Sprinkler Systems in Multi-Family Common Attic Spaces, Is There a Need?

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CERTIFICATION STATEMENT

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed: _____

Abstract

The Irving Fire Department has become very proficient at fighting multifamily apartment fires. The reason we have become so good at this aspect of our profession is because the City of Irving seem to have more than their fair share of these types of fires. The purpose of this applied research project is to investigate what impacts attic fires in multi-family dwelling have had on the citizens of Irving and determine if a new city ordinance needs to be adopted. A descriptive research method was used to answer the following four questions: what has been the impact to the City of Irving and its citizens for attic fires in multi-family dwellings for the time period of 2009-2014, what cities in the Dallas and Fort Worth Metroplex have a city ordinance addressing installation of sprinkler systems in the common attic space of multi-family dwellings, what insurance premium incentives have insurance companies implemented for newly constructed multi-family dwellings that have installed sprinkler system in the common attic spaces, and what insurance premium incentives have insurance companies implemented for retro fitting multi-family dwellings with sprinkler systems in the common attic spaces?

The literature review shows overwhelming support for stricter laws requiring sprinkler systems in residential occupancies. However, the political battle continues from local city councils to state legislatures because home builders are resisting this transformation. The proponents need to be persistent in their quest to see this law come to fruition, after all, the benefits of sprinkler systems have been realized for more than one-hundred and forty years.

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Irving was founded in 1903 and was officially incorporated April 1914. During the infancy days the City of Irving focused on its infrastructure and connections with utility companies for its residences. Irving organized a volunteer fire department and "in 1925, the City Commission appointed Frank Pate the town's first fire marshal. When there was a fire, Pate fired six shots with his pistol to call volunteers to the station" ("Irving's History," n.d., p. 1). Irving has grown to a population of close to 230,000 in the past 100 years, making it the 13th largest city in Texas, and has established itself as a major metropolitan city in our nation.

The City of Irving has residential property for its community in both the single family and multi-family dwelling occupancy types. Like most municipalities, the builders construct residences that meet the demand of their customers. Unfortunately, the customers are focused on the layout, interior design, and convenience of their future home and not the safety and security of their family and property. The consequences of the uneducated home buyer or renter could lead to the loss of property and even life. Multi-family residents have an even greater risk of these losses because the incidents can be caused by any of the residents and it will affect them all.

The impact of a fire in a multi-family resident can be devastating to the families who live there and the communities they reside in. Many occupants in multi-family residences do not have any insurance for their personal property because of their financial challenges or other priorities take precedence at the time. The City of Irving has many multi-family residences that are attractively constructed and most of them are well maintained. Our multi-family sprinkler ordinance requires protection for living areas, but the attic space is unprotected and currently not required to be sprinklered. Since the attic space is unprotected, when an uncontrolled fire

establishes itself in this space it has had free reign to cause major damage to the structure and as a result a huge impact to our community.

Considering the amount of potential damage that can take place when the fire gets into the structure and reaches the attic space one must question if more can be done. The purpose of this applied research project is to investigate what impacts attic fires in multi-family dwelling have had on the citizens of Irving and determine if a new city ordinance needs to be adopted. The research questions that need to be asked are: 1) what has been the impact to the City of Irving and its citizens for attic fires in multi-family dwellings for the time period of 2009-2014, 2) what cities in the Dallas and Fort Worth Metroplex have a city ordinance addressing installation of sprinkler systems in the common attic space of multi-family dwellings, 3) what insurance premium incentives have insurance companies implemented for newly constructed multi-family dwellings that have installed sprinkler system in the common attic spaces, 4) What insurance premium incentives have insurance companies implemented for retro fitting multi-family dwellings with sprinkler systems in the common attic spaces?

A descriptive research method will be used to develop a new sprinkler ordinance, if needed, and to answer four research questions that will help to reduce the risk of families losing their homes and personal property due to fire loss involving the common attic space. An analysis will be completed to bring about an awareness of what percentage of the City of Irving's residential population currently reside in multifamily occupancies and the impact they have endured do to not having sprinkler systems in the common attic space.

Background and Significance

The Irving Fire Department (IFD) is a career fire department comprised of 308 civil service uniformed personnel and 9 general government employees. The IFD consist of 11 fire stations, fire and police training facility, public education facility and a fire administration building that consist of administration and support staff, property distribution center and the headquarters for fire prevention. The IFD operates on a $36 million dollar budget for fiscal year 2014-2015 and answers more than 23,000 calls for service annually.

The IFD also has several specialty teams and programs that are well trained and capable of protecting and serving the community. Some of the programs IFD offers the surrounding community is a bike medic team, critical incident stress management team, honor guard team, and tactical medic team that respond with the police departments SWAT team. The teams that are trained to the technician level are the Hazardous Material Team, Technical Rescue Team, and the Swift Water Rescue Team. Like most fire departments the IFD steps up and fills the gap to keep our community safe and should really be called an all hazards mitigation department instead of a fire department. The IFD is proud to serve the citizens of Irving and believe constant training and improvement is the best way to meet the needs of a city and its citizens. The City of Irving is constantly improving and protecting its image so they can stay competitive in the corporate partner world which reinforces the competitive spirit of the fire department.

The City of Irving is conveniently located immediately adjacent to DFW International Airport and between the cities of Dallas and Fort Worth. Irving is one of the largest cities in the Metroplex. The City of Irving has incorporated 67.6 square miles of real estate and “is the home to over 8,500 local and multi-national companies, and Five Fortune 500 companies operate global headquarters in Irving” ("Economic profiles / demographics," 2012, p. 1).

The ethnic diversity and education of the City of Irving's demographics in 2010 was "30.8% White, 41.1% Hispanic, 12.3% African-American, and 14% Asian. More than three-fourths of the city's population is educated above the high school level, with almost 33.3% having a Bachelor's degree". ("State & County QuickFacts," n.d., p. 1). The City of Irving is a very diverse community that enjoys the benefits of growth and prosperity regardless of race or cultural differences. It is estimated that the City of Irving's population will reach close to 280,000 by 2030.

In the late 1970's and throughout the 1980's Irving was a gold rush for multi-family apartment contractors. Irving currently has close to 300 apartment complexes within its city limits. According to the US Census Bureau Irving has an estimated "91,128 housing units and 54.5% of them are multi-family dwellings" ("State & County QuickFacts," n.d., p. 1). Many of these apartments were constructed prior to the adoption of the first sprinkler ordinance. The City of Irving adopted their first multifamily sprinklering requirements, Ordinance 6152, on August 6, 1992 and amended the 1991 Uniform Building Code (UBC) according to the director of building codes (G. Miller, personal communication, March 3, 2015).

The largest fire loss, year in and year out, in the City of Irving is multifamily dwellings and more specifically apartments. When these apartment fires reach the attic, the majority of the time, they do cause significant structural and material damage. "An attic fire is started under the roof and will inevitably involve all of the roof that is accessible to the spread of flames beneath it. Thus, it is likely that the entire roof is either burned away or that destruction is very widespread" (DeHaan, 2007, p. 291). In the year of 2014 the Irving Fire Department responded to 18 apartment fires for a total structure dollar loss of $5.4 million dollars and 45% of these fires reached the attic space and caused an estimated 86% of the total dollar loss or $4.65 million

dollars' worth of structural loss. What we are experiencing locally seems to be in line with the national statistics as well, "the death trend in multifamily buildings was up 35 percent and injuries increased 4 percent. Adjusted dollar losses were up 21 percent in multifamily buildings. Property losses in multifamily residences continued the overall national upward trend" ("Residential Structure and Building Fires," 2008, p. 53). A lot of resources are utilized for these emergencies but an ounce of prevention could go a long ways in protection.

