Only Gold Leaf Homes (D. Lauza, personal communication, January 6, 2009) has actual experience installing residential sprinklers; an authorized representative stated that some homeowners view sprinklers as value added to their homes. Gold Leaf Homes states that the approximate installation costs for new construction is \$2.20 square/foot. With regards to disadvantages of these systems, an authorized representative of Gold Leaf Homes noted that it is “unknown if

insurance companies are providing large enough premium reductions to make installations worthwhile to the home buyer” (D. Lauza, personal communication, January 6, 2009).

Sprinkler system installation contractors were polled for their perspective regarding residential sprinkler systems. If adopted by the State of New Hampshire, sprinkler installation contractors have the potential to benefit from the recent International Residential Code updates. Results of Installation Contractor responses are listed in Table 4.

Table 4 – Sprinkler Installation Contractor Responses

Company Name	Authorized Representative	Contact Telephone (603)	Career Installations	Installation Cost per Sq/Ft
Tri-State Sprinkler	Dave Ninteau	421-2899	800	\$ 1.50 -1.80 Sq/Ft average
Superior Fire Protection	Ed Caron	644-4700	300 – 400	\$ 2.50 Sq/Ft average
Difava Fire Protection	Bob Difava	396-6418	15-20	\$ 2.50 Sq/Ft average

With regards to disadvantages of these systems, an authorized representative of Superior Fire Protection (E. Caron, personal communication, January 6, 2009) stated that the holding tank in the basement for homes on private wells is 300-gallons, and takes up space in the basement. Tri-State Fire Protection states that “the cost of installation for homes with private wells is approximately \$1200 more than homes with city water” (D. Ninteau, personal communication, January 6, 2009).

In summary, Derry already has several references to residential fire sprinklers in the existing Town Code. However, far more comprehensive language is required to assure that these systems are installed for all new one and two family construction within the Town. Research indicates that the advantages of residential sprinklers systems are greater than the disadvantages. Marketing material exists in an easy to understand format for uninformed stakeholder groups, and many stakeholder groups clearly support more comprehensive residential sprinkler ordinance language.

Discussion

The research suggests that residential fire sprinkler protection systems are beneficial to home owners and fire suppression personnel, as they are proven to significantly reduce life safety issues and property damage associated with fire. NFPA (Imholte, 2008, p. 12) statistics show that U.S. fire departments responded to 381,000 home structure fires in 2005, which caused 13,300 civilian injuries, and 3,030 deaths. This same year, property damage was reported at \$6.7 billion. Eighty-two percent of all civilian fire deaths in 2005 resulted from home structure fires. The researcher is of the opinion that if every home had a residential sprinkler system; fire related injuries, deaths, and property loss could be drastically reduced. Chief Klauber (personal communication, January 11, 2009) states that the sooner water can be applied to a fire, the sooner the fire can be controlled and possibly extinguished.

The State of New Hampshire (New Hampshire Department of Safety, 2007) Building Code has adopted the 2006 edition of the International Building Code and the 2006 edition of the International Residential Code as published by International Code Council. Wyman (personal communication, February 12, 2009) states that the State Fire Marshal is looking to have the New Hampshire State Legislature adopt the 2006 NFPA Life Safety Code which requires residential

sprinklers in all new one and two family dwellings. This is the same language proposed and adopted at the recent International Code Council conference with regards to the International Residential Code.

Millions of Americans have installed smoke alarms in their homes in the past few decades, but a smoke alarm can only alert the occupants to a fire in the house...it cannot contain or extinguish a fire; residential sprinkler systems can. (FEMA, 2004, p. 1)

The ISO recommends a 13% discount for a one or two family residence with a sprinkler system meeting NFPA 13D standards and an additional two percent more if smoke detectors are also present. Insurance companies contacted in the Greater Derry Area have policies consist with this ISO recommendation; each stated a 10-15 percent premium reduction as a result of having residential fire sprinklers installed and operational.

