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Public Housing: Identifying the Fire Problem

and Executing Prevention Strategies

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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.

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Abstract

Fires occurring within the Monroe Housing Authority (MHA) properties from 2005 to 2010 were problematic and resulted in a higher frequency of civilian fire casualties than fires that occurred in the remainder of the community. Research was performed to reduce the number of civilian fire casualties by identifying the most common cause of fire and to implement methods to decrease its incidence within the MHA properties. The descriptive research method was utilized and both an analysis of National Fire Incident Reporting System (NFIRS) reports from the City of Monroe Fire Department (MFD) and a survey questionnaire of other public housing authorities in the state of Georgia were utilized. Data from the NFIRS analysis and survey questionnaire were used to answer pertinent research questions that addressed: how fires and related casualties in MHA properties compared to other residential fires in Monroe, how they compared with other public housing authorities in Georgia, determining the leading cause of fire and injury in other public housing authorities, and to determine what education, engineering, and enforcement measures were being utilized by other public housing authorities to address the fire problem. Results from the research indicated that cooking fires were the leading cause of residential fires in Monroe and the leading cause of civilian fire injuries in both MHA properties and other public housing authorities in the state of Georgia. The research also indicated that with the exception of smoke alarms, very little was being done within public housing authorities to address education, engineering, and enforcement measures to reduce the prevalence of fire. Recommendations included establishing a partnership between MHA and MFD, requiring annual fire safety education training, and purchasing automatic stovetop fire suppressors or temperature regulating cover plates to reduce the prevalence of cooking fires and associated injuries.

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Introduction

The United States Department of Housing and Urban Development (HUD, n.d.) established public housing as a means to provide "decent and safe rental housing for eligible low-income families, the elderly, and persons with disabilities" (para. 1). Significant research has concluded that low-income individuals (Fahy & Norton, 1989; Gunther, 1981; Karter & Donner, 1978; Munson, 1976), the elderly (Miller and Davey, 2007), and the disabled (Shields, 1994) experience a higher risk of fire and fire related injuries than the remaining population. The problem is that fires occurring within the Monroe Housing Authority (MHA) properties from 2005 to 2010 resulted in a higher frequency of civilian fire casualties than fires that occurred in the remainder of the community.

The purpose of this research is to reduce the number of civilian fire casualties by identifying the most common cause of fire and to implement methods to decrease its incidence within the Monroe Housing Authority properties. The descriptive research method was utilized and both an analysis of National Fire Incident Reporting System (NFIRS) reports from the City of Monroe Fire Department (MFD) and a survey questionnaire of other public housing authorities in Georgia were utilized. Data from the NFIRS analysis and survey questionnaire were utilized to answer pertinent research questions. (a) How does the prevalence of fire and occurrence of civilian fire casualties within the Monroe Housing Authority compare to the remaining residential fires within the City of Monroe? (b) Is the fire problem in the Monroe Housing Authority unique or a representation of the overall fire problem within Georgia's public housing authorities? (c) What is the leading cause of fire and fire related injuries in other Georgia housing authorities?

(d) What education, engineering, and enforcement measures are other Georgia housing authorities utilizing to address the fire problem?

Background and Significance

The residential fire problem has long plagued the United States. The National Commission on Fire Prevention and Control (1973) reported that residential fires accounted for 70% of structure fires and 87% of fire deaths during 1971. Nearly forty years later, Karter (2010) reported that approximately 78% of structure fires in the United States occurred in residential occupancies and were responsible for approximately 85% of civilian fire deaths and 77% of civilian fire injuries. These statistics have shown that the residential fire problem is still a significant problem plaguing the American population. This was summed by Loyd and Richardson (2010) who stated “the United States has a severe fire problem that if not addressed, will continue to worsen drastically” (p. 12).

In an effort to better understand where injuries and deaths occurred in residential occupancies, Karter (2010) divided casualty data into those that occurred in multifamily dwellings and those that occurred in one- and two-family dwellings. Multifamily dwellings, such as apartments, were responsible for 465 deaths and 3,350 injuries (Karter, 2010). One- and two-family residential dwellings, such as standard homes and duplexes, were responsible for 2,100 civilian deaths and 9,300 civilian injuries (Karter, 2010). In addition to residential occupancies, specific populations have been identified as being high-risk for fire and fire related injury and death. The Federal Emergency Management Agency (2010) labeled children under five, impoverished households, adults over 65, people with disabilities, and populations that speak little or no English as experiencing a greater risk of both natural and man made disasters including fire.

The HUD Public Housing Program was designed to accommodate a portion of the population that has statistically been high-risk for fire and associated injuries and death. Low-income families, the elderly, and individuals with disabilities are all specifically listed as being the three target populations for public housing (HUD, n.d.). On the national level, HUD (n.d.) reported that approximately 1.2 million households reside in housing provided by over 3,300 public housing authorities throughout the country.

While conducting a community risk assessment for Monroe, Georgia, the researcher determined that MFD responded to 156 residential structure fires (NFIRS incident type codes 111 and 113) between January 1, 2005 and December 31, 2005 (Appendix A) that resulted in zero deaths and nine documented civilian fire casualties (Appendix B). Of these 156 fires, 19 occurred in MHA dwellings and resulted in three civilian fire casualties. Further investigation into the problem indicated that 17 of the 19 public housing fires originated in the kitchen and that 15 of the fires were determined to be the result of unattended cooking. The very brief overview of the data from fires in the MHA indicated that there was an identifiable and preventable fire problem within the housing authority.

In order to gain background information on the fire problem within the Monroe Housing Authority, an interview was conducted with MHA Executive Director K. Stuart (personal communication, April 7, 2011). According to Stuart, MHA was established in 1949 and currently provides public housing to residents of Loganville, Madison, Monroe, Rutledge, and Social Circle, Georgia. For the scope of this research, only data pertaining to the complexes protected by MFD were utilized. Stuart reported that within the city limits of Monroe, MHA had nine different complexes ranging from duplexes to two story apartments that provided 330 individual dwelling units that ranged from one to five bedrooms each. Stuart indicated that the

housing authority viewed fires within their dwellings as a significant problem and provided documentation of \$147,094 in fire related repairs to the housing complexes in Monroe from 2005 to 2010.

Stuart (personal communication, April 7, 2011) indicated that the housing authority viewed cooking fires as being the most significant and destructive to public housing properties. When questioned about fire safety measures within each dwelling, Stuart reported that each dwelling was equipped with battery operated smoke alarms, a fire extinguisher, and fire walls that separated each unit. According to Stuart, no formal fire safety education or fire extinguisher training programs had been provided to the residents. Stuart also indicated that batteries in smoke alarms were replaced when discovered by MHA maintenance personnel or when the resident requested new batteries. Stuart pointed out that MHA had a form that all maintenance personnel were required to fill out upon completing any repairs in dwellings and one of the mandatory criteria was to check the smoke alarm. Stuart stated that the lease agreement signed by the residents had an eviction clause for residents found to be responsible for a fire that resulted from careless acts. According to Stuart, this type of clause was necessary to hold individuals accountable for their actions since the careless action of one could have a significant impact on other residents within the same housing complex. Executive Director Stuart stated that he embraced the idea of working with MFD on prevention strategies that would benefit the residents, the housing authority, and the fire department by reducing the frequency of fire and fire related injuries.

One of the significant goals discussed in the National Fire Academy's Executive Analysis of Community Risk Reduction (EACRR) course was to "empower the Executive Fire Officer with the ability to lead community risk reduction in a strategic manner" (Federal Emergency

Management Agency [FEMA], 2009, p. SM 1-7). The EACRR course was centered around the United States Fire Administration's (USFA, 2008) five-step process to public fire education planning which was comprised of conducting a community risk analysis, developing community partnerships, creating intervention strategies, implementing strategies, and evaluating the results of the strategies. The scope of the current research represents a direct embodiment of this dynamic process. The research was designed to establish a foundation on which collaboration between MFD and MHA would result in a safer public housing authority with a reduction in the frequency of fire and a reduction in civilian fire injuries.

Research into strategies that reduce the frequency of fire in public housing holds significance at multiple levels. On the local level, the research meets the requirements of Section 5.2, Goal 2 of the Monroe Housing Authority's (2010) annual plan which states that housing authorities should "provide a safe and secure environment in the PHA's [public housing authority] public housing developments" (p.1). A reduction in the frequency and occurrence of fire within housing authority dwellings would potentially decrease the risk of civilian fire casualties and death along with reducing the loss of both public housing property and personal belongings. The City of Monroe Fire Department would benefit in that a reduction in the frequency of residential structure fires would reduce the workload of a daily crew that consists of five to seven firefighting personnel.

This research also holds significance on the national level. A review of archived Executive Fire Officer Program (EFOP) Applied Research Projects (ARP) through the National Emergency Training Center's Learning Resource Center (LRC) revealed that very few ARP's have been conducted to address the fire problem and related civilian injuries in public housing authorities. This is a significant finding due to the fact that HUD (n.d.) reported that there were

over 3,300 public housing authorities throughout the country. Addressing and reducing the fire problem in one housing authority could potentially provide valuable information and prevention strategies to reduce the fire problem and related civilian injuries in others.

Furthermore, the research also supports the goals of the United States Fire Administration. The first goal of USFA's (2010) strategic initiatives was intended to "reduce risk at the local level through prevention and mitigation" (p. 18). As an effort to support this goal, the USFA developed two objectives. Each of these objectives closely correlated with the scope of the research. Objective 1.1 was designed to "encourage the state, local, and tribal adoption of risk reduction, prevention, mitigation, and safety strategies" (USFA, 2010, p. 18). The research directly supported this objective by addressing risk reduction, prevention, and safety strategies. Objective 1.2 was designed to "encourage code development, compliance, safe building design, and infrastructure resilience" (USFA, 2010, p. 18). This objective was directly supported through the fire reduction engineering and enforcement measures included within the research.

Literature Review

Socioeconomic Fire Factors

Research concerning the socioeconomic factors contributing to the incidence of fire has been performed as a means to better understand and address the nation's fire problem. Multiple studies (Fahy & Norton, 1989; Gunther, 1981; Karter & Donner, 1978; Munson, 1976) have concluded that individuals living at or below the poverty level have a significantly greater risk of experiencing a fire than more prosperous individuals. Sales (2009) reported that the lower income population typically learned about fire by either experiencing a fire or knowing someone who had experienced a fire. Research by Dissanaik and Rahimi (2009) found that in addition to fire incidence, burn injuries varied significantly based on a patient's age, sex, and socioeconomic

status. Dissanaïke and Rahimi placed an emphasis on the importance of understanding the cultural and socioeconomic contributing factors as an aid to plan for prevention and treatment programs for individuals that fell into this category.

Jennings (1999) postulated that population, environmental factors, technology, organization, and social-psychological factors were all contributing factors to the social causes of fire. Jennings' research also documented that there was little correlation between fire loss in the community and the resources invested in the fire service. Jennings listed the primary determinant of fire loss as the socioeconomic and environmental factors within the community.