An entity that affects the firefighting professions by dictating how residential occupancies are constructed is the building construction industry. The more common building standards utilized by municipalities in Texas is the International Building Code and/or Underwriter Laboratories. During the 2009 Texas Legislative Session there were some heated discussions between fire chief officers and home builders for installation of sprinkler systems in residential structures. According to Roland Garcia with the Pearland Fire Department some of the reasons from the home builders to not install sprinkler systems are "smoke alarms provide adequate safety and protection from fires and sprinklers are not needed, water damage from sprinklers increase dollar loss in fires, sprinklers will price potential homebuyers out of the new home market" (Garcia, 2013, slide 20). Garcia goes on to say "15% of potential homebuyers are willing to pay for installation of fire sprinklers and 34% of potential homebuyers will choose fire sprinklers as a free option" (Garcia, 2013, slide 23). However, the National Fire Protection Association (NFPA) posted the following on their website "In 2013 home structure fires caused 83% of the civilian fire deaths and 78% of the civilian fire injuries" (National Fire Protection Association [NFPA], 2013, p. 1). The NFPA website goes on to say "Sprinklers decrease the fire death rate per 1,000 reported home fires by about 80% and the average loss per home fire by about 70%" (NFPA, 2013, p. 2).

One way that our building codes have tried to help through prevention is with fire walls. The gypsum industry has marketed their products remarkably well to promote drywall partitions instead of masonry for fire walls in multifamily dwellings. However, it is well documented that the gypsum fire wall usually does not hold up past the construction phase before holes are punched through it for wires, air ducts, or anything else that is deemed necessary to go through to the other side. "Unfortunately, the use of fire-rated gypsum board in fire-resistive enclosures has created a myth about an almost magical ability of gypsum board to limit the extension of fire" (Brannigan & Corbett, 2008, p. 255).

On the other hand, Masonry firewalls are usually pretty stable and dependable to assist in slowing down an advancing fire but there has been documented issues with them as well. "One of the primary defects involves not bringing a masonry firewall through the roof with a masonry parapet. Builders resist this because it is costly, and unless the wall is flashed properly, there can be leaks" (Brannigan & Corbett, 2008, p. 257) Remodeled roofs, especially going from a flat to a pitched, have been known to be constructed where the new roof extends around the fire wall that penetrates the roof or "permitting overhangs or mansards to project beyond the firewall is another defect in firewalls" (Brannigan & Corbett, 2008, p. 257).

Another issue with older multifamily dwellings is the timber in the attic space has been exposed to heat for many, many years and it has dried the timber out to a point that it is a desired fuel source for any uncontrolled attic fire. The "attics are ventilated to prevent condensation. There is a constant natural air flow upward through the lower vent, out the upper vent, generally at the highest point of the gable vent" (Brannigan & Corbett, 2008, p. 256). The attic space is designed to stay dry and have plenty of ventilation to keep air moving and materials dry. This makes the attic a prime location for a fire to spread quickly. "Dry wood is more readily ignited

than wood with a higher moisture content. Continuous or even recurrent exposure to raised temperatures will dry wood with the result that the ignition temperatures may be somewhat lowered" (DeHaan, 2007, p. 107). Raised temperatures is what wood in the attic space is continuously exposed to in the south and it is one of the reasons attic fires are so devastating.

In spite of all the material possessions that a fire can and does destroy the worst is always that it can cause injuries and take human lives. Multifamily housing possess higher risks for all who live in these residences. There are more potential ignition sources, different levels of safety minded residents, and construction features that are less forgiving to the destruction of fire. In 2013 there were "487,500 structure fires, causing 2,855 civilian deaths, 14,075 civilian injuries, and $9.5 billion in property damage" ("Fires in the u.s.," 2015, p. 1). In 2013, there were "56 Firefighter fire ground fatalities, 24 were due to burns, 16 were due to internal trauma or crushing, seven to sudden cardiac death, eight to asphyxiation or smoke inhalation, and one to electrocution" (Fahy, LeBlanc, & Molis, 2015, p. 1). These deaths and injuries did not all happen at multifamily residence but they did transpire at single and multifamily residents. There is a definite need to look at sprinkler systems in the attic spaces of multifamily dwellings.

The results of this research has the potential to touch all five of the goals of the United States Fire Administration (USFA). But the most impactful one will be goal 1, which states "reduce risk at the local level through prevention and mitigation" (United States Fire Administration [USFA], 2009, p. 18). The objectives within this goal encourages "the State, local, and tribal adoption of risk reduction, prevention, mitigation, and safety strategies and encourage code development, compliance, safe building design, and infrastructure resilience" (USFA, 2009, p. 18).

In conclusion, it is the goal of this research to determine if an updated city ordinance would be beneficial to the community. The "Structural Change Models with the following steps in the analysis, planning, implementation, and evaluation (APIE) Model" (USFA, 2013, p. SM 5-3) will be utilized from the National Fire Academy Executive Development course if it is determined that the ordinance revision is necessary. The driving force for conducting this research is to decide if a more stringent sprinkler ordinance is crucial. With the installation of a sprinkler system in the attic space of multifamily residents the largest property loss due to fire degradation can be cut to a fraction of its current level and lives of citizens and firefighters will have another level of protection.

Literature Review

The literature review utilized a review of departmental data, books, and web-based literature, information collected from other municipalities and insurance companies as well as local ordinance. The primary focus of the research is centered on the impact of attic fires in multifamily dwelling structures and the extensive damage it has caused as well as the financial burden to the citizens of Irving, Texas. The important thing to remember is there will be information and data in the following pages that will come from other sources that may present another perspective and/or may give a more comprehensive viewpoint of the perceived problem with attic fires. A descriptive research method will be utilized because it "requires the collection of data to answer questions concerning the current status of the subject of the study; how things are at the present time" (USFA, 2013, p. SM 1-21). First of all to gain a better understanding we need to comprehend the current sprinkler standards as published by the National Fire Protection Association.

The two standards that are applicable for residential occupancies are NFPA 13R and NFPA 13D. However, the one most applicable for multifamily dwellings is NFPA 13R. NFPA 13R "was published in 1989, it represented a milestone in the development of sprinkler installation design standards. The first edition resulted in a standard for the protection of low-rise residential facilities" (*NFPA 13R*, 2011, p. 13R-1). The standard goes on to say "promulgated as a document that provides for increased levels of protection to building occupants, the document also considers the economic aspects of a sprinklered facility as compared to an unsprinklered facility" (*NFPA 13R*, 2011, p. 13R-1). This standard has been updated and revised multiple times as new information, clarification on the scope of the standard, and as new construction features were implemented. The latest edition of NFPA 13R is the 2013 edition and it was revised for a few reasons to include updating "the title to address low-rise residential occupancies instead of addressing the number of stories outlined in the document scope. Several sections were added to address the concept of shadow areas in different configurations within NFPA 13R protected structures" (*NFPA 13R*, 2011, p. 13R-2). So as time moves forward and construction features change and safety issues present themselves this document has shown a history of being updated and an expectation to continue this practice into the future.