Residential fire sprinklers (National Fire Sprinkler Association, 2003) may allow fire departments to modify operational procedures as these systems have the potential to provide for acceptable increases in response times, better and safer utilization of staffing and equipment, reduce out of service time while on-scene at fire incidents, reduced workman's compensation and injury expenses, and more flexibility with location of fire stations allowing for more focus on emergency medical service requirements. Chief Klauber (personal communication, January 11, 2009) states that the primary advantage to residential sprinkler systems is that they can extinguish most fires while they remain small, which saves lives and reduces property loss. The advantages outweigh any disadvantages for sure.

The Residential Fire Safety Institute (2008) has noted that residential fire sprinklers also have advantages with regards to being environmentally friendly. The researcher will definitely mention this viewpoint when introducing future ordinance language to various stakeholder

groups, as environmentally friendly initiatives are extremely popular. Reduction of water usage, reductions of toxins into the atmosphere, and reduction of waste into the landfill are all extremely important marketing points.

New Hampshire Fire Marshal Investigator Chris Wyman (personal communication, February 12, 2009) states that if the fire is extinguished early, it reduces the amount of toxic gases produced, which increases chances of victim survival. The primary benefit of a residential sprinkler system is the fact that it has the capability of extinguishing the fire during the initial phase, prior to the fire advancing to the flashover phase. According to FEMA (2004), the advantages of a newly designed home sprinkler system are fast response from sprinkler heads; they react to lower heat levels and extinguish the fire in the incipient phase. Residential fire sprinklers (National Fire Sprinkler Association, 2003) have the potential to reduce the need for additional fire stations and potentially reduce firefighter staffing requirements. Allstate Insurance Agent Gerry Rowan (personal communication, January 6, 2009) states that water damage from accidental activation is covered by Allstate Insurance.

Advantages (Dmuchowski, p. 19) may exist for developers and home buildings such as reducing street width requirements, increasing distance requirements between fire hydrants, reducing water main size requirements, allowing more homes in a subdivision, and reducing the cul-de-sac turn radius requirements are some examples of such. Gerry Rowan from Allstate states that,

I always encourage customers to install fire detection and fire protection in new homes; I have had clients that have had their homes saved with much less damage due to automatic alarms. Currently, no such experience with fire sprinklers saving a home, but I

have the highest confidence that they will significantly reduce overall damage. (G. Rowan, personal communication, January 6, 2009)

Derry Battalion Chief Webb state that,

Instead of relying on financial arguments, we should focus on installing sprinklers as an ethical act. The problem with this argument is that we are the “Live Free or Die” state, and if we are having difficulty making ethical arguments for seatbelts and motorcycle helmets, it will be even harder to make them for sprinklers. (J. Webb, personal communication, December 29, 2009)

The National Association of Home Builders (2007) distributes information stating that the installation costs are significantly higher than organizations who favor residential sprinklers.

Installation costs can be high as \$5 to \$7 per square foot; homes in rural areas without municipal water connections may require extra pumps, a generator and water storage tank for the fire sprinklers to work effectively; and maintenance requirements can be onerous for many home owners. (p. 1)

Home Builders and Installation Contractors in the Greater Derry Area provided an average installation cost of \$2.20 per square foot. Homes with private wells average approximately \$1200 more for installation due to water holding tank and pump (D. Nintean, personal communication, January 6, 2009).

The Home Fire Sprinkler Coalition (2005) provides information relative to addressing common concerns with sprinkler systems, concerns such as: sprinklers operate all at once, flooding every room in the house; sprinklers will leak; smoke alarms are all you need; sprinklers cost too much; water damage from sprinklers is worse than the fire; sprinklers are ugly; and sprinklers will freeze in the winter. Home Fire Sprinkler Association (2005) notes that only the

sprinkler head near the fire area will discharge water onto the fire, other sprinkler heads will not activate unless required. Sprinkler heads have no additional leakage issues than routine plumbing installations. Nationally, a conservative estimate is that sprinkler system installation cost one to two percent of total building cost, and some of this is off-set by insurance premium reductions. Sprinkler heads are inconspicuous, often concealed behind ceiling color matching plates. Finally, sprinkler systems installed correctly should not freeze; anti-freeze additives are also available to address this concern to a greater degree of satisfaction.