Bertrand and McKenzie (1976) performed a study in New Orleans, Louisiana to determine the socioeconomic, socio-cultural, and socio-demographic variables that contributed to the significant incidence of fire found in the socioeconomically depressed area at the time of the study. Bertrand and McKenzie's research concluded that human factors were extremely important in accounting for fires in high-risk and socioeconomically depressed areas. Bertrand and McKenzie further concluded that fires in these areas were causally associated with predictable attitudes of carelessness such as smoking in bed, leaving cooking unattended, and placing clothes and other objects near heaters. Bertrand and McKenzie further concluded that the lack of a strong spirit of community, a lack of fire safety training and facilities, and an attitude of fatalism toward fire further contributed to the fire problem in the lower socioeconomic population.

Shai (2006) conducted a study that investigated the social and demographic characteristics of nonfatal structure fire injuries that occurred in Philadelphia, Pennsylvania from 1993-2001. Shai reported that the two most important predictors of fire in the sample area were older housing and low income. Shai further correlated the relationship between low income

areas and the high number of reported fire injuries. Data from Shai's study showed that the Philadelphia census tracts with the highest percentage of combined low income residents and older housing had a higher rate of fire injuries than areas comprised of either low income residents or older housing. Thus, Shai concluded that the risk of fire injury was greater when both contributing factors (low income and older housing) were present.

Cooking Fires

Fires related to cooking have been documented as the leading cause of residential fires and associated civilian fire injuries in the United States (FEMA, 2007). Of these cooking related fires, unattended cooking has been acknowledged by numerous sources as being the leading contributor (Bradley, 2003; FEMA, 2007; USFA, 2005). Although this fact has often been accepted, it is not necessarily reality in all instances. Research conducted by McConnell, Dwyer, and Leeming (1996) in the Memphis Housing Authority from 1985-1993 contradicted the current trend and revealed that at that time unattended cooking fires ranked behind children playing with matches as being the leading cause of fire in the housing authority.

Further research has attempted to trend specific patterns in the nation's residential cooking fire problem. The United States Fire Administration (2005) concluded from National Fire Data Center data that cooking fires peaked six o'clock in the evening with the noon hour following in frequency. Fats, oils, and grease were the leading type of material ignited when a cooking fire occurred (USFA, 2005). Other potential causes of fires originating at cooking equipment included combustibles such as rags and pot holders being placed too close to the heat source, failure to thoroughly clean ovens and ranges, and the combustion of overhanging combustibles such as curtains or clothing (Bradley, 2003). Ahrens (2011) concluded that households equipped with electric ranges had a higher related incidence of fire than homes

equipped with gas ranges. Smoke alarms were present and alerted occupants in 45% of cooking fires (USFA, 2005) versus 29% of all residential structure fires (USFA, 2004).

The United States Fire Administration (2004) reported that kitchen fires caused less in property loss and were less fatal than other types of residential fires, but resulted in more injuries. Over half of the civilian fire injuries from 1999 to 2003 occurred when occupants attempted to extinguish the fire on their own (FEMA, 2007). Ahrens (2011) documented that children under five and adults 65 and older faced the highest risk of death from a cooking fire in the home. Shai (2006) recommended the development and use of safer stoves, the emphasis of safe handling of cooking equipment, and addressing the behavior associated with unattended cooking as methods to decrease the prevalence of the cooking fire problem.

Education

Robertson (2005) described fire prevention education as the dissemination of fire information as a means to promote the public's awareness of the fire problem in hopes that the public would take appropriate precautions against fire. In addition, Appy and Compton (2003) proposed that a fire prevention educational strategy should provide all of the necessary information to support the use of engineering products that promote fire safety. Appy and Compton further indicated that a community cannot rely on education alone as an exclusive means to create a safer environment. Of specific importance to individuals that share characteristics of public housing residents, Gamache (2003) proposed that an effective fire education program designed to reach the socioeconomically challenged adult population should reflect the limitations that a depressed income and decreased education inflicted.

Braxton (2005) reported on the fire education program developed for the residents of the Suffolk, Virginia Housing Authority. After addressing that there was a fire problem in the

housing authority, both the Suffolk housing officials and Suffolk Department of Fire and Rescue collaborated to amend the housing lease to require both current and new residents to complete eight hours of their required community service in fire and life safety education programs (Braxton, 2005). According to Braxton, prospective residents would not receive a public housing unit if they did not sign up for the course. The new lease required that residents spend four hours in fire safety instruction presented by Suffolk Department of Fire and Rescue personnel and four hours conducting a home safety inspection, creating and practicing a home fire escape plan with family members, and conducting a fire drill. In addition to the initial program, the revised lease agreement required an annual refresher course for all residents (Braxton, 2005). Performing a safety inspection of all housing properties on a six month rotation was also encouraged by Diment (2008).

Since its inception, Braxton reported that a five thousand dollar grant was received which allowed for expansion of the program. Classes were conducted each month and rotated between the different housing locations. Braxton reported that since the program's inception, only one major fire had occurred in a one year period versus six in a 45 day period prior to the program's implementation. Braxton concluded that both the public housing officials and fire officials recognized that success of the program was contingent upon the cooperation and collaboration of both organizations. In a similar manner, McConnell, Dwyer, and Leeming (1996) developed a 35 minute fire safety program and trained 2,340 adults at the Memphis Housing Authority between March 1994 and June 1995. Prior to the implementation of the training program, the Memphis Housing Authority averaged 70 to 80 dwelling fires per year. At the time the research was published, only four fires had occurred in the housing authority since the program's inception (McConnell et al., 1996).

Sales (2009) reported on a partnership study conducted between the National Fire Protection Association (NFPA) and Emergency Services-Fire for the City of Hamilton, Ontario. The study's sample population was the high-risk areas of Hamilton that consisted of low-income residents, students, renters, home owners in older homes, immigrants, and retired seniors. The study results were of significant importance to the fire service's approach to fire safety education. Sales reported that a majority of the residents considered firefighters to be the most prominent and effective communicators of the fire safety message. Participants also concluded that the inclusion of burn victims or fire victims would be ideal in presenting the fire safety message (Sales, 2009). Sales also reported that the Ontario study participants recommended that messaging on the radio and internet could be an effective method to reach a greater percentage of the population.

Ta, Frattaroli, Bergen, and Gielen (2006) performed a review of 12 fire prevention intervention articles published between January 1998 and September 2004. Their review of the literature revealed that fire service personnel played an integral part in establishing the legitimacy and validity of fire prevention programs in the community. Furthermore, Ta et al. concluded that the fire prevention programs that involved a partnership between the sponsoring organization and the fire department were in fact successful in preventing fires and deaths in the community.

Schwartz, Grisso, Miles, Holmes, and Sutton (1993) performed an injury prevention and home hazard reduction program in a poor urban African-American community in Philadelphia, Pennsylvania. Schwartz et al. selected the population sample based on research that determined that injuries, including those from residential fires, occurred at a higher rate in the minority American population. The program was designed at changing the risks of the target minority

population on a community level. Based on their experience with the program, Schwartz et al. discovered that individuals with minimal education could be effectively trained in community based prevention programs when community leaders, block leaders, and families were involved in the process.

Engineering

The U.S. Fire Administration (2008) described engineering strategies as the use of technology to create a safer product or to modify an environment where a risk occurred. For the scope of the research, literature associated with the use of smoke alarms, stovetop fire suppressors, and temperature regulating stove cover plates was reviewed.

Smoke alarms. Smoke alarms have been defined as a devices designed to detect fires through the presence of smoke and sound an audible alarm to notify occupants of the fire threat (Public-Private Fire Safety Council, 2006). Data compiled by the Public-Private Fire Safety Council indicated that approximately 20% of American homes have smoke alarms that are not working due to dead or missing batteries. Potentially more alarming, Bush (2003) reported that approximately one third of smoke alarms in apartments are non operational. Of the non operational smoke alarms, the Public-Private Fire Safety Council found that the nearly half of the alarms had been disabled as a result of nuisance alarms or continuous alarming.

Research has supported these findings with similar results in both the United States and England. Rowland et al. (2002) performed a study on the use of smoke alarms in a housing authority in England and found that nearly 50% of the detectors were not working 15 months after installation. Furthermore, of the smoke alarms found to be not working, 40% were missing or disabled by the housing tenants. Rowland et al. recommended future research into smoke alarms that were less sensitive to cooking and cigarette smoking as a means to reduce the

frequency of tenant interference.

Ahrens (2008) studied national fire data from 2000 to 2004 and found that the death rate per 100 residential fires was half as high in residences with working smoke alarms compared to those with absent or malfunctioning alarms. Ahrens' report indicated that on average 1,020 people died per year during the five year sample in homes with working smoke alarms. Twenty-two percent of residential fire deaths occurred in homes where smoke detectors were present but failed to operate. Forty three percent of residential fire deaths during the same time period occurred in residences without smoke alarms (Ahrens, 2008). Ahrens documented that the leading cause of unwanted activations of smoke alarms was unwanted activations. Research indicated that battery removal was eight times more frequent in smoke alarms versus the removal of batteries in other battery powered equipment (Ahrens, 2008).

Jones, Thompson, and Davis (2001) found that smoke alarm use was positively associated with home ownership by performing a study comparing smoke alarm use in rural and suburban Georgia counties. Surprisingly, Jones et al. discovered that in a rural Georgia county several study respondents did not know the name or the purpose of the smoke alarm before the study.

Researchers have developed suggestions to combat the problems associated with smoke alarm use. McConnell, Dwyer, and Leeming (1996) reported that the Memphis Housing Authority installed smoke alarms in all units, but a random spot check in 1992 revealed that less than eight percent of the dwelling units had an operating smoke alarm with the remaining 92% being vandalized or left inoperable. Diment (2008) stressed to housing directors the importance to educate tenants on the significance of smoke alarms and how to appropriately handle nuisance or false alarms rather than disabling the alarm. The U.S. Fire Administration (2009)

recommended that all non lithium batteries be replaced on an annual basis and that the entire smoke alarm unit should be replaced every eight to ten years.

Stovetop fire suppressor. The literature reviewed for a stovetop fire suppressor was based on the Stovetop Firestop manufactured by Williams Pyro. The suppressor reviewed contained 12 ounces of siliconized sodium bicarbonate extinguishing agent (Hazeltine, 1997). Friedman (2003) reported that sodium bicarbonate with an anticaking agent such as silicone was the preferred dry chemical extinguishing agent for kitchen fires that could involve cooking oil. The device was designed to be mounted above any type of local household stovetop and would automatically discharge in the presence of a fire (Hazeltine, 1997; Porter, 2006).

Several testing procedures were utilized to assess the suppressor's effectiveness. Hazeltine's 1997 testing consisted of the device successfully extinguishing both a skillet ignited with Sterno and a skillet ignited with heptane as fuel. In both scenarios, the extinguishing agent was discharged without the splashing of fuel, and no reignition occurred (Hazeltine, 1997). Porter's 2006 testing of the Stovetop Firestop's microhood configuration consisted of heating one inch of vegetable oil in a cast iron skillet to 675 degrees Fahrenheit, igniting the oil, and documenting the action of the suppression device. Porter found that the grease fire burned for approximately one minute before the suppressor discharged and fully extinguished the fire with no splashing of fuel. Consistent with Hazeltine's 1997 testing, reignition did not occur after the heat source to the skillet and the oil remained on for five minutes after the fire was extinguished (Porter, 2006).

Wright (2010) listed the benefits of stovetop fire suppressors as being safe, affordable, suitable for all stovetops, and that the devices are both tested and proven. Williams Pyro (n.d.) reported that the price per pair ranged from \$34.50 to \$36.50 depending on quantity ordered.