"It's important to note that NFPA 13R: Standard for the Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories in Height does allow for certain areas to be unsprinklered within the given type of building"(Jakubowski, 2012). The words within this quote that deserves to be highlighted and stressed are does allow. The Standard has areas that it allows owners to not install sprinkler protection for the property. The following

studies will be centered around sprinkler system installation and the various parameters that the studies are based upon.

> Scottsdale, AZ, has conducted a detailed 10 year study on the impact of residential fire sprinklers on their community. In June of 1985, the City of Scottsdale passed a comprehensive fire sprinkler ordinance which required all new multi-family and commercial structures to be protected by sprinklers. The results of the study held some surprises. Surveys of the home insurance companies in the Scottsdale area yielded an average discount of 10% for homes with residential sprinkler systems installed. The author goes on to say "In more than 90% of the incidents, the fire was controlled with 1 or 2 sprinklers activated. Most importantly, the study indicates that at a minimum 8 lives were saved in these fires by the residential sprinkler systems. This study is yet another measure that demonstrates with real world experience how sprinklers can decrease the amount of property damage from both the fire and the suppression of the fire, while providing improved life safety.(Madrzykowski, 2002, p. 13)

The National Institute of Standards and Technology (NIST) conducted a study titled *Benefit-Cost Analysis of Residential Fire Sprinkler Systems.* This study was to look at the installation cost and the projected outcome of installing a sprinkler system in a residential occupancy. The study states "in 1984, evidence suggested that sprinkler systems were not cost-effective, perhaps explaining the relatively small number of houses equipped with fire sprinklers today, even while fire professionals maintain that such systems protect lives and property from fire" (Butry, Brown, & Fuller, 2007, p. ES-1). The NIST study goes on to say "over the past two decades, advancement in the performance and cost-structure of fire sprinkler technologies have occurred, altering the cost effectiveness of fire sprinkler systems" (Butry et al., 2007, p. ES-1).

This is a very comprehensive study utilizing data from National Incident Reporting System and an annual survey of fire departments conducted by the NFPA. The results of residential sprinkler systems speak for themselves,

> Over the 2002 to 2005 study period, houses equipped with smoke alarms and a fire sprinkler system experienced 100 % fewer civilian fatalities, 57 % fewer civilian injuries, and 32 % less direct property losses and indirect costs resulting from fire than houses equipped only with smoke alarms. In addition, homeowners of dwellings with fire sprinkler systems received an added bonus of an 8 % reduction in their homeowner insurance premium per year, according ISO. (Butry et al., 2007, p. ES-1)

The bottom line is this study showed that the installation of residential sprinkler systems are cost effective and economical. The table below is a more conclusive look at their results.

Table ES-1. Summary of Baseline Benefit-Cost Analysis of a Multipurpose Network Residential Sprinkler System for the Colonial, Townhouse, and Ranch House.

Benefits	Colonial	Townhouse	Ranch
Fatalities Averted	3725.57	3725.57	3725.57
Injuries Averted	224.74	224.74	224.74
Direct Uninsured Property Losses Averted	79.64	79.64	79.64
Indirect Costs Averted	15.93	15.93	15.93
Insurance Credit	948.41	948.41	948.41
Benefit Subtotal Costs	**4994.29**	**4994.29**	**4994.29**
Installation (50 % Markup)	2075.08	1895.17	828.66
Costs Subtotal	**<2075.08>**	**<1895.17>**	**<828.66>**
Net Present Value	**2919.2**	**3099.11**	**4165.62**

(Butry et al., 2007, p. ES-2)

The executive summary of the NIST study concludes by stating residential sprinkler systems have improved dramatically over the past twenty years and between the sprinkler system performances coupled with the life cycle has made residential sprinkler system very cost effective and financially prudent.

After getting written permission from the designated contact, see Appendix H, the following special study was conducted by the National Association of Home Builders (NAHB) on fire sprinklers impact to insurance premiums. This study was conducted September 2007 with the following questions to be answered "To what extent are sprinklers able to prevent injuries or property damage due to fire? Is it enough to justify the added cost of sprinklers?" and if the added cost is justified there were a couple follow up questions, "what is the impact on housing affordability, and are there any factors that can help offset the added cost?" (Xu, 2007, p. 1).

The study considers the viewpoints of builders, fire sprinkler proponents, and the insurance companies. From a builders perspective the additional cost would be justified if they could "show that monetary savings existed to offset, or almost offset the added upfront costs of installing fires sprinklers" (Xu, 2007, p. 1). The study goes on to state "builders in that case would be able to install sprinkler systems in most new homes and market the sprinklers effectively to prospective buyers as an added safety feature that pays for itself" (Xu, 2007, p. 1). The National Association of Home Builders conducted some research to support this claim. The survey included 102 builders who built more than 5,500 homes in 2006. "The survey results show that the median cost of installing fire sprinklers in the 5,527 homes was about $5,573. The median size of the surveyed homes was 2,271 square feet" (Xu, 2007, p. 3) this is about a $2.45 per square foot cost.

Since proponents claim an insurance reduction pays for the cost of installing the residential sprinkler system this study wanted find out if this was in fact true. From an insurance companies point of view the systems may have their pros but they also have their cons. “Savings to insurance companies occur if sprinklers extinguish fires in their early stage or contain fires until the fire fighters get to the scene —resulting in reduced injuries, deaths, and property damage” (Xu, 2007, p. 1). The study goes on to say that “additional costs may occur if sprinklers discharge accidentally and cause unnecessary water damage” (Xu, 2007, p. 1). From the data that was collected in this study the cost of the sprinkler systems are not negated by insurance savings; furthermore, it could even cause a negative impact on the sale of the new homes.

The study broke down the residential sprinkler systems into two classes, an A and a B and got prices for each with various insurance companies. The classes were defined as

> Class A, where automatic sprinklers are installed in all areas including bathrooms, attics, closets, and attached structures; and Class B, where automatic sprinklers are totally or partially omitted in bathrooms, attics, closets, and attached structures. Insurance usually, but not always, offers different discounts for each type of system. (Xu, 2007, p. 2)

The study had a chart that estimated insurance premium discount percentages from the major companies and it was broken down for each state. For example in Texas “State Farm offered a 10% for Class A and 5% for Class B, Allstate 2% for Class A and 0% for Class B, and Farmers 10% for Class A and 5% for Class B”(Xu, 2007, table 1). Unfortunately for homeowners, insurance discounts are usually capped at about 20%, according to this study, and with other safety devices, i.e. smoke detectors, being installed in the new home the incentive of installing a

sprinkler system for insurance premium savings could be extremely small or nonexistent (Xu, 2007, p. 2).

Table 2 shows the installation cost along with other associated fees that cause a financial impact to the bottom line of home builders.