The research discovered several references to freezing sprinkler pipes as a reason for concern. Several local fire service professionals and building contractors have had personal experiences with this concern in the Greater Derry Area. In addition, installation contractors note that these systems “need a holding tank in basement for homes with a private well, which takes up a lot of space” (E. Caron, personal communication, January 6, 2009).

The Derry Fire Chief and Battalion Chiefs provided a perspective with regards to cisterns that was consistent; cisterns are of limited value. Battalion Chief Webb (personal communication, December 29, 2008) explains that “if we cannot extinguish a fire with the amount of water that we arrive with, then we are going to need more water than any two or three cisterns can provide”. Battalion Chief Hoffman (personal communication, January 9, 2009) notes that each cistern requires two annual inspections, lawn mowing, snow plowing, and are eyesores to a neighborhood. Battalion Chief Doyle (personal communication, January 18, 2009) states that cisterns are non-effective. They are a reactive measure with regards to fire suppression. Cisterns are usually remote from fire scene, not well maintained, and of limited water supply. Battalion Chief Doyle describes cisterns as a band-aid on a bullet wound. Research suggests that if initial arriving apparatus are unable to extinguish a fire with water on-

board, then an infinite supply of water should be established to assure total extinguishment; and a cistern is not an infinite supply of water. Residential fire sprinklers extinguish a fire in the incipient phase or initial phase; cisterns are only utilized when the fire has progressed well beyond this point, often resulting in a total loss of the structure.

The Home Fire Sprinkler Coalition (2007a) has developed an informational packet reviewing the benefits of residential fire sprinklers. Information is provided for fire departments, code enforcement officials, elected officials, home builders, insurance companies, real estate agencies, sprinkler installation contractors, and home buyers. The Town of Derry (G. Sioras, personal communication, January 5, 2009) has approximately 6000 acres available for residential construction; which could result in as many as 2500 homes depending on zoning requirements. Wyman (personal communication, February 12, 2009) states that the State of New Hampshire had 32 fire related deaths in 2008, 19 of these were directly caused by the fire, and greater than 95% of these deaths occurred in residential occupancies. Wyman also notes that the Town of Derry has had nine fire deaths since 1972, with 100% of these deaths occurring in residential occupancies.

The researcher has direct responsibility for Department emergency operations including fire suppression. The results of this research indicate that residential fire sprinklers are a tremendous life safety benefit for home owners and firefighters. If the fire can be extinguished while in the initial phases; it greatly increases the survival chances for occupants of the home, and reduces danger for fire suppression personnel as well. The researcher understands that not all stakeholder groups support moving forward with enhanced comprehensive ordinance or State regulation language regarding residential fire sprinklers; however the benefits of these systems far outweigh the negatives. In the opinion of the researcher, several of the disadvantages of these

residential fire sprinkler systems as noted by the National Association of Home Builders are over exaggerated, and should not deter the Town from initiating more comprehensive ordinance language.

Recommendations

The problem for the Town of Derry, New Hampshire is that firefighter and civilian life safety may be compromised due to the lack of a comprehensive residential fire sprinkler protection ordinance. The purpose of this research was to identify the issues relative to a comprehensive residential fire sprinkler protection ordinance in the Town of Derry, New Hampshire. In an effort to assist with prioritizing continued action toward the reality of a comprehensive residential fire sprinkler ordinance for the Town, the following recommendations are presented in Table 5.