Furthermore, Williams Pyro documented that more than a dozen fire departments had secured Department of Homeland Security Fire Prevention and Safety (FP&S) grant funding to purchase the StoveTop FireStop device for use in high-risk occupancies.

Temperature regulating stove cover plate. The Safe-T-element is described as an electronically controlled solid cover plate that is either installed pre delivery or over an existing stovetop burner to prevent temperatures from exceeding 350 degrees Fahrenheit (Pioneering Technology, 2010). Current data confirmed that typical electric element stoves heated to a range of 1300 to 1600 degrees Fahrenheit while common combustibles ignited in the 700 degree Fahrenheit range (Senter, 2009). Data from Pioneering Technology (2010) acknowledged that the Safe-T-element was designed to shut off and cool to a safe operating temperature should the element reach the cutoff temperature of 350 degrees Fahrenheit. This operational feature was supported by Crawford (2005) who found that the use of the Safe-T-element would boil water but not ignite a piece of paper placed directly on the heating element.

Lehman (2010) of the Canadian Standards Association performed a cooking performance comparison that compared the initial heat up time, overall cooking performance, and heat recovery of the Safe-T-element to both standard coil and glass-ceramic stovetop ranges. Lehman found that the stovetop equipped with the Safe-T-element took on average 18.3% longer to heat up than a standard coil element but the glass-ceramic stovetop took on average 25.7% longer to heat up. When comparing the cooking performance, Lehman documented that the Safe-T-element and the glass-ceramic stovetop performed equally with an average increase in cooking time of 12% over a standard coil element. The comparison's heat recovery testing utilized deep frying of frozen fries resulted in an increase in cook time of 54% from 11:31 for a standard coil stovetop to 17:17 on the Safe-T-element stovetop (Lehman, 2010). Lehman further suggested

that due to the dangerous nature of deep frying, an appliance specifically designed for the purpose of frying should be utilized.

The literature indicated that there are several success stories for the use of the Safe-T-element in the public housing arena. The Toronto Community Housing and Toronto Fire Services announced that no cooking fires had occurred in any of the 1,000 housing units that had been equipped with the Safe-T-element over a two year period (Mullins, 2010). Furthermore, Winston (2010) indicated that the Youngstown, OH Metropolitan Housing Authority had secured a FEMA FP&S grant in the amount of \$74,800 to install 374 Safe-T-element units in the housing authority dwellings. In the year following installation, no unattended stove top cooking fires or false alarms from unattended cooking fires had occurred in the housing authority dwellings (Winston, 2010).

Senter (2009) documented that the use of the Safe-T-element created two side effects, an increased cooking time and an annual energy reduction of \$30 to \$50. A further benefit to the use of the Safe-T-element in multifamily dwellings was the relatively low cost of approximately \$215 per element and installation (Senter, 2009) versus the overall cost of a sprinkler system. Crawford (2005) praised the proactive nature of the Safe-T-element as a means to prevent fire rather than react to an existing fire in the way a smoke alarm operates.

Enforcement

The U.S. Fire Administration (2008) described enforcement as rules that required the use of a specific safety program. An example of an enforcement strategy pertaining to smoke alarms was found in the Official Code of Georgia. According to the Fire Protection and Safety Act (1987), all dwellings constructed after July 1, 1987 were required to be equipped with an approved listed smoke alarm.

Other examples of enforcement strategies include the different municipalities that have embraced and mandated the use of stovetop fire suppression devices. Section 98-535 of the City of North Richland Hills, TX (2008) city ordinance required the use of a permanent or temporary fire suppression system on all vent hoods. Section 30-70 of the Shreveport, LA (2009) city ordinances had a similar ordinance that required an automatic fire suppression system to be installed over the stoves in all apartment buildings with three or more dwelling units that do not have sprinkler systems. Westwego, LA (2009) city ordinance Section 7:55 required that all non-sprinklered apartment buildings with two or more dwellings install an automatic fire suppression system over the stovetop. Support for such devices extends beyond the local level. Texas Senate Bill 139 (1999) of the 76th Legislature allowed for a reduction in a homeowner's insurance premium when an approved stovetop fire suppression device was utilized.

Procedures

Overview

The experiments documented within this section utilized descriptive research and addressed the types of fires occurring in MHA properties and the fire experience of other public housing authorities in the state of Georgia.

Experiment 1

Research Procedure

Incident data for all residential structure fires occurring within the city of Monroe from January 1, 2005 to December 31, 2010. Firehouse Software version 7.7.0 was utilized as the database for all incident data reported to NFIRS. An initial query was performed for all structure fire incident types NFIRS 111 and NFIRS 113 that occurred in NFIRS 419 and NFIRS 429 residences during the prescribed time period. From the list of incidents, all automatic and mutual

aid responses outside of Monroe's municipal boundaries were excluded from the sample. The final data resulted in a total of 156 residential fires included in the study (Appendix A).

Once the incident sample had been established, each individual incident report was reviewed for specific data. Data obtained from each incident report included the incident number, NFIRS incident type coding, area of fire origin, and the listed cause of ignition. Each incident was also reviewed for civilian fire casualties (Appendix B) along with smoke alarm presence and effectiveness (Appendix C).

Once all data had been collected, incidents were then separated between those that occurred within MHA properties (Appendix D) and those that occurred in all other residential occupancies (Appendix E). Data was then utilized to show the prevalence and types of fires and fire related injuries that were occurring in each residential occupancy type.

Definition of terms. Casualty- "A person injured or killed either as a result of the incident or during the mitigation of the incident" (National Fire Data Center [NFDC], 2010, p. 3-43)

NFIRS 111- A structure fire incident type consisting of a building fire (NFDC, 2010).

NFIRS 113- A structure fire incident type consisting of a "cooking fire involving the contents of a cooking vessel without fire extension beyond the vessel" (NFDC, 2010, p. 3-22).

NFIRS 419- A building classification consisting of a "1- or 2-family dwelling, detached, manufactured home, mobile home not in transit, [or] duplex" (NFDC, 2010, p. 3-51).

NFIRS 429- A building classification consisting of a "multifamily dwelling. Includes apartments, condos, townhouses, rowhouses, [and] tenements" (NFDC, 2010, p. 3-51).

Limitations

The primary limitation to the study was that the research conducted relied on the accuracy of MFD NFIRS incident reports from 2005 to 2010. Only data reported on the NFIRS incident reports was included in the research. Thus, data may be inaccurate if additional civilian fire casualties occurred during the specified time period and were not properly documented by MFD personnel on the NFIRS report. The same limitation is true regarding the location of fire origin, factors contributing to ignition, and the use and effectiveness of smoke alarms. Only factually documented data from NFIRS incident reports was considered for inclusion.

Experiment 2**Participants**

Public housing authorities within the state of Georgia were selected to be participants in the study. The United States Department of Housing and Urban Development, the federal agency responsible for administering the public housing program, was contacted and a list of all 188 public housing authorities operating in Georgia was obtained. Of the 188 public housing authorities, 166 provided low-rent housing through public housing authority owned complexes, 19 offered Section-8 housing vouchers for privately owned home rental, and 3 offered both low-rent and Section-8 housing. For the scope of this research, inclusion criteria was established as being the public housing authorities that provided a valid email address through HUD and provided low-rent housing to residents (Appendix F). The list of email contacts was reduced to prevent duplication of surveys distribution due to many housing authorities functioning as a parent organization by operating multiple smaller housing authorities. For example, the Monroe Housing Authority operated the Monroe Housing Authority, Loganville Housing Authority, Social Circle Housing Authority, Madison Housing Authority, and Rutledge Housing Authority.

Only one survey request was submitted per email address instead of five. A total of 123 survey requests were distributed via email. Six of the email requests were returned based on an invalid or undeliverable email address. This resulted in a final distribution of 117 survey requests. Only 16 of the 117 public housing authorities requested to participate in the research responded, resulting in a return rate of 13.7%.

Research Procedure

Upon establishing the participants in the research, a draft survey instrument was developed. A 21 question questionnaire was drafted in order to ascertain the types of fires that other public housing authorities in Georgia were experiencing and to document the education, engineering, and enforcement measures that they were utilizing to prevent the occurrence of fire and fire related injuries.

The survey was developed with four sections that each addressed a specific topic. The first section consisted of four basic questions and was designed to obtain data on the physical size, resident population size, and the presence of high-risk populations within the residential population of the participating public housing authorities.

The second section of the survey instrument was designed to determine the severity of the fire problem in the participating public housing authorities. Data was obtained that addressed annual public housing authority dollar loss from fire, the primary cause of fire over the previous five years, the most common cause of fire related injury over the past five years, and notification procedures between the local fire department, and the public housing authority pertaining to fires and injuries occurring within public housing authority properties.

The third section of the survey instrument was designed to evaluate the education, engineering, and enforcement measures utilized by the public housing authority. For education,

data was obtained that addressed the prevalence and frequency of fire safety education, the presence of fire evacuation drills, training in the use of fire extinguishers, and establishing who was responsible for the fire safety education of residents. Data for enforcement measures was collected to address eviction clauses for careless fires and the banning of smoking, candles, and other open flames within public housing authority properties. Data for engineering strategies was obtained to address the types of engineering strategies currently in use by the participating public housing authority.

The fourth, and final, section was an open ended question designed to ascertain recommendations from a public housing administrator's perspective to the fire service in general about methods to reduce fire and fire related injuries in public housing authority properties.

Once the draft questionnaire was completed, it was distributed to the 6 personnel assigned to A-shift at the City of Monroe Fire Department. Each shift personnel reviewed the questions for clarity and necessity for inclusion. Suggestions and feedback were provided to the researcher and a final survey instrument (Appendix G) was developed for distribution.

Due to convenience, the online method of delivery was utilized for the survey instrument. The website <http://www.QuestionPro.com> was utilized as the host site for the survey instrument. A letter of request (Appendix H) was drafted and emailed to each selected public housing authority to request participation in the research. The letter requested participation in the study and reiterated the fact that the responses of the participants were anonymous. A completion deadline was provided to ensure that adequate time would be available for results analysis.

Definition of terms. Low-Rent- Housing owned and operated by the local housing authority and provided to low-income residents at affordable rental rates (Housing Authority of DeKalb County, 2005).

Section-8- Also known as the Housing Choice Voucher Program, assists low income families and individuals in finding suitable rental housing offered by a private owner using a voucher issued by the local Housing Authority (Housing Authority of DeKalb County, 2005).

Limitations

Several limitations to the above research were noted. The primary limitation to the study was that the research conducted was restricted to public housing authorities located in the state of Georgia. Data from public housing authorities in other states was not solicited or collected. Therefore, the data obtained in the research was regional in nature and may not provide a cross sectional evaluation of the fire problem within the nation's public housing authorities as a whole. The survey request was distributed via email and the survey was hosted by <http://www.QuestionPro.com> on the internet. An invalid email address or lack of internet service prevented participation in the study. Six survey requests were documented as being undeliverable due to invalid email addresses provided by HUD. Statewide data from Georgia was also a limitation in that only 16 of the 117 public housing authorities requested to participate completed the survey. Thus, the data obtained did not represent a majority of the public housing authorities in the state. A final limitation of significance was that the participants were only reporting fires and the causes of those fires for which reporting occurred. The local housing authority may not be aware if a fire department responded to a cooking fire confined to a pot with no further damage occurring to the dwelling. This lack of reporting and knowledge by the local public housing authority may reduce the accuracy of the data.