Table 2. Median Costs Associated with Sprinkler Systems

Installation Cost	$3,744
Additional Cost By Category	
Fire Sprinkler Permit Fee	$198
Fire Sprinkler Design Fee	$593
RFS Water Service Pipe Changes	$866
RFS Water Meter Changes	$172
Total Additional Cost	$1,829
Total Cost to Builder	$5,573

Source: NAHB Research Center 2007 Fire Sprinkler Survey (Xu, 2007, p. 12)

The study states that not all insurance companies offer reduced premiums for having a sprinkler system, but a lot of them do. In addition, if the cost of sprinkler systems were to come down to, or less than, the cost of an annual insurance premium on the newly constructed home then builders would be more inclined to add this feature. "If achieved, it would allow the market to provide sprinkler systems in most new homes without adversely affecting affordability. Local governments could make a contribution toward achieving this by not increasing permit, tap, or other fees on homes" (Xu, 2007, p. 4).

Lastly, to reference the one document that has spear headed the fire prevention and education as much or more than any other study, *America Burning*. A Commission on Fire Prevention and Control was established and many recommendations came from this committee. The Chairman, Richard E. Bland, wrote a letter on behalf of the board to The President, Richard M. Nixon, highlighting the fact that "Over $11 billion of our resources are wasted by destructive

fires each year. Additionally, 12,000 people are killed and tens of thousands of persons are scarred physically and emotionally by fire" (*America burning*, 1973, p. viii). The emphasis of this opening letter lays out the effects of fire during that time, recommendations to address the problems, and the responsibility of the Federal Government to remain focused on the problem moving forward. One of the aspects that received attention by the Commission is "the fire protection features of buildings need to be improved", which goes on to say, more specifically, "there is a need for automatic fire extinguishing systems in every high-rise building and every low-rise building in which many people congregate" (*America burning*, 1973, p. xi).

In Chapter 4 of the report, planning for fire protection, it states "excellent fire protection in the form of automatic extinguishing systems – lies within technical grasp, and certainly lies within the resources of most communities to provide" (*America burning*, 1973, p. 27). In addition, Chapter 11's code and standards topic speaks of the Roman laws and how they regulated the height of buildings and the distance between them and how the Spanish province, in Louisiana, in 1796 passed an ordinance against wood roofs in New Orleans (*America* burning, 1973, p. 79). In a country where liberty is regarded as a precious commodity the public was, and is, willing to sacrifice these intrusions on liberty for the sake of life safety through strict code requirements.

In many areas of this report the same comments and perspectives given then still applies today, over forty years later, such as "the present state of fire protection engineering does not leave today's building designer in a condition of helplessness. Much of what is known about fire safety is simply being ignored" (*America burning*, 1973, p. 89). However, we have made some progress in sprinkler system cost efficiencies which was an objective from this report, "research and development are needed toward automatic extinguishing systems that will be cheap,

aesthetically acceptable, and adaptable to existing homes as well as new construction"(*America burning*, 1973, p. 136). The following statement from the report deserves more discussion and follow through, "automatic extinguishing systems in residences would not only save lives and reduce direct losses from fire, but would also reduce other expenses to the Nation, such as the costs of treating burn and smoke injuries, and insurance costs"(*America burning*, 1973, p. 136).

The purpose of this literature review was to evaluate some of the studies that have been conducted and determine if they have had an influence in shaping where we are now in regards to residential sprinkler systems. However, obtaining data and information for multifamily dwellings that have sprinkler systems in the attic space was challenging and minimal at best for the writer. Knowing that sprinkler systems were invented over one-hundred and forty years ago this writer expected to locate more pertinent data and information for the specific topic. The one underlying theme through the studies referenced in the literature review is as a Nation we are making progress at a snail's pace, but moving forward none the less. In 2003 meeting of the United States Fire Administration the following policy statement was developed to magnify a commitment and to reinvigorate motivation towards the National Residential Fire Sprinkler Initiative, "The United States Fire Administration advocates the use of automatic fire sprinklers to save lives, reduce injuries, and protect property. Based on an identified history of success, this technology should be employed in all residential occupancies" (Milke, 2003, p. 2). The data and information is conclusive that fire sprinkler systems save lives and property and in return reduces insurance and healthcare costs. The challenge will be modifying our Class B systems to Class A's and requiring the Class A's system in new construction of multifamily residential dwellings.

Procedures

This descriptive research project addresses four specific questions related to sprinkler systems in the attic space of multifamily residential dwellings. The following questions were crafted to get specific information on this project:

1) What has been the impact to the City of Irving and its citizens for attic fires in multi-family dwellings for the time period of 2009-2014?

2) What cities in the Dallas and Fort Worth Metroplex have a city ordinance addressing installation of sprinkler systems in the common attic space of multi-family dwellings?

3) What insurance premium incentives have insurance companies implemented for newly constructed multi-family dwellings that have installed sprinkler system in the common attic spaces?

4) What insurance premium incentives have insurance companies implemented for retro fitting multi-family dwellings with sprinkler systems in the common attic spaces?

The Irving Fire Department has put forth an enormous amount of resources, at the expense of tax-payers, to respond to and mitigate structure fires located in the attic space of multifamily dwellings. The descriptive research method was used to put together two different questionnaires one survey for insurance companies, that are licensed to operate in the State of Texas, and a second survey for municipalities in the Dallas/Fort Worth Metroplex. The descriptive research method search was performed using the World Wide Web to access the Texas Department of Insurance for a listing of major insurance companies to send the questionnaire to. The second questionnaire for the municipalities was sent with permission of the association president to a member listing of the Fire Prevention Association of North Texas

(FPANT). The findings are presented in this applied research project using the Publication Manual of the American Psychological Association, 6th edition (American Psychological Association, 2010).

The first question was: what has been the impact to the City of Irving and its citizens for attic fires in multi-family dwellings for the time period of 2009-2014? This question presented challenges because collecting data from one source proved to be inconclusive, so several were utilized. Several personnel, who had administrative privileges, were burdened with this request but they all respectfully collected the data and information without voicing apprehensions. The writer realized by sharing the end goal with the responsible personnel they were more than willing to assist in hopes of a positive result. Appropriate data and information for the first question required extensive research using National Incident Reporting System, Computer Aided Dispatching data, Irving Fire Department's Annual Reports, and Irving Fire Department's Records Management.

The second question was: what cities in the Dallas and Fort Worth Metroplex have a city ordinance addressing installation of sprinkler systems in the common attic space of multi-family dwellings? This question was addressed by sending out a survey utilizing the FPANT regional association in the form of three closed-ended questions.

1. Does your city's fire code ordinance require a sprinkler system in newly constructed multi-family dwellings **common attic spaces**?
2. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces**?
3. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces** when certain criteria is met? For

example, the apartment complex is taken over by new ownership thereby requiring a new Certificate of Occupancy.

The third question was: what insurance premium incentives have insurance companies implemented for newly constructed multi-family dwellings that have installed sprinkler system in the common attic spaces? For this question the writer had to log onto the Texas Department of Insurance (TDI) website and select the major insurance companies to ask this question to. The questionnaire was emailed, by the writer, to the contact person identified on the website.

The driving force behind limiting it to major insurance companies was the simple logic of if they cannot afford to offer this discount then the smaller companies more than likely would not either. In order for the data to be collected on this question the following questions was part of the questionnaire:

Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having installed a sprinkler system in newly constructed multi-family dwellings common attic spaces?

a. If yes, can you send some details on the premium discount specifications?
b. If no, would you consider implementing one?

Note: Multi-family dwellings include more than one apartment, condominium, or townhouse sharing a common attic space. These multi-family dwellings could be more than one story in height and are located within the city limits of Irving, Texas.