Table 5: Recommendations

Short-Term Goal	Obtain informational packets from Home Fire Sprinkler Coalition to assist with educating stakeholder groups
Short-Term Goal	Establish plan to educate all stakeholder groups in a coordinated effort
Short-Term Goal	Closely monitor International Residential Code (IRC) vote appeals and review decisions
Short-Term Goal	Encourage State Legislators to adopt IRC changes as approved; keep requirement for residential sprinklers in the document
Short-Term Goal	Encourage State Legislators to adopt the 2006 edition of the Life Safety Code as presented by the New Hampshire State Fire Marshall
Long-Term Goal	Convene stakeholder policy development group to assist with ordinance development if IRC vote or 2006 Life Safety Code is not adopted by the

	State of New Hampshire
Long-Term Goal	Continue to educate all stakeholder groups in a coordinated effort
Long-Term Goal	Encourage comprehensive ordinance language to reflect original intent of IRC vote if IRC vote or 2006 Life Safety Code is not adopted by the State
Long-Term Goal	Schedule workshop with Derry Planning Board to review proposed comprehensive ordinance regarding residential fire sprinklers
Long-Term Goal	Encourage Planning Board to approve comprehensive ordinance language
Long-Term Goal	Attend Planning Board public hearing on the proposed ordinance language and address stakeholder comments or concerns
Long-Term Goal	If Department fails to gain Planning Board approval, continue to educate stakeholder groups
Long-Term Goal	Reattempt to gain Planning Board approval of comprehensive ordinance language as soon as practical

Further research should be conducted regarding communities with residential fire sprinkler ordinances in place over a period of several years. The data from these communities should be assembled for information distribution purposes. Future readers of this research should evaluate their communities and determine how to implement residential fire sprinkler ordinances and then determine most effective methods to monitor effectiveness of ordinance with regards to life safety. In summary, Chief Klauber (personal communication, January 11, 2009) states, “the primary goal of the fire service is to protect life safety by reducing fire related

death and injury, residential fire sprinklers are an invaluable tool that allows us to meet our goals”.

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Appendix A

Feedback Instrument Analysis and Supplemental Documents

Mike Gagnon

From: Mike Gagnon
Sent: Monday, February 09, 2009 12:15 PM
To: Fire Alarm
Subject: FW: Assistance Requested
Attachments: Michael J Gagnon.vcf

From: Mike Gagnon
Sent: Monday, February 09, 2009 12:13 PM
To: 'Christopoulos, Chris'
Cc: Mike Gagnon
Subject: Assistance Requested

NHAFC Members,

Your assistance is appreciated with completion of this short feedback instrument regarding residential fire sprinklers. Only 5 questions; two minutes to complete. This information will be utilized to complete an NFA EFOP applied research project. Only one response per community please.

This can be accesses at: http://www.surveymonkey.com/s.aspx?sm=5Cpc0Zb2Wa_2b82CTeKZrFDw_3d_3d

Thank you,

Mike Gagnon

Michael J. Gagnon
Battalion Chief
Derry Fire Department
14 Manning Street
Derry, New Hampshire 03038
(603) 432-6751 -- Administration
(603) 537-9216 -- Administration Fax
(603) 432-6121 -- BC's Office
(603) 432-6752 -- BC's Fax
mikegagnon@ci.derry.nh.us
www.derry-nh.org

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Residential Fire Sprinklers - Feedback Instrument

Currently, I am working on an Applied Research Project for the Executive Fire Officer Program at the National Fire Academy. This Project is on Residential Fire Sprinklers. I appreciate your assistance in completing this short feedback instrument.