Results

Experiment 1 Results

The first experiment was designed to determine how fires and civilian fire casualties occurring within MHA properties compared to fires that occurred in all other residential occupancies within the city during the sample time period. Structure fire statistics from 2005 to 2010 were analyzed in order to determine the prevalence of fire and associated civilian fire casualties throughout the City of Monroe. For the sample time period, a total of 156 residential structure fires (NFIRS 111 and NFIRS 113) occurred and resulted in a total of nine civilian fire casualties. The data was then reduced and divided among fires that occurred in MHA properties and fires that occurred in all other residential occupancies.

Further analysis of the fire statistics revealed that 137 fires occurred in residential occupancies and resulted in six civilian fire casualties. Nineteen fires occurred in MHA properties and resulted in three civilian fire casualties. Incident reports indicated that all fires in MHA properties were confined to the dwelling of origin as were all civilian fire casualties. Based on the above data, a civilian fire casualty occurred once per every 6.33 structure fires in MHA properties. Civilian fire casualties occurred at a rate of once per every 22.8 residential structure fires in other residential occupancies.

In an effort to further compare the fire problem between MHA properties and other residential structure fires, the area of origin for each was determined. Of the 19 structure fires occurring in MHA properties, 17 (89.47%) originated in the kitchen with the remaining 2 (10.53%) occurring in the bedroom. The four leading area of origins for structure fires in all other residential occupancies were 83 (60.58%) originated in the kitchen, 13 (9.48%) originated in the bedroom, six (4.37%) originated in the laundry room, and five (3.64%) originated in the

bathroom. The remaining 34 (24.81%) areas of origin were distributed among the attic, den, exterior, garage, crawlspace, dining area, roof, lobby, closet, wall, storage area, and area undetermined.

The data indicated that a fire originating in the kitchen was the leading area of origin for both MHA properties and the remaining residential property fires. As a means to further understand the complexity of the fire problem, fires originating in the kitchen were broken down for further evaluation. Of the 17 kitchen fires in MHA properties, 11 (64.70%) were documented as resulting from unattended cooking, five (29.41%) were undetermined, and one (5.88%) was the result of equipment failure. Eighty-three kitchen fires occurred in all other residential occupancies. Of the 83 kitchen fires, 46 (55.41%) were documented as resulting from unattended cooking, 15 (18.07%) occurred during supervised cooking, 11 (13.25%) were undetermined, eight (9.64%) resulted from equipment malfunction, and the remaining three resulted from utilizing a stove as a heater (1.20%), storing combustibles in the oven (1.20%), and a cigarette (1.20%).

The next area of comparison between MHA properties and all other residential properties pertained to civilian fire casualties. In MHA properties, three (100%) of civilian fire casualties were the result of fires that originated in the kitchen. Of these kitchen fires, all three (100%) occurred as a result of unattended cooking. Incident reports also indicated that all three civilian casualties resulted in fires that were contained to the object of origin. An analysis of civilian fire casualties in remaining residential structures revealed that 50% originated in the den or common area, 33.33% originated in the kitchen, and 16.67% originated in the bedroom. Of the two fires that originated in the kitchen, one (50%) was determined to be the result of unattended cooking and the other (50%) was documented as an undetermined cause.

The final area of comparison between fires in MHA properties and fires in all other residential properties was centered on the presence and effectiveness of smoke alarms. For the scope of this research, smoke alarms were coded in one of four categories: alerted, failed to operate, undetermined, and none present. Smoke alarms in MHA properties operated in five (26.31%) fires and failed in four (21.05%) fires. The remaining ten (52.64%) were coded as undetermined. There were no reports of smoke alarms being absent in the incident reports for MHA properties. In the remaining residential fires, smoke alarms operated in 40 fires (29.19%), failed to operate in 21 fires (15.33%), were absent in 11 fires (8.03%), and were coded as undetermined in 65 fires (47.45%).

In summation of the first experiment, the data indicated that there were some significant similarities and differences between fires and civilian fire casualties that occurred in MHA properties and those that occurred in all other residential properties. The primary significant difference between the two populations was the frequency of civilian fire casualties. As previously stated, a fire in MHA properties resulted in one civilian fire casualty for every 6.33 reported structure fire. In all remaining residential structures, a civilian fire casualty occurred at a rate of one for every 22.8 reported structure fires. Another significant difference between the sample groups was that kitchen fires were the cause of 100% of all civilian fire casualties in MHA properties but only accounted for a third of civilian fire casualties in all other residential occupancies.

The final areas of comparison were the area of origin, cause of ignition, and smoke alarm effectiveness. Although MHA properties and other residential properties shared the top two areas of origin as being the kitchen and bedroom, significant differences were noted. The data confirmed that kitchen fires were more frequent in MHA properties, occurring at a rate of

89.47% of structure fires versus 60.58% of structure fires in all other residential occupancies.

Unattended cooking was the leading cause of ignition in both sample groups with 64.70% being documented in MHA properties and 55.41% being documented in all other residential occupancies. The final comparison of data revealed that smoke alarms only properly operated in 26.31% of MHA property fires and 29.19% of all other residential structure fires.

Experiment 2 Results

All public housing authorities listed by HUD with a valid email address within the State of Georgia were contacted with a request for participation in the research. Of the 117 public housing authorities identified as being eligible for participation, 16 completed the survey. This represented 13.67 % of the public housing authorities selected for participation. Table 1 represents the number of housing developments managed by each participating public housing authority. Half of the participating housing authorities, eight of 16 (50 %), managed only one or two housing developments, and 15 of 16 (93.75%) managed seven developments or less. The lone outlying public housing authority (6.25%) managed 27 different housing developments.

Table 1
Number of Housing Developments Managed

Number of Developments	Responses	Percentage
1	5	31.25
2	3	18.75
4	1	6.25
5	2	12.5
6	2	12.5
7	2	12.5
27	1	6.25

Table 2 represents the number of individual dwelling units managed by the participating public housing authorities. The data indicated that ten of the 16 (62.5%) participating public housing authorities managed small housing authorities with 200 or less dwelling units.

Table 2
Number of Dwelling Units Managed

Number of Dwellings	Responses	Percentage
1-100	3	18.75
101-200	7	43.75
201-300	2	12.5
301-400	0	0
401-500	2	12.5
501+	2	12.5

Participating public housing authorities served between 20 and 1,600 residents. A majority, 68.75%, served 500 residents or less. Table 3 represents the high-risk populations served by participating public housing authorities. Of significance to the fire service, all participants (100%) served children less than five years of age, adults over the age of 65, and people with disabilities.

Table 3
High-Risk Populations

Population	Responses	Percentage
Children less than 5 years	16	100
Impoverished households	11	68.75
Adults age 65 and above	16	100
People with disabilities	16	100
Foreign language	6	37.5

Participants were asked about the approximate annual dollar loss from fire within the participating public housing authority. Responses ranged from no fire loss to \$113,000 annually. A majority (56.25%) of respondents indicated that there was no annual dollar loss from fire. Participants that listed a dollar figure had a range from \$500 at a minimum to \$113,000 at a maximum.

Table 4 represents the primary cause of fire as determined by the participants over the previous five year period. Five respondents indicated that no fires had occurred during the prescribed time period. For the 11 reported fires, cooking was responsible for eight (72.72%), open flames for two (18.18%), and the remaining fire cause was unknown (9.09%).

Table 4
Primary Cause of Fire

Cause	Responses	Percentage
Cooking	8	50
Heating Equipment	0	0
Electrical Malfunction	0	0
Open Flame	2	12.5
Smoking	0	0
Intentional (Arson)	0	0
Unintentional/Careless	0	0
No Reported Fires	5	31.25
Unknown	1	6.25

Table 5 represents the primary cause of fire related injury over the five year sample period. Eleven (68.75%) of the respondents indicated that no injuries had been reported as a result of fire over the previous five year period. The remaining participants indicated that of the

five represented public housing authorities, all injuries (100%) that occurred as a result of fire were the result of cooking. No other cause of fire related injury was selected.

Table 5
Primary Cause of Fire Related Injury

Cause	Responses	Percentage
Cooking	5	31.25
Heating Equipment	0	0
Electrical Malfunction	0	0
Open Flame	0	0
Smoking	0	0
Intentional (Arson)	0	0
Unintentional/Careless	0	0
No Reported Injuries	11	68.75
Unknown	0	0

Questions pertaining to the reporting of fires and fire related injuries by the local fire department were answered by participants. When asked about whether or not the housing authority was notified when damage occurred to the dwelling units from a building fire (NFIRS 111), a majority (93.75%) indicated that the housing authority was notified. Only one respondent (6.25%) indicated that the housing authority was not notified by the fire department. The participants were then questioned about the reporting of a contained fire (NFIRS 113) that did not cause damage to the structure. Eleven participants (68.75%) indicated that the housing authority was notified for this type of fire. The remaining five (31.25%) indicated that such responses were not reported to the public housing authority by the fire department. Fifteen participants (93.75%) indicated that all fire related injuries were reported to the public housing authority. Only one participant (6.25%) indicated that fire related injuries were not reported.

When questioned about education, all participants (100%) indicated that a fire safety education class was not required as a part of the lease agreement, and only one housing authority (6.25%) had hosted or sponsored a fire safety education class for residents over the five year sample period. None (0%) of the participants indicated that the housing authority had sponsored a fire evacuation drill over the five year sample period. When questioned about training in fire extinguisher use, only one (6.25%) housing authority had trained their residents. The education section concluded with a question asking who the public housing authority believed to be responsible for the education of residents in fire safety. Two participants (12.5%) responded that it was the sole responsibility of the local fire department; the remaining participants (87.5%) indicated that there was an equal responsibility between the local fire department and the local public housing authority.

Three questions pertaining to enforcement were answered by participants. The first ascertained if the lease agreement for public housing included an eviction clause for fires that were determined to be the resident's fault. Nine participants (56.25%) indicated that the lease agreement did contain an eviction clause. None (0%) of the participants indicated that smoking was banned within the dwelling units of the public housing authority. Only four (25%) indicated that candles and other open flames were banned inside the dwelling units.

The engineering section of the survey instrument contained two questions that addressed engineering strategies that were in current use by the participants. Table 6 represents the responses of participants. Smoke alarms of both batteries (56.25%) and hard wired (87.5%) power sources were the most commonly chosen engineering strategies in use. It should be noted that a choice that included both battery and hard wired power was not provided on the survey instrument. No (0%) participants utilized smart stove or stove cover plate technology such as the

Safe-T-element. One participant (6.25%) utilized a stovetop extinguishing system such as the StoveTop FireStop. The final engineering question revealed that 14 of the participants (87.5%) provided portable fire extinguishers in each dwelling unit.

Table 6
Engineering Strategies in Use

Engineering Strategy	Responses	Percentage
Sprinkler System	1	6.25
Fire Alarm System	2	12.5
Smart Stove / Cover Plate	0	0
Stove Extinguisher System	1	6.25
Battery Smoke Alarms	9	56.25
Hard Wired Smoke Alarms	14	87.5
None	0	0
Other	1	6.25

The final section of the survey instrument was an open ended question that allowed the participants to provide suggestions or recommendations to the fire service from public housing administrators. The following anonymous statements were provided. “Our biggest problem is the way residents cook. Most fry a lot and cause the smoke detector to go off. Many times they take a broom handle and knock the smoke detector off the ceiling...” “Work with the local housing authority to promote and provide community training on fire safety. I think the local housing authority should be the upfront leader in this effort for their residents”. “Collaborate with the HA [housing authority] to teach fire safety.”