The fourth question was: what insurance premium incentives have insurance companies implemented for retro fitting multi-family dwellings with sprinkler systems in the common attic spaces? This question was included in the same process as the third question listed above and emailed by the writer to the contact person listed on the TDI website. So, the same insurance

companies that were identified for question three was utilized for question four. The major insurance companies were identified using the Texas Department of Insurance website. In order for the data to be collected on this question the following questions was part of the questionnaire:

Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having retro-fitted a sprinkler system in the common attic spaces of previously constructed multi-family dwellings?

a. If yes, can you send some details on the premium discount specifications?

b. If no, would you consider implementing one?

Note: Multi-family dwellings include more than one apartment, condominium, or townhouse sharing a common attic space. These multi-family dwellings could be more than one story in height and are located within the city limits of Irving, Texas.

The limitation of emailing survey questions is the lack of respondents. The writer experienced difficulties getting municipalities and insurance companies to respond to the questionnaires. However, there seems to be sufficient data and information to be beneficial for an applied research paper.

Results

The results of this applied research project are answered using the descriptive research method. The literature review was utilized to answer four questions posed. The first question was: what has been the impact to the City of Irving and its citizens for attic fires in multi-family dwellings for the time period of 2009-2014? Appropriate data and information for the first question required extensive research using National Incident Reporting System, Computer Aided

Dispatching data, Irving Fire Department's Annual Reports, and Irving Fire Department's Records Management.

The data shows that between resources used and losses received from fire degradation the City of Irving spent a large sum of money fighting fires with personnel and equipment resources, water usage, and loss of property. A large portion of these losses could have been reduced significantly with a sprinkler system in the attic space of multifamily residences. The literature review section revealed information that sprinkler systems cost an estimated $2.45 per square foot for home builders according to the NAHB. Builders say this is liability for them that impacts their bottom line and makes their houses less affordable. They go on to say the only way this can become an amenity they would be able to market is if and when the sprinkler systems installation cost is reduced to, or is less than, a one year insurance premium for the new home.

However, the citizens of Irving finance an annual budget for the fire department of $36 million. The IFD responded to 22,120 incidents, which can be broken down to 44,678 apparatus responses in 2014. The IFD has 11 frontline engine pumper, 4 frontline ladder trucks, and 8 frontline ambulances, which make up the sum of apparatus for the department, the light duty vehicles are not accounted for in the total sum of apparatus responses for 2014. So, if we divide the annual budget by the total responses made by apparatus the sum equals $805.77 per apparatus response.

In Appendix G we see the normal number of apparatus that respond to a structure fire in an apartment complex on a first alarm is three engine pumpers, two ladder trucks, one medical intensive care unit, one safety officer, and one chief officer. This amounts to a minimum of nineteen personnel on scene with six apparatus and two light duty vehicles. So, on a first alarm

response it is costing the citizens of Irving $4,835, second alarm $8,058, third alarm $10,475, and fourth alarm $12,087; based on the budget being divided by apparatus responses in the previous paragraph. From 2009-2014 the IFD responded to:

- Fourteen 2 alarm fires amounting to $112,812
- Ten 3 alarm fires amounting to $104,750
- Two 4 alarm fires amounting to $24,174

The total for all apparatus response cost from 2009-2014 equals $241,736.

In addition, the use of water when there is an active fire is another cost to the citizens of Irving. All public water usage is metered with a monthly fee to cover usage. The fees fall into a wide range depending on variables like meter size, single family residential, apartments, commercial, and large industrial. Also taken into consideration for billing is amount used, there is a break down found in Appendix F that shows how depending on the facility and the usage an additional fee is added depending on volume used above the monthly service fee base amount.

When IFD connects their pumper(s) to a wet hydrant there is no meter to measure the amount of water used. So, to put an accurate dollar figure on water usage at a multifamily structure fire where the fire degradation has reached the attic space is unrealistic. However, it is a variable that should be included in the discussion with builders for justification for installing sprinkler systems in the attic space of multifamily structures.

Appendix C shows that from 2009 to 2014 the City of Irving suffered $12,184,500 worth of property value from fires reaching the attic space in multifamily dwellings that were not protected by a sprinkler system. So, if we add all these costs up that impacted the citizens of Irving the expenses would total $12,426,236 plus water usage.

The second question was: what cities in the Dallas and Fort Worth Metroplex have a city ordinance addressing installation of sprinkler systems in the common attic space of multi-family dwellings? There were limitations to the questionnaire that were emailed out. The Dallas/Fort Worth Metroplex is a large area with an estimated population of 6.6 million (Murray, 2015, p. 1). The writer focused on the thirteen metropolitan cities that were of 100,000 in population or larger, but sent the questionnaire to six other developing cities as well. Unfortunately, after multiple requests for responses to the survey questions the writer only received twelve replies, six from the 100,000 plus population and all six from the developing cities. The questions that were sent out are as follows:

1. Does your city's fire code ordinance require a sprinkler system in newly constructed multi-family dwellings **common attic spaces**?
2. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces**?
3. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces** when certain criteria is met? For example, the apartment complex is taken over by new ownership thereby requiring a new Certificate of Occupancy.

The questionnaire was sent to the following cities that compared to Irving (228,427) and who are affiliated with the Fire Prevention Association of North Texas. The cities with an asterisk next it them did not respond:

100,000 Population or Larger

*Dallas (1,241,162)	Fort Worth (792,727)
*Arlington (375,600)	Plano (269,776)
*Garland (233,564)	*Grand Prairie (181,824)
McKinney (143,223)	*Mesquite (143,195)
*Frisco (128,176)	Carrollton (125,409)
*Denton (121,123)	Richardson (103,297)
Lewisville (101,074)	

*Did not respond to the questionnaire

Developing Cities

Euless (53,224)	Grapevine (50,195)
Bedford (48,592)	Duncanville (38,524)
Rockwall (37,490)	Prosper (18,000)

After multiple emailing's, twelve of the nineteen cities responded, which gave the writer a 63.2% response rate and, in the writers opinion, gave enough information to benefit this project. The survey received mixed responses to the first question with five of the large population and four of developing cities replying yes to requiring sprinklers in the attic space compared to one of the large population and two of developing cities replying no. None of the cities required retrofitting current multifamily occupancies with sprinklers in the attic space and only three required it with a new ownership or with a rebuild due to destruction, such as a fire.

The third question was: what insurance premium incentives have insurance companies implemented for newly constructed multi-family dwellings that have installed sprinkler system in the common attic spaces? For this question the writer had to log onto the Texas Department of Insurance (TDI) website and select the major insurance companies to ask this question to. The questionnaire was emailed, by the writer, to the contact person identified on the website. The related question that was sent out on the questionnaire was:

> Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having installed a sprinkler system in newly constructed multi-family dwellings common attic spaces?
>
> c. If yes, can you send some details on the premium discount specifications?
>
> d. If no, would you consider implementing one?
>
> Note: Multi-family dwellings include more than one apartment, condominium, or townhouse sharing a common attic space. These multi-family dwellings could be more than one story in height and are located within the city limits of Irving, Texas.