*** 1. New Hampshire Community Name?***** 2. Does your community currently have any form of residential fire sprinkler ordinance language?**

- Yes
 No
 Unsure

3. If you answered "Yes" on question #2 - Does the language include all newly constructed one and two family dwellings?

- Yes
 No
 Unsure

*** 4. Is your community interested in enhancing current language or developing residential fire sprinkler ordinance language in the future?**

- Yes
 No
 Unsure

*** 5. Name and Position of person completing feedback instrument.**

Name

Position

Residential Fire Sprinklers - Feedback Instrument Results	
#1 - New Hampshire Community Name?	
Answer Options	Response Count
	36
<i>answered question</i>	36
<i>skipped question</i>	0

Numbe	Response Date	Response Text
1	02/09/2009 17:33:00	Londonderry
2	02/09/2009 17:33:00	Milford
3	02/09/2009 17:33:00	Berlin
4	02/09/2009 17:43:00	Rochester
5	02/09/2009 17:43:00	MANCHESTER
6	02/09/2009 17:43:00	Newton
7	02/09/2009 17:47:00	Laconia
8	02/09/2009 17:49:00	Plymouth Fire-Resuce
9	02/09/2009 17:56:00	north hampton
10	02/09/2009 18:14:00	Durham
11	02/09/2009 18:14:00	City of Claremomnt
12	02/09/2009 18:14:00	Merrimack
13	02/09/2009 18:24:00	Sugar Hill
14	02/09/2009 18:41:00	Exeter
15	02/09/2009 18:47:00	Hopkinton
16	02/09/2009 18:59:00	Hooksett
17	02/09/2009 19:01:00	Newington
18	02/09/2009 19:02:00	Salem
19	02/09/2009 19:22:00	Loudon
20	02/09/2009 20:18:00	Hampstead
21	02/09/2009 20:25:00	Chester
22	02/09/2009 20:33:00	Stratham, NH
23	02/09/2009 20:42:00	Goffstown
24	02/09/2009 21:48:00	Gorham
25	02/09/2009 21:58:00	Barrington
26	02/09/2009 22:10:00	Dublin
27	02/09/2009 22:18:00	City of Keene
28	02/09/2009 22:21:00	New Ipswich
29	02/10/2009 00:08:00	Bethlehem NH
30	02/10/2009 01:34:00	Nashua
31	02/10/2009 20:18:00	Rindge
32	02/10/2009 20:40:00	New Boston
33	02/10/2009 22:33:00	Epping, N.H.
34	02/10/2009 23:08:00	Somersworth, City of
35	02/11/2009 15:16:00	Whitefield Fire Rescue
36	02/11/2009 16:21:00	Wolfeboro

#2 - Does your community currently have any form of residential fire sprinkler ordinance language?		
Answer Options	Response Frequency	Response Count
Yes	41.7%	15
No	58.3%	21
Unsure	0.0%	0
<i>answered question</i>		36
<i>skipped question</i>		0

#3 - If you answered "Yes" on question #2 - Does the language include all newly constructed one and two family dwellings?		
Answer Options	Response Frequency	Response Count
Yes	5.9%	1
No	94.1%	16
Unsure	0.0%	0
<i>answered question</i>		17
<i>skipped question</i>		19

#4 - Is your community interested in enhancing current language or developing residential fire sprinkler ordinance language in the future?		
Answer Options	Response Frequency	Response Count
Yes	61.1%	22
No	11.1%	4
Unsure	27.8%	10
<i>answered question</i>		36
<i>skipped question</i>		0

#5 - Name and Position of person completing feedback instrument.		
Answer Options	Response Frequency	Response Count
Name	100.0%	36
Position	100.0%	36
<i>answered question</i>		36
<i>skipped question</i>		0