To conclude, data from both the first and second experiment were utilized to determine if the fire problem in MHA properties were unique or a representation of the fire problem within

public housing authorities throughout the state of Georgia. The data revealed that cooking fires were the leading cause of fire at both the local and state level. Furthermore, all reported civilian fire casualties from survey participants were the result of cooking related fires which mirrored data from MHA properties. It should be noted that a definitive comparison cannot be determined since the public housing authority survey only had a 13.67% participation rate. However, the fire problem in the MHA properties was a representation of the fire problem within the participating Georgia public housing authorities. Education, engineering, and enforcement measures at the state level were limited with very little evidence from participants that measures beyond smoke alarm use were currently being utilized on a large scale.

Discussion

The research resulted in some significant results for all fire departments and public housing authorities. The initial experiment was designed to utilize fire department incident reports as a means to compare the fire problem and civilian fire casualties within the MHA properties to those that occurred in all other residential occupancies. The foundation of this research originated during the completion of the community risk assessment portion of the EACRR precourse material. The assessment was the first time that data from all three MFD shifts had been compiled into a single data set to accurately reflect the significance of the fire problem. The overall frequency of cooking fires throughout the city struck the researcher as being problematic, especially the frequency of civilian fire casualties from cooking fires within MHA properties.

As previously discussed, it was already established that public housing authorities were designed to provide housing to low-income families, people with disabilities, and the disabled (HUD, n.d.). These populations had also been identified by FEMA (2010) as being high-risk for

fire and associated injuries. Therefore, a significant portion of the high-risk population was residing under housing provided by MHA. Research to protect those individuals from harm and the property from damage would be beneficial to all involved.

As the results section demonstrated, cooking related fires were the leading cause of structure fires in all residential occupancies during the sample time period. This was not surprising to the researcher since the research data correlated with the data reported by FEMA (2007) which indicated that cooking fires were the leading cause of residential fires nationwide. The research data also revealed that unattended cooking was the leading documented cause of fires originating in the kitchen. This result supported the previously published and discussed works of Bradley (2003), FEMA (2007), and USFA (2005). One interesting deviation from the research data and the literature was that unattended cooking was not the leading cause of fire in the Memphis Housing Authority from 1985-1993 as reported by McConnell, Dwyer, and Leeming (1996). McConnell et al. found that children playing with matches were the leading cause of fire in their sample housing authority. This discrepancy could be attributed to the population difference between the two public housing authorities, as McConnell et al. reported that some 19,000 residents occupied the Memphis Housing Authority. This is a significant difference from the number of residents that occupy the 330 dwelling Monroe Housing Authority.

The initial experiment research also indicated that 100% of civilian fire casualties occurring in MHA properties were the result of kitchen fires. This result was not surprising to the researcher. Like other published data, this mirrored the report of USFA (2004) which indicated that kitchen fires caused less property loss and death than other residential fires but resulted in more injuries. In fact, all civilian fire casualties in MHA properties were reported as

being confined to the object of origin. Therefore, the more damaging and destructive fires in MHA properties during the sample period did not result in any documented injuries.

The utilization of smoke alarms was the final area of comparison between MHA properties and other residential properties that experienced a structural fire. Based on information obtained from MHA through personal communication on April 7, 2011, the presence of smoke alarms in all MHA dwellings had been established. What the researcher did not expect the data to reveal was that smoke alarms were documented as failing in over 20% of the fires. This figure closely mirrored the figure of the Public-Private Fire Safety Council (2006) which reported that approximately 20% of American homes had smoke alarms that did not function properly. This was especially significant since MHA maintenance staff performed smoke alarm checks on each dwelling serviced throughout the year. However, this was not as significant as the 92% of smoke alarms found to be vandalized or inoperable by McConnell, Dwyer, and Leeming (1996) in their study of the Memphis Housing Authority. The incident reports did not indicate the contributing factors to smoke alarm failure but one could predict from other research (Ahrens, 2008; Public-Private Fire Safety Council, 2006; Rowland et al., 2002) that the result was from battery removal or unit disabling from unwanted activations. This failure rate reinforced Diment's (2008) stance on the importance of housing authority directors educating tenants on the importance of smoke alarms and how to appropriately handle nuisance alarms without removing batteries or disabling the unit.

The second research experiment was designed to address the fire problem in other housing authorities, identify the fire reduction methods in current use, and to provide a basis on which to compare MHA to other public housing authorities in Georgia. It should again be noted that the survey instrument only had a 13.67% completion rate, so only generalities between

MHA and participating Georgia housing authorities could be formulated. Unfortunately, an entire cross-sectional view of the public housing fire problem in Georgia could not be established.

The size of participating housing authorities was also of importance. As stated earlier, MHA operated nine housing complexes within the municipal boundaries of Monroe, Georgia. Of the 16 participating public housing authorities, 93.75% operated less than the nine complexes. When comparing the participating public housing authorities based on individual dwellings, 25% surpassed the 330 dwellings operated by MHA. This was significant in order to establish if the fire problem was influenced by the size of the public housing authority or the population served.

All participating public housing authorities indicated that they served children less than five years of age, adults over 65, and individuals with disabilities. Again, these were all high-risk populations as identified by FEMA (2010).

The research indicated that although different sized public housing authorities participated in the research, they shared a similar fire problem. Cooking fires were the leading cause of fire and fire related injuries in the study. Again, this was not a surprise to the researcher as it mirrored the previously cited studies (Bradley, 2003; FEMA, 2007; USFA, 2005). However, two housing authorities cited open flames such as lighters and matches as being the leading cause of fire, but not injury, within their public housing authority. This finding was more in line with the findings of McConnell, Dwyer, and Leeming (1996). After viewing this data, the researcher was able to conclude that the fire problem plaguing the MHA was not a local problem, but rather a significant problem plaguing other public housing authorities throughout the state.

One area of concern to that the researcher experienced was the potential for public housing authorities to miss out on the total fire problem within their jurisdiction. Two questions were asked of the participants to determine how fires and fire related injuries were reported. The driving factor for these questions was the fact that all civilian fire casualties that occurred in MHA during the sample period were coded by MFD personnel as being a cooking fire confined to a container (NFIRS 113). This is significant due to the fact that only structure fires with structural damage were reported to MHA administration. Therefore, on the local level, MHA was never informed by MFD of the civilian fire casualties that occurred within their complexes. The research was designed to ascertain if this reporting between MFD and MHA was mirrored by other fire departments and public housing authorities throughout the state. Over 93% of participants indicated that the public housing authority was notified of a fire related injury when the fire produced structural damage and over 68% indicated that they were notified of a fire related injury that occurred when a fire was confined to the cooking container.

Potentially the greatest surprise to the researcher was the overall lack of education, engineering, and enforcement measures being utilized by the participating public housing authorities. The research revealed that the public housing authorities were aware of the leading cause of fire and fire related injuries within their complexes but very little prevention or mitigation efforts were documented. In fact, only one participant indicated that a fire safety education class had occurred in the previous five years. This surprised the researcher in that participants documented annual fire losses up to \$113,000 but did not appear to be making any proactive changes to reduce or prevent such loss.

To further expand on prevention measures, the literature indicated that other public housing authorities throughout the United States and Canada had utilized automatic stovetop fire

suppressors and temperature regulating cover plates (Mullins, 2010) and others had received federal grant funding to purchase the devices as a means to prevent the cooking fire problem (Winston, 2010). The researcher believed that following suit by public housing authorities in Georgia would be valuable to residents, the public housing authorities, and the local fire departments.

In the end, the research revealed several significant findings. First of all, residents in MHA properties were more likely to suffer a fire related injury than residents in all other residential occupancies based on the injury to fire frequency ratio. Secondly, cooking fires were the leading cause of fire and fire related injuries in the participating public housing authorities. The resulting comparison of the fire problem in MHA versus the participating housing authorities revealed that the fire problem in MHA properties mirrored the fire problem in the participating public housing authorities. Lastly, very few education, engineering, and enforcement measures were being utilized by participating public housing authorities.

Recommendations

Based on the results from the research, there are several recommendations that would be beneficial to the City of Monroe Fire Department, the Monroe Housing Authority, as well as other fire departments, and public housing authorities throughout Georgia and the United States.

The first recommendation is to acknowledge that there is a cooking fire problem within the Monroe Housing Authority. The data indicated that cooking fires were responsible for almost 90% of all fires and 100% of civilian fire casualties within MHA properties. This data was closely mirrored by other public housing authorities indicating that the problem is not only a local issue. However, in order to effectively prevent future occurrence, steps must be taken to address the issue. The initial interview with MHA Executive Director K. Stuart (personal

communication, April 7, 2011) revealed that the MHA had looked into automatic stovetop fire suppressors some ten years ago but had chosen not to act because of concerns with shelf life, accidental discharge, and resident tampering. Based on data provided for the current research, \$80,813.37 in fire damage and all civilian fire casualties could have been prevented with some type of cooking fire mitigation strategy. The research clearly indicated that the prevention and mitigation of cooking related fires are significant measures needed to address the fire problem currently plaguing the Monroe Housing Authority.

The second recommendation is for the Monroe Housing Authority to form a partnership with the City of Monroe Fire Department. Current interaction between the two agencies has traditionally been the result of a fire that has already occurred. Emphasis should be placed on an increased cooperation between the two agencies as a means to prevent fires from occurring. Further support of this cooperation was reported by Sales (2009) who concluded that a majority of residents participating in a fire safety education course considered firefighters to be the most prominent and effective communicators of the fire safety message. To further support this recommendation, Ta, Frattaroli, Bergen, and Gielen (2006) concluded that fire prevention programs that involved a partnership between the sponsoring organization and the fire department were successful in preventing fires in the community.

The third recommendation addresses both education and enforcement measures to prevent fires within MHA properties. Participating housing authorities and the MHA indicated that fire safety education was not required as a part of the lease agreement and only one (6.25%) participating housing authority had sponsored a fire safety education course over the previous five years. The recommendation is to follow the lead of the Suffolk, Virginia Housing Authority as described by Braxton (2005). The recommendation is to implement an initial fire safety

education program that must be successfully completed by incoming residents prior to the lease agreement being finalized. The initial program could be performed by Monroe Fire Department personnel and filmed so that MHA administrators could provide the training as often as needed to meet the needs of new families. Furthermore, as Braxton (2005) described, an annual refresher course and annual self administered home safety inspection should also be included in the lease agreement. Failure to agree to the terms of the initial and annual programs would result in denial of the proposed occupant from gaining public housing. This recommendation was supported by the work of Braxton (2005) and McConnell, Dwyer, and Leeming (1996) who documented that fire safety programs designed for public housing authorities were described as being successful in reducing the prevalence of fire.