The questionnaire was emailed to thirteen insurance companies contact person listed on the Texas Department of Insurance website. It is important to note that the writer had to send and resend this survey to the identified insurance companies on four separate occasions in order to get the high success rate. Twelve of the thirteen companies responded, which gave the writer a 92.3% response rate, and only three of the companies offered a reduction in premiums for the installation of a sprinkler system in the attic space of multifamily dwellings. The most well know of the three was State Farm. Most of the insurance companies reported that they do not or have ceased writing policies for multifamily dwellings, see Appendix E.

The fourth question was: what insurance premium incentives have insurance companies implemented for retro fitting multi-family dwellings with sprinkler systems in the common attic spaces? For this question the writer utilized the previous acquired list from logging onto the Texas Department of Insurance (TDI) website and select the major insurance companies to ask this question to. The questionnaire was emailed, by the writer, to the contact person identified on the website. The related question that was sent out on the questionnaire was:

Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having retro-fitted a sprinkler system in the common attic spaces of previously constructed multi-family dwellings?

a. If yes, can you send some details on the premium discount specifications?

b. If no, would you consider implementing one?

Note: Multi-family dwellings include more than one apartment, condominium, or townhouse sharing a common attic space. These multi-family dwellings could be more than one story in height and are located within the city limits of Irving, Texas.

The questionnaire was emailed to thirteen insurance companies contact person listed on the Texas Department of Insurance website. It is important to note that the writer had to send and resend this survey to the identified insurance companies on four separate occasions as well. Twelve of the thirteen companies responded, which gave the writer a 92.3% response rate, and only three of the companies offered a reduction in premiums for the retro installation of a sprinkler system in the attic space of multifamily dwellings. The most well know of the three was State Farm. Most of the insurance companies reported that they do not or have ceased writing policies for multifamily dwellings, see Appendix E.

Discussion

In spite of a September 2008 National Fire Protection Association report stating "the cost of installing sprinkler systems to the home builder averaged $1.61 per sprinklered square foot" (*NFPA 13R*, 2011, p. 1) arguments remain against installation because of price. According to Roland Garcia with the Pearland Fire Department some of the reasons from the home builders to not install sprinkler systems are "smoke alarms provide adequate safety and protection from fires and sprinklers are not needed, water damage from sprinklers increase dollar loss in fires, sprinklers will price potential homebuyers out of the new home market" (Garcia, 2013, slide 20).

Without a doubt the City of Irving has suffered a huge financial impact from not requiring a 13R sprinkler system installed in both living spaces and attic spaces of multifamily occupancies. The discussion and heated debates continue between chief officers of fire departments throughout the country and home builders. The interactions have gone all the way to the Texas Legislators here in the State of Texas and the battle was lost for the Texas Fire Chiefs but the war continues. On the positive side there has been progress but unfortunately not enough and what has improved has been too slow.

Henry S. Parmelee invented the first practical automatic sprinkler system. His motivation came from high insurance premiums being imposed upon him for his piano factory. His thoughts were the added protections from a mechanical device would reduce his premiums (Irmilam, 2010, p. 1). The builders seem to have the same perspective as Henry S. Parmelee and that is the bottom line that affects them financially. The difference is Henry S. Parmelee's invention can help fire protection and the builders can hurt civilians and firefighters. That is why firefighters are looking at this issue from a community cost and safety standpoint rather than a

selfish point-of-view. The Fire Marshal for the State of Texas, Chris Connealy had the following to say:

> The results of having a sprinkler system cannot be over emphasized.
>
> Not one person has been killed in a fire in Texas in the past ten years inside an apartment complex that was equipped with a fire sprinkler system according to data provided by the State Fire Marshal's Office. In contrast, 114 people have been killed by fires in apartments not equipped with sprinkler systems. (Insurance Council of Texas, 2012, p. 1)

The article goes on to say "fire sprinklers save lives," says State Fire Marshal Chris Connealy. "Implementing the International Fire Code requiring builders to install fire sprinkler systems in new apartment complexes has greatly reduced the loss of life and property" (Insurance Council of Texas, 2012, p. 1). The NFPA website states "Sprinklers decrease the fire death rate per 1,000 reported home fires by about 80% and the average loss per home fire by about 70%" (NFPA, 2013, p. 2).

Discussions tend to focus on the living space without regard to non-living spaces that can and do cause a negative impact to the living spaces. Throughout these discussions the topic of sprinkler systems in the attic seems to be a forgotten aspect or it is considered to be another battle waiting down the road. The 2007 special study that was conducted by the National Association of Home Builders (NAHB) on fire sprinklers impact to insurance premiums broke down the systems into two classes. "Class A, where automatic sprinklers are installed in all areas including bathrooms, attics, closets, and attached structures; and Class B, where automatic sprinklers are totally or partially omitted in bathrooms, attics, closets, and attached structures" (Xu, 2007, p. 2).

By including the attic fires of multifamily dwellings in the discussion the overall impact to life and property can be understood and an educated decision can hopefully prevail. Attic fires in multifamily dwellings can be devastating to the occupants, property owner, and the community. “An attic fire is started under the roof and will inevitably involve all of the roof that is accessible to the spread of flames beneath it. Thus, it is likely that the entire roof is either burned away or that destruction is very widespread” (DeHaan, 2007, p. 291). What we are experiencing locally seems to be in line with the national statistics as well, “the death trend in multifamily buildings was up 35 percent and injuries increased 4 percent. Adjusted dollar losses were up 21 percent in multifamily buildings. Property losses in multifamily residences continued the overall national upward trend” ("Residential Structure and Building Fires," 2008, p. 53).

Based upon the data and information contained in this report there seems to be overwhelming evidence that supports the concept of residential sprinkler system installation. The writer experienced difficulty in locating sources that could negate the proponents for residential sprinkler systems. The disproportionate support should be easily recognized by the reader, with all the professional organizations, experts in the prevention and investigation fields, and supporting data basically having to overcome the unscrupulous views of home builders.

“The debates occurring today are primarily political. There are many technological answers available to address the early questions about design, installation, cost effectiveness, and quality of materials. The remaining issues cannot be solved by the fire service alone” (Ford, n.d., p. 4). The sprinkler system has been around for one-hundred and forty plus years. Proponents are still having to convince law makers of the overwhelming evidence to support the installation of these systems in all residential occupancies. Unfortunately the writer expects there will not be any impactful changes in fires losses, “without the support of additional major stakeholder

groups like city and county managers, local policy makers, architects, researchers, the insurance industry, engineers, the sprinkler industry, and even the general public" (Ford, n.d., p. 4).

Recommendations

The original purpose of this applied research project was and still is to investigate what impacts attic fires in multi-family dwelling have had on the citizens of Irving and determine if a new city ordinance needs to be adopted. The City of Irving adopted their first multifamily sprinklering requirements, Ordinance 6152, on August 6, 1992 and amended the 1991 Uniform Building Code (UBC) according to the director of building codes (G. Miller, personal communication, March 3, 2015). This was a positive first step for the City of Irving and its citizens. However, no updates have taken place since 1992 even though building construction has changed exponentially.

After reviewing the material contained within the literature review the writer believes that if saving lives was the only benefit to residential sprinkler systems it would be well worth it. The good news is there are many more benefits to the installation of a Class A residential sprinkler system. The unfortunate part is there is a roadblock of politics that has proven time-and-time again that it is difficult to get past. Many of the communities have taken forward steps to institute residential sprinkler systems in attic spaces of multifamily occupancies. Unfortunately, they do not have a plan for retro-fitting existing multifamily occupancies and the two must go together. The writer believes with a concerted effort of low cost installation, state and local laws mandating Class A sprinkler systems, and insurance companies offering an incentive by reducing annual premium rates everyone will see and receive the benefits.