Numbe	Response Date	Name	Position
1	02/09/2009 17:33:00	Kevin MacCaffrie	Fire Chief
2	02/09/2009 17:33:00	Frank Fraitzl	Fire Chief
3	02/09/2009 17:33:00	Randall Trull	City of Berlin Fire Chief
4	02/09/2009 17:43:00	Norm Sanborn	Fire Chief
5	02/09/2009 17:43:00	JAMES BURKUSH	FIRE CHIEF
6	02/09/2009 17:43:00	William Ingalls	Fire Chief
7	02/09/2009 17:47:00	Charles Roffo	Deputy Chief of Fire Prevention
8	02/09/2009 17:49:00	Tom Morrison	Deputy Fire Chief
9	02/09/2009 17:56:00	Lambert	Fire Chief
10	02/09/2009 18:14:00	Corey Landry	Chief
11	02/09/2009 18:14:00	Peter S. Chase	Fire Chief
12	02/09/2009 18:14:00	David Parenti	Assistant Chief
13	02/09/2009 18:24:00	Allan Clark	Fire Chief
14	02/09/2009 18:41:00	Brian Comeau	Fire Chief
15	02/09/2009 18:47:00	Richard Schaefer	Chief
16	02/09/2009 18:59:00	Michael Williams	Fire Chief
17	02/09/2009 19:01:00	Roy Greenleaf	Fire Chief
18	02/09/2009 19:02:00	Kevin J. Breen	Fire Chief
19	02/09/2009 19:22:00	Jeffrey Burr Sr.	Chief
20	02/09/2009 20:18:00	Will Warnock	Captain
21	02/09/2009 20:25:00	Rich Antoine	Fire Chief
22	02/09/2009 20:33:00	Robert Law	Fire Chief
23	02/09/2009 20:42:00	Richard O'Brien	Fire Chief
24	02/09/2009 21:48:00	Rick Eichler	Fire Chief
25	02/09/2009 21:58:00	Rick Walker	Fire Chief
26	02/09/2009 22:10:00	Tom Vanderbilt	Fire Chief
27	02/09/2009 22:18:00	Gary Lamoureux	Fire Chief
28	02/09/2009 22:21:00	David Leel	Fire Chief
29	02/10/2009 00:08:00	Jack Anderson	Chief Bethlehem Fire
30	02/10/2009 01:34:00	Richard Wood	Fire Marshal, Nashua Fire Rescue
31	02/10/2009 20:18:00	Rickard Donovan	Chief
32	02/10/2009 20:40:00	Dan MacDonald	Fire Chief
33	02/10/2009 22:33:00	Roswell J Galvin	Fire Chief
34	02/10/2009 23:08:00	Donald R. Messier	Fire Chief/EMD
35	02/11/2009 15:16:00	James P. Watkins	Fire Chief
36	02/11/2009 16:21:00	Thomas J. Zotti	Deputy Chief

Appendix B

Derry Fire Battalion Chiefs' Detailed Responses

Mike Gagnon

From: Mike Gagnon
Sent: Saturday, December 27, 2008 8:24 PM
To: DFD BATT CHIEFS
Subject: Gagnon - NFA EFOP Interview
Attachments: Michael J Gagnon.vcf

Derry Fire Battalion Chiefs,

The interview questions below are for my final applied research project at the NFA-EFOP. I thought it would be nice to have quotes from each of you in this final paper. Your assistance is greatly appreciated. The questions are as follows:

- 1 – Have you responded to any incidents where residential fire sprinklers activated? Outcome?
- 2 – Are you aware of any disadvantages regarding residential fire sprinklers?
- 3 – What are your feelings regarding the effectiveness of cisterns? Why?
- 4 – Would you support the fire department recommending more comprehensive ordinance language regarding residential fire sprinklers in the future? Why?
- 5 – Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced?

You may respond to these questions via email.

Thanks BC's – Your support with this EFOP endeavor has been tremendous – The end is near!

Mike Gagnon

Do your best, take care of each other, wear your seatbelt, and stop at redlights!

Michael J. Gagnon
Battalion Chief
Derry Fire Department
14 Manning Street
Derry, New Hampshire 03038
(603) 432-6751 -- Administration
(603) 537-9216 -- Administration Fax
(603) 432-6121 -- BC's Office
(603) 432-6752 -- BC's Fax
mikegagnon@ci.derry.nh.us
www.derry-nh.org

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Residential Fire Sprinklers
Derry Fire Department
Battalion Chief's Feedback Instrument

Battalion Chief David Hoffman Response

1. Have you responded to any incidents where residential fire sprinklers activated? Outcome?

Approximately eight years ago I responded to a building fire in a 28 x 44 2 story square foot residence, sprinkled, in the southern section of town. There was an approximately 6 minute response time. On arrival I found heavy fire from the garage under the house. As we started fire attack there was a moderate explosion of an acetylene tank in the basement. On investigation it was determined that the fire was started by approximately two gallons of gasoline spilled on the garage floor. The acetylene explosion destroyed the residential sprinkler plumbing. It was undetermined whether there was a head in the area of origin.