The fourth recommendation would be to implement fire extinguisher training. Although this recommendation could be included in the previous recommendation of fire safety education training, the researcher has chosen to separate it from the overall education portion. MHA Executive Director K. Stuart (personal communication, April 7, 2011) indicated that all 330 dwelling units of the MHA properties were equipped with a fire extinguisher. However, a review of the data during experiment 1 resulted in no documentation of a resident using a fire extinguisher to extinguish the fire prior to fire department arrival. Furthermore, no fire extinguisher training was provided to MHA residents and only one (6.25%) participating public housing authority indicated that they provided the training to residents over the previous five year period. The researcher recommended that the fire extinguisher training stand alone from the previously described fire safety education class based on the importance of performing hands on training with the extinguisher

The fifth recommendation addresses securing funds and purchasing a temperature regulating stovetop cover plate device to prevent cooking fires from occurring. This device would be retrofitted on all current electric element stoves. The research indicated that temperature regulating stovetop cover plates cost approximately \$215 per unit (Senter, 2009) which equates to approximately \$70,950 needed to outfit all 330 MHA dwellings. Although significant, this is less than the MHA has spent over the past five years to repair damage resulting from cooking fires. The research indicated that other public housing authorities had received Fire Protection and Safety grant monies to implement cooking fire mitigation strategies (Winston, 2010). The recommendation is for the MHA to appropriately budget for the purchase of these devices or to apply for grant funding through the Fire Protection and Safety grant program to cover the purchase costs of the devices. The recommendation also includes a clause that would include built in temperature regulating technology on all future stove purchases by the MHA.

The sixth recommendation is to consider the purchase and installation of automatic stovetop fire suppressor units. The stovetop fire suppressor units were priced between \$34.50 and \$36.50 per pair (Williams Pyro, n.d.) and would cost the MHA between \$11,385 and \$12,045 to outfit all 330 MHA dwellings. The benefit to these devices is that they cost significantly less than the stovetop cover plates. However, they are single use and have a limited shelf life. If funding for the stovetop cover plates can not be secured in a timely manner, the recommendation is to purchase the automatic stovetop fire suppressors as a preliminary means to outfit each dwelling with cooking fire protection while funding for the more expensive stovetop cover plates could be secured. Williams Pyro indicated that fire departments had been successful

in securing Fire Protection and Safety grant funding for the purchase and installation of automatic stovetop fire suppressors in residences occupied by high-risk populations.

The final recommendation is based on USFA (2009) data. MHA Executive Director K. Stuart (personal communication, April 7, 2011) indicated that all dwelling units were equipped with a smoke alarm however, when asked about battery replacement; Stuart indicated that all batteries were not replaced at the same time. According to Stuart, batteries were replaced when the resident advised that the batteries were dead or dying or when MHA maintenance crews found an alarm in need of batteries. The recommendation is for the MHA maintenance crews to continue checking the alarms on each visit and to implement an annual battery replacement program as a means to confirm that each dwelling's smoke alarm batteries were replaced on an annual basis. The data indicated that in four of the fires in MHA properties, the smoke alarm failed to operate. The recommendation also includes a clause that would void the lease agreement should a smoke alarm be found disabled or damaged by the tenant. This final recommendation would address this problem as a means to prevent dead batteries or smoke alarm tampering from being a contributing factor to a civilian fire casualty.

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Appendix A
Residential Structure Fires 2005-2010

Incident	Address		Type	Origin
05-0051	240 N. Midland Avenue	111	Residential	Kitchen
05-0134	141 Hubbard Street	111	Residential	Kitchen
05-0297	118 Felker Street	111	Residential	Kitchen
05-0405	305 E. Marable Street	111	Residential	Bedroom
05-0436	982 Tall Oaks	111	Residential	Kitchen
05-0476	321.5 Walker Drive	111	Residential	Bedroom
05-0535	203 B Tanglewood Drive	111	Residential	Kitchen
05-0625	408 Windsor Drive	111	Residential	Kitchen
05-0731	510 A Carver Place	111	MHA	Bedroom
05-1025	11 Rose Ison Terrace	111	MHA	Kitchen
05-1034	515 B King Street	111	MHA	Kitchen
06-0035	1401 S. Broad	111	Residential	Bathroom
06-0115	108 Atha Street	111	Residential	Kitchen
06-0144	1316 S. Madison Ave.	111	Residential	Bedroom
06-0177	700 Kendall Ct.	111	Residential	Den
06-0237	324 Turner Street	111	Residential	Den
06-0252	910 S. Broad St.	111	Residential	Attic
06-0244	1207 Mathis St.	111	Residential	Undetermined
06-0928	134 Ford Street	111	Residential	Kitchen
06-1129	1328.5 S. Madison Ave.	111	Residential	Bedroom
07-0143	1 Kaye Ln.	111	Residential	Garage
07-0274	410 Mears St.	111	Residential	Bedroom
07-0285	700 Kings Ridge Dr.	111	Residential	Garage
07-0309	125 Carver Drive (42)	111	MHA	Kitchen
07-0498	228 N. Midland Ave.	111	Residential	Laundry
07-0372	626 Lakeview Dr.	111	Residential	Laundry
07-0790	108 Nowell St.	111	Residential	Kitchen
07-0914	342 Towler St. Lot 10	111	Residential	Kitchen
07-0942	204 B Sorrells St.	111	Residential	Kitchen
07-0926	515 Hill Street	111	Residential	Bedroom
07-1022	320 Parkway Place	111	Residential	Dining
07-1059	579 E. Tall Oaks	111	Residential	Kitchen
07-1069	309 Turner Street	111	Residential	Crawl Space
07-1109	219 B Tanglewood Ln.	111	Residential	Bedroom
07-1243	415 E. Church Street	111	Residential	Storage
07-1268	216 Walker Drive	111	Residential	Bathroom
07-1275	801 Davis Street	111	Residential	Kitchen
07-1351	609 West Creek Circle	111	Residential	Kitchen
07-1353	303 Etten Drive	111	Residential	Laundry

08-0020	340 Towler St. Lot 1	111	Residential	Undetermined
08-0022	107 Ford Street	111	Residential	Attic
08-0030	109 Davis St.	111	Residential	Bathroom
08-0041	223 Carwood Dr.	111	Residential	Porch
08-0141	103 Mt. View Dr.	111	Residential	Kitchen
08-0207	511 Launius Street	111	Residential	Wall
08-0226	303 Walker Drive	111	Residential	Bedroom
08-0531	700 E Church	111	Residential	Attic
08-0603	350 Davis St. Lot1	111	Residential	Bathroom
08-0612	219 B Alcovy Street	111	Residential	Bedroom
08-0658	1343 Armistead Circle	111	Residential	Garage
08-0662	210 B Tanglewood Ln	111	Residential	Kitchen
08-0832	509 A Green Street	111	Residential	Crawl Space
08-0834	953 Lopez Lane	111	Residential	Outside
08-0848	2014 Meadow Walk Dr.	111	Residential	Closet
08-0868	238 N. Midland Ave.	111	Residential	Lobby
08-0890	1450 S. Broad Lot 170	111	Residential	Dining
08-0975	739 A Wheel House Lane	111	Residential	Kitchen
09-1138	12 Rose Ison Terrace	111	MHA	Kitchen
08-1189	316 Towler Street	111	Residential	Outside
08-1348	505 Hill Street	111	Residential	Crawl Space
08-1426	707 Reese Street	111	Residential	Porch
08-1475	315 Knight Street	111	Residential	Kitchen
09-0105	425 Plantation Drive	111	Residential	Kitchen
09-0428	236 A Atha Street	111	Residential	Laundry
09-0541	1103 B New Lacy St.	111	Residential	Kitchen
09-0573	1129 Reed Ct	111	Residential	Kitchen
09-0670	525 Maple Street	111	Residential	Kitchen
09-0778	430 B Irving Street	111	Residential	Bedroom
09-1047	208 B Sorrells Street	111	Residential	Den
09-1055	671 Gatewood Way	111	Residential	Kitchen
09-1109	1227 S. Madison Ave.	111	Residential	Bedroom
09-1184	808 E. Church Street	111	Residential	Den
09-1271	1206 Claywill Circle	111	Residential	Bedroom
09-1291	405 Shamrock Dr.	111	Residential	Roof
10-0033	125 Carver Drive (37)	111	MHA	Kitchen
10-0037	17 Magnolia Terrace	111	MHA	Bedroom
10-0326	120 Atha Street	111	Residential	Laundry
10-0348	116 A E. Fambrough Street	111	Residential	Kitchen
10-0693	555 Michael Circle	111	Residential	Attic
10-0725	1043 D Wheel House Lane	111	Residential	Bedroom
10-0757	527 Landers Street	111	Residential	Kitchen
10-0772	388 B Birch Street	111	Residential	Kitchen

10-0906	504 Forest Street	111	Residential	Bathroom
10-0930	551 Bridgeport Place	111	Residential	Kitchen
10-0940	934 Harvest Lane	111	Residential	Kitchen
10-1053	116 Victory Drive	111	Residential	Porch
10-1123	1403 S. Broad Street	111	Residential	Kitchen
10-1154	1338 Armistead Circle	111	Residential	Exterior Wall
10-1171	300 B Tanglewood Dr.	111	Residential	Exterior Wall
10-1262	215 Bryant Road	111	Residential	Laundry
10-1362	1501 Meadow Walk Drive	111	Residential	Kitchen
10-1369	116 Cook Place Apartments	111	Residential	Kitchen

05-1117	398 B Birch Street	113	MHA	Kitchen
05-1187	574 E. Tall Oaks	113	Residential	Kitchen
06-0079	415 Ash St.	113	Residential	Kitchen
06-0100	837 Fawnfield Dr.	113	Residential	Kitchen
06-0553	625 Young St.	113	Residential	Kitchen
06-0599	719 Cloverdale	113	Residential	Kitchen
06-0638	409 Reed Way	113	Residential	Kitchen
06-0907	618 Plaza Trace	113	Residential	Kitchen
06-0988	320 A Towler St.	113	Residential	Kitchen
06-1124	315 A Ash St.	113	Residential	Kitchen
06-1182	300 B Tanglewood Dr.	113	Residential	Kitchen
06-1192	10 Rose Ison Terrace	113	MHA	Kitchen
07-0046	219 Tanglewood Ln.	113	Residential	Kitchen
07-0144	125 Carver Dr. (12)	113	MHA	Kitchen
07-0159	789 Ridge Rd.	113	Residential	Kitchen
07-0197	109 B W Fambrough St.	113	Residential	Kitchen
07-0289	706 Lawrence St.	113	Residential	Kitchen
07-0505	555 Baron Drive	113	Residential	Kitchen
07-0530	13 Magnolia Terrace	113	MHA	Kitchen
07-0951	1904 Highland Creek Drive	113	Residential	Kitchen
07-1144	340 Towler St. Lot 5	113	Residential	Kitchen
07-1337	568 Ridgeview Court	113	Residential	Kitchen
08-0249	1017 Wheel House Ln.	113	Residential	Kitchen
08-0283	125 Carver Dr. (24)	113	Residential	Kitchen
08-0295	707 A Lacy Street	113	Residential	Kitchen
08-0365	1011 New Lacy St.	113	Residential	Kitchen
08-0686	28 Magnolia Terrace	113	MHA	Kitchen
08-0688	601 Breedlove (105)	113	Residential	Kitchen
08-0833	705 Stone Creek Court	113	Residential	Kitchen
08-0970	1109 Springer Lane	113	Residential	Kitchen
08-1037	710 White Oak Dr.	113	Residential	Kitchen
08-1055	601 Breedlove (133)	113	Residential	Kitchen