The City of Irving has been financially impacted by this issue for many, many years. The personnel and apparatus response cost from 2009-2014 amounted to $241,736. The water needed to bring these emergencies under control is enormous and the property value lost just on attic fires in multifamily structures themselves during the 2009-2014 time period amounted to $12,185,500 when you add all this up it amounts to a staggering $12,427,236 plus water usage.

If a multifamily structure can be built for $100-$200 per square foot making an average square foot price at $150. The total dollar loss for 2009-2014 divided by the construction square foot price equals 81,267 square feet. So, for the National Association of Home Builders to make the case that residential sprinkler systems cost and estimated $2.45 per square foot times the 81,267 square foot of floor space amounts to less than $200,000.

The bottom line is what would have cost the builders $200,000 ended up costing the community $12,427,236 plus the water usage, does not seem to be a legitimate discussion. This should not even be a logical debate but then again politics are involved. Most of the municipalities that answered the questionnaire had an ordinance in place for sprinklers in the attic space of newly constructed multifamily occupancies. So, in addition to the surrounding communities and the financial impact to the City of Irving's citizens justifies updating the residential sprinkler ordinance to include the attic spaces of multifamily occupancies.

However, in order to make this transition a smooth one the writer wanted to look at the possibility of promoting insurance premium reductions for both newly constructed and retro-fitted attic spaces in multifamily occupancies. Only three of the thirteen insurance companies stated they offered premiums reductions for Class A sprinkler systems. This looks to be another uphill battle, but since the home office of Allstate Insurance is in the City of Irving there may be

an opportunity there that can be explored. By taking this issue to the Texas Fire Chiefs Association and forming a collaborative coalition with the Texas Municipal League, the State Fire Marshal's Office, and State Representatives the writer believes legislation will eventually be passed to support insurance reduction on premiums and mandates on Class A sprinkler systems installation in multifamily dwellings.

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Appendix A

Sprinklered Attics in R2 occupancies

On Friday February 6, 2015 a survey was disseminated amongst Fire Prevention Association of North Texas (FPANT) members. Provided are the three questions that were asked.

1. Does your city's fire code ordinance require a sprinkler system in newly constructed multi-family dwellings **common attic spaces**?
2. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces**?
3. Does your city's fire code ordinance require a sprinkler system to be retro-fitted in existing multi-family dwellings **common attic spaces** when certain criteria is met? For example, the apartment complex is taken over by new ownership thereby requiring a new Certificate of Occupancy.

Appendix B

Results of questionnaire for Sprinklered Attics in R2 occupancies:

City or Town	Question 1	Question 2	Question 3
Lewisville	Yes	No	No
Plano	Yes	No	Yes, if fire
Rockwall	Yes,3 stories or higher	No	No
Euless	Yes, see ordinance provided	No	No
Duncanville	Yes	No	No
Prosper	Read email		
McKinney	Yes	No	Yes
Bedford	Yes	No	Yes
Carrollton	Yes	No	No
Richardson	No	No	No
Ft. Worth	Yes, at 3 stories	No	No
Rowlett	Yes	No	No
Grapevine	No	No	No
Paris	No	No	No

Appendix C

Rpt No	Inc Number	Date	Time	Address	Apartment name	Bldg Loss
09-010	**900687**	**1/15/2009**	**15:31:55**	**2440 N MACARTHUR BLVD LOT 2516**	**REGAL PARC PHASE II**	**100,000.00**
09-022	92132	11/27/2009	2:51:07	3727 N OCONNOR RD	CHAPPAREL CREEK APARTMENTS	500,000.00
10-006	**1310**	**1/21/2010**	**14:53:00**	**1819 ESTRADA #251**	**OAK HILLS APARTMENTS**	**120,000.00**
10-015	2112	2/5/2010	12:32:54	1005 METKER ST LOT 55	IRVING PLACE APT	200,000.00
10-024	**3101**	**2/22/2010**	**4:11:09**	**3813 N OCONNOR RD**	**CHAPPAREL CREEK APARTMENTS**	**1,700,000.00**
10-062	9802	6/27/2010	21:03:17	817 E GRAUWYLER RD	KINGS MANOR APT	100,000.00
10-076	11309	7/25/2010	3:33:17	203 ALPINE CT	4-PLEX	150,000.00
10-079	12123	8/10/2010	13:49:51	2002 ROCK ISLAND RD LOT 1056	ROCK ISLAND APT	215,000.00
11-024	105894	4/7/2011	9:47:12	4312 W NORTHGATE DR Apt 4010	WESTWOOD VILLAGE APT	120,000.00
11-056	112343	7/27/2011	22:41:16	234 N IRVING HEIGHTS DR	THE HIEGHTS	802,500.00
12-002	200149	1/3/2012	21:30:57	3903 WILLIAM DEHAES DR	MARBLETREE APT	300,000.00
12-007	201316	1/24/2012	15:03:38	3306 WILLOW CREEK DR LOT 401	THE WILLOWS APT	120,000.00
12-049	**212798**	**8/12/2012**	**17:36:08**	**5015 Courtside apt199**	**BROADMOOR VILLAS APT**	**800,000.00**
12-061	217086	10/26/2012	18:46:43	1925 W 5TH ST LOT 271	HIDDEN VILLAGE APT	100,000.00
12-072	**219250**	**12/3/2012**	**20:19:55**	**1008 SAN JACINTO DR #1024**	**ARBORS OF LAS COLINAS APT**	**1,000,000.00**
13-038	**311652**	**7/20/2013**	**17:54:28**	**3810 ESTERS RD**	**EAGLE CREST APTS**	**500,000.00**
13-040	**312201**	**7/30/2013**	**22:04:59**	**7374 PARKRIDGE BLVD**	**PARKRIDGE PLACE APT**	**300,000.00**
13-052	314251	9/3/2013	18:06:14	1832 ESTRADA PKWY # 2097	SURREY OAKS APT	403,000.00
14-002	400364	1/6/2014	15:20:00	1129 N. OCONNOR	PARKSIDE APARTMENTS	55,000.00
14-025	**404996**	**3/22/2014**	**1:53:00**	**2508 FINLEY**	**FINLEY SQUARE**	**920,000.00**
14-029	405527	3/30/2014	1:24:00	3749 WILLIAM DEHAES	WOODLAND RIDGE	750,000.00
14-036	407885	5/5/2014	22:30:00	1221 N BRITIAN	STUDIO MANOR APT	150,000.00
14-043	**408551**	**5/16/2014**	**13:16:00**	**10417 N MACARTHUR**	**RESORT APARTMENTS**	**1,600,000.00**
14-044	**408576**	**5/16/2014**	**21:46:00**	**5015 COURTSIDE**	**BROADMOOR VILLAS APT**	**260,000.00**
14-057		7/6/2014	3:35:00	1706 VALLEY VIEW	LAKE RIDGE APT	120,000.00
14-079	419993	11/17/2014	4:33:00	4024 N STORY	SHADOWS	800,000.00
2 alarm regular print, 3 alarm bold print, and 4 alarm yellow highlight					**TOTAL DOLLAR LOSS =**	**12,185,500.00**

*Note – The incidents that highlighted were 4 alarm structure fires, bold were 3 alarm structure fires, and the remaining incidents were 2 alarm structure fires.