The second incident was an accident or vandalism. A head was broken off by a "balloon hitting" in a second story bedroom. Damage was limited due to rapid response and residential flow rate being calculated correct for the room and the occupancy.

2. Are you aware of any disadvantages regarding residential fire sprinklers?

At this time the disadvantage is resistance from uninformed public. The insurance industry could be more supportive of the residential sprinkler initiative.

In areas of cold weather they become another system that must be protected from freezing. They also present a possibility of water flow damage outside the normal utility chase ways. They may be seen as another maintenance expense or burden.

I have personally heard people state that the first time they are going to do when they move into their new house is to turn the sprinklers system off

3. What are your feelings regarding the effectiveness of cisterns? Why?

The system of multiple small cisterns is not effective in the Town of Derry. If the arriving company with 2000 to 11,000 gallons of water cannot handle the fire load another 3000 to 4000 gallons will not meet the required flow.

Mutual aid companies cannot be depended on to have trained personnel or the necessary adaptors.

Multiple cisterns are costly to maintain

- 2 annual inspectors of the water level
- Mowing and cleaning
- Snow removal
- Several sites are eyesores

A smaller number of properly located cisterns with larger amounts of water between 50 and 100,000 gallons of water would be more effective. The small number of cisterns engineered by the town would allow for better constructed sites that would be more effective.

4. Would you support the fire department recommended more comprehensive ordinance language regarding residential fire sprinklers in the future? Why?

Yes, a well written ordinance may help clear up language and close loop holes. It will also reduce the number of requests for exceptions. The ordinance will need clearly defined retrofitting and must include language that will not cause owners to delay remodeling or abandoned existing buildings.

The need for residential sprinklers is driven by an increased and changing residential fire loads, and the change in building materials to lightweight wood and composites. Also the large square foot

McMansion's and current great room craze leads to large compartments found in residential homes.

Two to three family homes will benefit by reducing the possibility of neighboring tenant's fire's destroying other's personal belongs.

5. Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced?

Mike, what I have done for this questions, I have identified some likely stakeholders and tried to identify some likely questions.

Firefighters- less fire, less work

Builders- expensive/ hot tubs sell houses, sprinklers don't

Realtors- expensive

Town and state-same as builder/realtor

Homeowner- I won't have a fire and would much rather has a hot tub

Installers-more money in hot tubs and faster

Repair/Maintenance people- not a necessary system, we can shut down and repair later

As they become more common they will become accepted. Remember that indoor plumbing was once considered unnecessary.

Although not as expensive, smoke detectors met some of the same resistance and arguments just 25-30 years ago.

Residential sprinklers must become a necessity and not an unneeded expensive burden.

Residential Fire Sprinklers

Derry Fire Department

Battalion Chief's Feedback Instrument

Battalion Chief Jack Webb Response

1 – Have you responded to any incidents where residential fire sprinklers activated? Outcome?

No. But I have had two fires that were either controlled by or extinguished by a “accidentally” sprinkler.

In August of 2007 at 13 Ela Ave, a basement fire was contained, further horizontal fire spread was stopped, and vertical fire spread was limited when the fire caused the solder on a cold water pipe to melt and the pipe separated becoming an accidental sprinkler.

This occurred again at 82 Overledge on December 13, 2008. At this fire the occupant was not home, and had left a candle burning in the downstairs, utility room, in a split level. The candle ignited cardboard boxes and plastic storage boxes, the fire burned through the hollow core door, causing severe smoke damage throughout the house. Eventually the fire melted the solder on a water pipe in the utility room, causing an accidental sprinkler that fully extinguished the fire. The homeowner returned several hours after the fire to find severe smoke damage in the entire house, but actual fire damage was limited to the utility room.