08-1219	616 Michael Circle	113	Residential	Kitchen
08-1259	328 Glen Iris Drive	113	Residential	Kitchen
08-1313	565 Tall Oaks	113	Residential	Kitchen
08-1318	394 Birch Street	113	MHA	Kitchen
08-1334	219 Mayfield Drive	113	Residential	Kitchen
08-1443	425 A Cook Street	113	Residential	Kitchen
09-0050	1808 Meadow Walk Drive	113	Residential	Kitchen
09-0178	140 Mt. View Drive	113	Residential	Kitchen
09-0205	425 E. Washington St. (31)	113	MHA	Kitchen
09-0209	516 Clearview Drive	113	Residential	Kitchen
09-0525	380 Birch Street	113	MHA	Kitchen
09-0597	23 GW Carver Drive	113	MHA	Kitchen
09-1093	229 A Tanglewood Dr.	113	Residential	Kitchen
09-1342	200 Douglas St.	113	Residential	Kitchen
09-1354	879 Hickory Drive	113	Residential	Kitchen
10-0279	813 Fawnfield Drive	113	Residential	Kitchen
10-0300	102 Cook Place	113	Residential	Kitchen
10-0530	652 Plaza Trace	113	Residential	Kitchen
10-0790	601 Breedlove (122)	113	Residential	Kitchen
10-0995	436 B Irving St.	113	Residential	Kitchen
10-1101	502 B Carver Place	113	MHA	Kitchen
10-1315	601 Breedlove (133)	113	Residential	Kitchen

Appendix B
Civilian Fire Casualties

Civilian Fire Casualties
Non MHA Residential Building Fires 2005-2010

Incident	NFIRS	Origin	Age	Sex	Injury	Severity
05-0476	111	Bedroom	14	Male	Smoke inhalation	Moderate
06-0237	111	Den	77	Female	Burns to face	Minor
06-0237	111	Den	65	Male	Burns to face	Minor
07-0505	113	Kitchen	17	Female	Burns to unknown areas	Undetermined
09-0105	111	Kitchen	70	Female	Burns to R. arm, smoke inhalation	Minor
09-1184	111	Den	65	Male	Smoke inhalation	Life Threat

Civilian Fire Casualties
Monroe Housing Authority Residential Building Fires 2005-2010

Incident	NFIRS	Origin	Age	Sex	Injury	Severity
06-1192	113	Kitchen	36	Female	Burns to R. hand and L. leg	Minor
07-0530	113	Kitchen	56	Male	Smoke inhalation	Minor
09-0205	113	Kitchen	73	Female	Smoke inhalation	Minor

Appendix C
Smoke Alarm Function

Incident		Smoke Alarm	Incident		Smoke Alarm
05-0067	113	Undetermined	05-0051	111	Alerted- Occupants responded
05-0108	113	Undetermined	05-0134	111	Present- Undetermined
05-0201	113	Failed to Operate	05-0297	111	Alerted- Occupants responded
05-0275	113	Alerted- Occupants Responded	05-0405	111	Alerted- Occupants responded
05-0348	113	Undetermined	05-0436	111	None Present
05-0732	113	Failed to Operate	05-0476	111	Undetermined
05-0739	113	Alerted- Occupants Responded	05-0535	111	Alerted- Occupants responded
05-0856	113	Undetermined	05-0625	111	Alerted- Occupants responded
05-0930	113	Undetermined	05-0731	111	Alerted- Occupants responded
05-1040	113	Undetermined	05-1025	111	Failed to Operate
05-1117	113	Operated	05-1034	111	Undetermined
05-1187	113	Alerted- Occupants Responded	06-0035	111	Alerted- Occupants responded
06-0079	113	Undetermined	06-0115	111	Present- Undetermined
06-0100	113	Alerted- Occupants Responded	06-0144	111	None Present
06-0553	113	Alerted- Occupants Responded	06-0177	111	Failed to Operate
06-0599	113	Alerted- Occupants Responded	06-0237	111	Undetermined
06-0638	113	Failed to Operate	06-0252	111	Undetermined
06-0907	113	Undetermined	06-0244	111	None Present
06-0988	113	Undetermined	06-0928	111	Undetermined
06-1124	113	Alerted- Occupants Responded	06-1129	111	None Present
06-1182	113	Undetermined	07-0143	111	Present- Undetermined
06-1192	113	Failed to Operate	07-0274	111	Undetermined
07-0046	113	Failed to Operate	07-0285	111	Undetermined
07-0144	113	Operated	07-0309	111	Operated- no occupants
07-0159	113	Alerted- Occupants Responded	07-0498	111	Undetermined
07-0197	113	Undetermined	07-0372	111	Undetermined
07-0289	113	Undetermined	07-0790	111	Undetermined
07-0505	113	Failed to Operate	07-0914	111	Operated- no occupants
07-0530	113	Undetermined	07-0942	111	Operated- no occupants
07-0951	113	Failed to Operate	07-0926	111	Undetermined
07-1144	113	Undetermined	07-1022	111	Alerted- Occupants responded
07-1337	113	Alerted- Did not respond	07-1059	111	Failed to Operate
08-0249	113	Undetermined	07-1069	111	Present- Undetermined
08-0283	113	Undetermined	07-1109	111	Failed to Operate (no batteries)
08-0295	113	Undetermined	07-1243	111	None Present
08-0365	113	Alerted- Occupants Responded	07-1268	111	Undetermined
08-0686	113	Undetermined	07-1275	111	Failed to Operate (no batteries)
08-0688	113	Alerted- Occupants Responded	07-1351	111	Alerted- Occupants responded
08-0833	113	Undetermined	07-1353	111	Undetermined

08-0970	113	Alerted- No Occupants	08-0020	111	Present- Undetermined
08-1037	113	Detector did not alert occupants	08-0022	111	Present- Undetermined
08-1055	113	Alerted- Occupants Responded	08-0030	111	Undetermined
08-1219	113	Undetermined	08-0041	111	Undetermined
08-1259	113	Detector did not alert occupants	08-0141	111	Failed to Operate
08-1313	113	Alerted- Occupants Responded	08-0207	111	Alerted- Occupants responded
08-1318	113	Undetermined	08-0226	111	None Present
08-1334	113	Undetermined	08-0531	111	Undetermined
08-1443	113	Undetermined	08-0603	111	Alerted- Occupants responded
09-0050	113	Alerted- Occupants Responded	08-0612	111	Undetermined
09-0178	113	Undetermined	08-0658	111	Undetermined
09-0205	113	Failed to Operate	08-0662	111	Failed to Operate
09-0209	113	Undetermined	08-0832	111	Undetermined
09-0525	113	Undetermined	08-0834	111	Present- Undetermined
09-0597	113	Undetermined	08-0848	111	Undetermined
09-1093	113	Alerted- Occupants Responded	08-0868	111	Undetermined
09-1342	113	Alerted- Occupants Responded	08-0890	111	Undetermined
09-1354	113	Undetermined	08-0975	111	Alerted- Occupants responded
10-0279	113	Undetermined	09-1138	111	Undetermined
10-0300	113	Undetermined	08-1189	111	Undetermined
10-0530	113	Detector did not alert occupants	08-1348	111	Undetermined
10-0790	113	Undetermined	08-1426	111	Undetermined
10-0995	113	Undetermined	08-1475	111	Alerted- Occupants responded
10-1101	113	Failed to Operate	09-0105	111	Alerted- Occupants responded
10-1315	113	Alerted- Occupants Responded	09-0428	111	Alerted- Occupants responded
			09-0541	111	None Present
			09-0573	111	Undetermined
			09-0670	111	None Present
			09-0778	111	None Present
			09-1047	111	Failed to Operate
			09-1055	111	Failed to Operate
			09-1109	111	Failed to Operate
			09-1184	111	None Present
			09-1271	111	Undetermined
			09-1291	111	Operated- no occupants
			10-0033	111	Alerted- Occupants responded
			10-0037	111	Undetermined
			10-0326	111	Undetermined
			10-0348	111	Alerted- Occupants responded
			10-0693	111	Too Small to Activate
			10-0725	111	Failed to Operate
			10-0757	111	Failed to Operate
			10-0772	111	Undetermined

10-0906	111	Undetermined
10-0930	111	Alerted- Occupants responded
10-0940	111	Undetermined
10-1053	111	Undetermined
10-1123	111	None Present
10-1154	111	Undetermined
10-1171	111	Alerted- Occupants responded
10-1262	111	Undetermined
10-1362	111	Alerted- Occupants responded
10-1369	111	Alerted- Occupants responded

Appendix D
Monroe Housing Authority Fires

MHA Building Fires (111) 2005-2010

Incident	NFIRS	Property	Origin	Cause
05-0731	111	Residential	Bedroom	Unattended child with a lighter
05-1025	111	Residential	Kitchen	Unattended cooking- bathing a child
05-1034	111	Residential	Kitchen	Unattended cooking
07-0309	111	Residential	Kitchen	Unattended cooking
09-1138	111	Residential	Kitchen	Unattended cooking
10-0033	111	Residential	Kitchen	Unattended cooking
10-0037	111	Residential	Bedroom	Undetermined
10-0772	111	Residential	Kitchen	Failure of Equipment

MHA Building Fires (113) 2005-2010

05-1117	113	Residential	Kitchen	Unattended cooking- left the residence
06-1192	113	Residential	Kitchen	Unattended cooking
07-0144	113	Residential	Kitchen	Unattended cooking- left the residence
07-0530	113	Residential	Kitchen	Unattended cooking- asleep
08-0283	113	Residential	Kitchen	Pot on stove- undetermined
08-0686	113	Residential	Kitchen	Pot on stove- undetermined
08-1318	113	Residential	Kitchen	Pot on stove- undetermined
09-0205	113	Residential	Kitchen	Pot on stove- undetermined
09-0525	113	Residential	Kitchen	Unattended cooking- asleep
09-0597	113	Residential	Kitchen	Unattended cooking
10-1011	113	Residential	Kitchen	Residue under stove eye

Appendix E
Non MHA Residential Fires

NFIRS Non MHA Residential Building Fires (111) 2005-2010

Incident	NFIRS	Property	Origin	Cause
05-0051	111	Residential	Kitchen	Unattended Cooking
05-0134	111	Residential	Kitchen	Unattended Cooking
05-0297	111	Residential	Kitchen	Unattended Cooking - Phone Call
05-0405	111	Residential	Bedroom	Undetermined
05-0436	111	Residential	Kitchen	Unattended Cooking- Asleep
05-0476	111	Residential	Bedroom	Lighter
05-0535	111	Residential	Kitchen	Unattended Cooking
05-0625	111	Residential	Kitchen	Unattended Cooking
06-0035	111	Residential	Bathroom	Undetermined
06-0115	111	Residential	Kitchen	Unattended Cooking
06-0144	111	Residential	Bedroom	Candle
06-0177	111	Residential	Den	Heater
06-0237	111	Residential	Den	Wood Stove
06-0252	111	Residential	Attic	Undetermined
06-0244	111	Residential	Undetermined	Undetermined
06-0928	111	Residential	Kitchen	Equipment Malfunction.
06-1129	111	Residential	Bedroom	Heater
07-0143	111	Residential	Garage	Electrical
07-0274	111	Residential	Bedroom	Electrical
07-0285	111	Residential	Garage	Vehicle
07-0498	111	Residential	Laundry	Dryer Fire
07-0372	111	Residential	Laundry	Ember from Grill
07-0790	111	Residential	Kitchen	Unattended Cooking
07-0914	111	Residential	Kitchen	Unattended Cooking
07-0942	111	Residential	Kitchen	Cigarette
07-0926	111	Residential	Bedroom	Electrical
07-1022	111	Residential	Dining	Equipment Malfunction.
07-1059	111	Residential	Kitchen	Unattended Cooking
07-1069	111	Residential	Crawl Space	Electrical
07-1109	111	Residential	Bedroom	Candle
07-1243	111	Residential	Storage	Equipment Malfunction.
07-1268	111	Residential	Bathroom	Heater
07-1275	111	Residential	Kitchen	Grease Fire (attended)
07-1351	111	Residential	Kitchen	Undetermined
07-1353	111	Residential	Laundry	Dryer Fire