Appendix D

1. Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having installed a sprinkler system in newly constructed multi-family dwellings common attic spaces?

    e. If yes, can you send some details on the premium discount specifications?

    f. If no, would you consider implementing one?

2. Does your company offer an incentive, credit or discount to commercial customer's insurance premiums, for having retro-fitted a sprinkler system in the common attic spaces of previously constructed multi-family dwellings?

    a. If yes, can you send some details on the premium discount specifications?

    b. If no, would you consider implementing one?

Note: Multi-family dwellings include more than one apartment, condominium, or townhouse sharing a common attic space. These multi-family dwellings could be more than one story in height and are located within the city limits of Irving, Texas.

Appendix E

Company Name	Website	Agent Name	Agent Email Address	Question 1	Question 2	Comments
AAA	apps.texas.aaa.com	John Schinnerer	Schinnerer.john@aaa-calif.com	No	No	The Automobile Club of Texas does not write policies for commercial entities.
Allianz Ins Group	www.allianz.com		AGCSCommunication@agcs.allianz.com	No	No	Allianz Global Corporate & Specialty does not write property insurance for multi-family dwellings; our clients are from the commercial and industrial business sectors.
Allstate	www.allstate.com	William W. Gonsiorek LUTCF				
Atlas General	atlasgeneral.com	Nikki Sibley	NikkiS@atlasgeneral.com	No	No	We do not offer insurance policies for commercial property risks in any capacity.
Farmers Ins. Group	www.farmers.com	Sakara Barnes	sakara.barnes@farmersinsurance.com	No	No	We currently do not offer a Commercial product in Texas that covers common attic spaces in multi-unit housing, which includes apartments, condominiums, and townhouses.
GEICO	www.geico.com			No	No	GEICO does not offer policies for multi-family dwellings that include more than one apartment, condominium, or townhouse.
Insurance Plus	www.landlords.insuranceplus.org			Yes	Yes	All insurers that we know of in the United States will offer a discount on property lines that have a full sprinkler system. The amount of the discount would depend on the rates approved by the state for that particular company. We write insurance for more than 10 insurance companies.
Liberty Mutual	www.libertymutualgroup.com	Shelby	1-800-845-40875	No	No	Does not write policies for multi-family dwellings.
Mercury Insurance Group	mercuryinsurance.com	Mike Burk	MBurk@MercuryInsurance.com	No	No	Effective 01/01/2014, Mercury Insurance Group is no longer writing Commercial Property Insurance in the state of Texas.
MetLife	www.metlife.com			No	No	MetLife does not offer policies for multi-family dwellings that include more than one apartment, condominium, or townhouse.
State Farm	statefarm.com	Sandi Brown / Cynthia Dokupil	cynthia.dokupil.io2l@statefarm.com	Yes	Yes	There is an 8% discount for working sprinkler system in the house and dwellings.
SwingleCollins & Associates	www.swinglecollins.com			Yes	Yes	SwingleCollins is a Broker Company for over 100 insurance copanies. Chris Peterie said that all the companies give discounts, said 5%-20% depending on the company and the coverage.
Traveler's Insurance	www.travelers.com	Optimum Financial Cover	info@gotooptimum.com			
Traveler's Insurance	www.travelers.com	ITO P&C Incorporated	wivacek@insteam1.com			

Appendix F

City of Irving Monthly Service Charge

Following are the monthly services charges based on meter size, including the first 3,000 gallons of consumption (updated Nov. 2014)

Meter Size	Monthly Service Charge
5/8 Inches	$9.29
3/4 Inches	$9.29
1 Inches	$11.26
1.5 Inches	$15.79
2 Inches	$22.29
3 Inches	$35.88
4 Inches	$50.22
6 Inches	$87.83
8 Inches	$110.93
10 Inches	$161.24
12 Inches	$240.09

Monthly Usage Charge

Following are the monthly usage charges for residential, apartment, commercial, and large industrial water rates including gallon consumption (updated Nov. 2014).

Residential Water Rates

- Next 7,000 gallons of water, per 1,000 gallons - $3.75
- Next 10,000 gallons of water, per 1,000 gallons - $4.05

All Over 20,000 Gallons

- October to May consumption, per 1,000 gallons - $4.32
- June to September consumption, per 1,000 gallons - $4.76

Apartment Water Rates

- Next 7,000 gallons of water, per 1,000 gallons - $3.75

- Next 10,000 gallons of water, per 1,000 gallons - $4.05

All Over 20,000 Gallons

- October to May consumption, per 1,000 gallons - $4.32
- June to September consumption, per 1,000 gallons - $4.67

Commercial Water Rates

- Next 7,000 gallons of water, per 1,000 gallons - $3.75
- Next 10,000 gallons of water, per 1,000 gallons - $4.05

All Over 20,000 Gallons

- October to May consumption, per 1,000 gallons - $4.32
- June to September consumption, per 1,000 gallons - $4.67

Large Industrial Water Rates

- All over 3,000 gallons of water, per 1,000 gallons - $3.55

Appendix G

112									

112 GLENWICK & PEBBLEBROOK TR.

	Engines			Truck	Truck	Chiefs	Other	A		
1 ST	5	2	1	2	7	BN1-BN2	520	E11A		
2 ND	4	6		8		ON CALL A/C	Closest Med 555			
3 RD	7	3		9		ALL A/C 500 INV	BOX 4			
4 TH	8	11								
5 TH	9	10								

HAZMAT: District Engine, E8, T8, HM 8, BC. If E8 & T8 both out of service then refer to BC.
Notify: 500, 501, 502, 503, IPD, Health Dept., (DCURD if applicable.)

Companies to Change Location

	Engines			Truck
2 ND	7-4	3-2	9-7	9-2
3 RD	8-2	11-4	10-11	
4 TH	10-4			
5 TH				

Reminders

Mutual Aid		520	Batt Chief	Alarm Office Help
SOUTH		2 nd Med	Request for Mutual Aid	Off Duty Dispatcher
MA-3	MA-5	2 nd Alarm	HAZMAT	any asst. chief
Send FEO Guides to MA Stations			Three or More Apparatus	Engine or Truck Code 3

IFD Form 50
11/11 Revision

Ambulances

M5	M2	M4	M6	M7	M3	M11	M10	M7X	M8X	M5X	M9X

Appendix H

-------- Original message --------
From: "Emrath, Paul"
Date:04/03/2015 9:48 PM (GMT-06:00)
To: Victor Conley
Subject: Re: Fire sprinkler and homeowner insurance

Fine. As long as you credit us, it's Perfectly o.k. to use the numbers.

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.

From: Victor Conley
Sent: Friday, April 3, 2015 8:41 PM
To: Emrath, Paul
Subject: Fire sprinkler and homeowner insurance

Hello,

My name is Victor and I'm a firefighter. I'm writing a paper for the national fire academy and I would like to use the report put out September 14, 2007 by Lankan Xu. My paper is on sprinkler systems and possible insurance discounts.

I need to turn my paper in next week and if at all possible I would appreciate permission to use information within your special study. I will reference your website in my paper and give NHAB full credit for the data.

Thank you,
Victor