2 – Are you aware of any disadvantages regarding residential fire sprinklers?

No. The two cases listed above caused over \$160,000 in property and contents damage, mostly from smoke. If these two homes had had a NFPA 13D residential sprinkler system, then that system would have triggered much earlier, preventing not only fire damage, but the damage from smoke. The fire at 82 Overledge drive had about \$110,000 in damage from thick plastic smoke that coated floor to ceiling. If there had been a sprinkler, it would have flowed unattended for several hours and at most would have caused \$2000 +/- in water damage, mostly confined to the utility room, and adjacent carpeting.

I have been to several fires that a residential sprinkler may not have been effective. These fires start as partition fires and move to the attic. A fire in a two family, also on December 13, 2008, at 88 Rockingham Road was an example of this. The fire started because of failure of a chimney and moved from an interior partition up into the attic. The fire did extensive damage to interior wall structures on several floors, but was contained by the sheetrock and flooring and did not break out of the wall until after the attic was heavily involved in fire.

3 – What are your feelings regarding the effectiveness of cisterns? Why?

In general I find them to be of little use. Most of our cisterns are between 5,000 and 8,000 gallons.

When we arrive at a house fire and declare a working fire we will have 8000 gallons of water in responding tankers and an additional 4000 gallons in the responding engines. If we cannot extinguish a fire with that amount of water then we are going to need more water than any two or three cisterns can provide. I would rather have tankers drive by a cistern and get filled at a hydrant or draft site that is farther away, but will provide large amounts of water than go to a cistern that might only fill two tankers before the water supply engine has to break it down and move to another.

4 – Would you support the fire department recommending more comprehensive ordinance language regarding residential fire sprinklers in the future? Why?

Yes, they are a proven technology that reduces damage and prevents injuries.

5 – Any recommendations for obtaining buy-in approval from stakeholders if more comprehensive language were introduced?

This could be difficult, because it represents a cost item that combined with the current economic slump in housing could negatively affect the margin for the builder/developer. According to the NAHB the average cost to the homebuyer of a sprinkler system is \$6700, which makes any reduction in insurance costs negligible. The National Association of Home Builders unsuccessfully appealed (to the ICC Board of

Directors)the inclusion of residential sprinklers in the 2009 ICC/IBC code (12/23/2008). I suspect they may try legal action to halt the code. If that occurs then I do not see any buy-in from builders/contractors. Instead of relying in financial arguments, I would focus on installing sprinklers is an ethical act. The problem with this argument is that we are the “Live Free or Die State” and if we are having difficulty making the ethical arguments for seatbelts and motorcycle helmets, I think it would be even harder to make them for sprinklers.

Residential Fire Sprinklers

Derry Fire Department

Battalion Chief's Feedback Instrument

Battalion Chief Michael Doyle Response

1. Yes, I have. As a company officer I was dispatched to a multi-family for a water problem. Two teenage boys were roughhousing when then hit the sprinkler head in a bedroom causing the system to flow. The outcome was a very upset mother, and some water damage.
2. The only concern I would have is if a sprinkler installation contractor should install piping in a area that is not insulated. Recently here in New England, this occurred in a senior citizen complex, a week of sub -zero weather resulted in significant water damage to multiple housing units due to frozen pipes which burst.
3. I believe they are non-effective. They are a reactive measure in my opinion, with regards to fire suppression. Usually they are remote from the scene, Not well maintained, manpower & apparatus intensive, with a limited supply. A "Band-Aid on a bullet wound".
4. Yes I would. They are a proven and effective method of reducing fire loss.
5. Educate the public; inform them of cost savings for homeowners insurance, safety and peace of mind; I consider residential sprinklers "My own personal firefighters, a firefighter in every room!"