08-0020	111	Residential	Unetermined	Undetermined
08-0022	111	Residential	Attic	Electrical
08-0030	111	Residential	Bathroom	Heater
08-0041	111	Residential	Porch	Undetermined
08-0141	111	Residential	Kitchen	Equipment Malfunction.
08-0207	111	Residential	Wall	Electrical
08-0226	111	Residential	Bedroom	Electrical
08-0531	111	Residential	Attic	Undetermined
08-0603	111	Residential	Bathroom	Electrical
08-0612	111	Residential	Bedroom	Electrical
08-0658	111	Residential	Garage	Undetermined
08-0662	111	Residential	Kitchen	Unattended Cooking- bathroom
08-0832	111	Residential	Crawl Space	Electrical
08-0834	111	Residential	Outside	Undetermined
08-0848	111	Residential	Closet	Lighter
08-0868	111	Residential	Lobby	Arson
08-0890	111	Residential	Dining	Undetermined
08-0975	111	Residential	Kitchen	Unattended Cooking
08-1189	111	Residential	Outside	Undetermined
08-1348	111	Residential	Crawl Space	Equipment Malfunction.
08-1426	111	Residential	Porch	Undetermined
08-1475	111	Residential	Kitchen	Unattended Cooking
09-0105	111	Residential	Kitchen	Unattended Cooking
09-0428	111	Residential	Laundry	Dryer Fire
09-0541	111	Residential	Kitchen	Unattended Cooking
09-0573	111	Residential	Kitchen	Unattended Cooking
09-0670	111	Residential	Kitchen	Accidental (spray)
09-0778	111	Residential	Bedroom	Electrical
09-1047	111	Residential	Den	Undetermined
09-1055	111	Residential	Kitchen	Unattended Cooking
09-1109	111	Residential	Bedroom	Electrical
09-1184	111	Residential	Den	Heater
09-1271	111	Residential	Bedroom	Undetermined
09-1291	111	Residential	Roof	Embers from Chimney
10-0326	111	Residential	Laundry	Equipment Malfunction.
10-0348	111	Residential	Kitchen	Unattended Cooking- Sleeping
10-0693	111	Residential	Attic	Equipment Malfunction.
10-0725	111	Residential	Bedroom	Candle
10-0757	111	Residential	Kitchen	Unattended Cooking
10-0906	111	Residential	Bathroom	Cigarette

10-0930	111	Residential	Kitchen	Unattended Cooking
10-0940	111	Residential	Kitchen	Unattended Cooking
10-1053	111	Residential	Porch	Undetermined
10-1123	111	Residential	Kitchen	Unattended Cooking
10-1154	111	Residential	Exterior Wall	Undetermined
10-1171	111	Residential	Exterior Wall	Electrical
10-1262	111	Residential	Laundry	Accidental
10-1362	111	Residential	Kitchen	Unattended Cooking- Phone
10-1369	111	Residential	Kitchen	Unattended Cooking

NFIRS Non MHA Residential Building Fires (113) 2005-2010

Incident	NFIRS	Property	Origin	Cause
05-0067	113	Residential	Kitchen	Equipment Malfunction
05-0108	113	Residential	Kitchen	Unattended Cooking- Asleep
05-0201	113	Residential	Kitchen	Unattended Cooking
05-0275	113	Residential	Kitchen	Unattended Cooking
05-0348	113	Residential	Kitchen	Unattended Cooking
05-0732	113	Residential	Kitchen	Unattended Cooking
05-0739	113	Residential	Kitchen	Unattended Cooking
05-0856	113	Residential	Kitchen	Unattended Cooking
05-0930	113	Residential	Kitchen	Unattended Cooking
05-1040	113	Residential	Kitchen	Undetermined
05-1187	113	Residential	Kitchen	Unattended Cooking
06-0079	113	Residential	Kitchen	Undetermined
06-0100	113	Residential	Kitchen	Unattended Cooking
06-0553	113	Residential	Kitchen	Unattended Cooking
06-0599	113	Residential	Kitchen	Unattended Cooking
06-0638	113	Residential	Kitchen	Cooking
06-0907	113	Residential	Kitchen	Unattended Cooking
06-0988	113	Residential	Kitchen	Unattended Cooking
06-1124	113	Residential	Kitchen	Undetermined
06-1182	113	Residential	Kitchen	Stove as a Heater
07-0046	113	Residential	Kitchen	Oven Element
07-0159	113	Residential	Kitchen	Unattended Cooking
07-0197	113	Residential	Kitchen	Cooking
07-0289	113	Residential	Kitchen	Cooking
07-0505	113	Residential	Kitchen	Undetermined
07-0951	113	Residential	Kitchen	Combustibles in Oven
07-1144	113	Residential	Kitchen	Oven Element
07-1337	113	Residential	Kitchen	Unattended Cooking- Asleep
08-0249	113	Residential	Kitchen	Cooking

08-0295	113	Residential	Kitchen	Undetermined
08-0365	113	Residential	Kitchen	Cooking
08-0688	113	Residential	Kitchen	Cooking
08-0833	113	Residential	Kitchen	Oven Element
08-0970	113	Residential	Kitchen	Unattended Cooking
08-1037	113	Residential	Kitchen	Oven Element
08-1055	113	Residential	Kitchen	Unattended Cooking
08-1219	113	Residential	Kitchen	Undetermined
08-1259	113	Residential	Kitchen	Cooking
08-1313	113	Residential	Kitchen	Cooking
08-1334	113	Residential	Kitchen	Cooking
08-1443	113	Residential	Kitchen	Undetermined
09-0050	113	Residential	Kitchen	Cooking
09-0178	113	Residential	Kitchen	Undetermined
09-0209	113	Residential	Kitchen	Oven Element
09-1093	113	Residential	Kitchen	Unattended Cooking- Asleep
09-1342	113	Residential	Kitchen	Cooking
09-1354	113	Residential	Kitchen	Cooking
10-0279	113	Residential	Kitchen	Undetermined
10-0300	113	Residential	Kitchen	Unattended Cooking
10-0530	113	Residential	Kitchen	Unattended Cooking
10-0790	113	Residential	Kitchen	Cooking
10-0995	113	Residential	Kitchen	Cooking
10-1315	113	Residential	Kitchen	Unattended Cooking- Bathroom

Appendix F Georgia Public Housing Authorities

Abbeville Housing Authority
248 Barnes Street
Abbeville, GA 31001
abbevilleha@windstream.net

Alamo Housing Authority
4 Sharpton Drive
Alamo, GA 30411
alamoha@windstream.net

Albany Housing Authority
PO Box 485
Albany, GA 31702
mccarthy@albanyhousingauthority.com

Alma Housing Authority
401 E. 12th Street
Alma, GA 31510
haca@accessatc.net

Americus Housing Authority
825 N. Mayo Street
Americus, GA 31709
edhaa@bellsouth.net

Athens Housing Authority
300 S. Rocksprings Street
Athens, GA 30606
ahaofficialmail@athenshousing.org

Atlanta Housing Authority
230 John Wesley Dobbs Ave. N.E.
Atlanta, GA 30303
renee.glover@atlantahousing.org

Augusta Housing Authority
1435 Walton Way
Augusta, GA 30901
joglesby@augustapha.org

Baxley Housing Authority
94 Highland Drive
Baxley, GA 31513
baxleyha@bellsouth.net

Blakely Housing Authority
411 Damascus Street
Blakely, GA 39823
housing@windstream.net

Blue Ridge Housing Authority
30 Ouida Street, Bld. G1
Blue Ridge, GA 30513
blueridgeha@tds.net

Bowdon Housing Authority
1 M Grammar School Road
Bowdon, GA 30108
housing_@bellsouth.net

Brunswick Housing Authority
PO Box 1118
Brunswick, GA 31521
bwkhous@comcast.net

Buford Housing Authority
2050 Hutchins Street
Buford, GA 30518
habuford@bellsouth.net

Byron Housing Authority
503 Boy Scout Road
Byron, GA 31008
byrha@windstream.net

Cairo Housing Authority
224 6th Avenue NE
Cairo, GA 39828
cairoha@windstream.net

Calhoun Housing Authority
607 Oothcalooga Street
Calhoun, GA 30701
gayersbrown@aol.com

Carrollton Housing Authority
1 Roop Street
Carrollton, GA 30117
Charles@carrolltonhousingauthority.com

Cave Spring Housing Authority
121 Fincher Street
Cave Spring, GA 30124
Cshousing@aol.com

Cedartown Housing Authority
344 West Avenue
Cedartown, GA 30125
alicecook@charterinternet.com

Chatsworth Housing Authority
1311-19 Old Dalton Ellijay Road
Chatsworth, GA 30705
chathous@windstream.net

Clayton Housing Authority
393 Shadyside Drive, Ste. 31
Clayton, GA 30525
claytonha@windstream.net

Cochran Housing Authority
PO Box 32
Cochran, GA 31014
cochranhousing@comsouth.net

College Park Housing Authority
2000 W. Princeton Avenue
College Park, GA 30337
cphousing@bellsouth.net

Colquitt Housing Authority
208 W. Pine Street
Colquitt, GA 39837
colquitha@bellsouth.net

Columbus Housing Authority
Wynnton
Columbus, GA 31906
colgaha@mindspring.com

Comer Housing Authority
55 Ivy Street
Comer, GA 30629
comerhsg103@msn.com

Conyers Housing Authority
1214 Summer Circle NW
Conyers, GA 30012
bhill@conyershousing.com

Cordele Housing Authority
401 S. 10th Street
Cordele, GA 31015
susan@cordelehousing.com

Covington Housing Authority
5160 Alcovy Road NE
Covington, GA 30014
covha@bellsouth.net

Cuthbert Housing Authority
968 Blakely Street
Cuthbert, GA 39840
walter.mattox@wgcha.org

Dallas Housing Authority
434 Paulding Lane
Dallas, GA 30132
dallasha@bellsouth.net

Danielsville Housing Authority
PO Box 677
Danielsville, GA 30633
dvilleha@yahoo.com

Dawson Housing Authority
553 Lemon Street NE
Dawson, GA 39842
dawsonha@windstream.net

Decatur Housing Authority
750 Commerce Drive, Ste. 110
Decatur, GA 30030
pap@decaturha.org

DeKalb County Housing Authority
750 Commerce Drive, Ste. 201
Decatur, GA 30030
exdir@dekalbhousing.org

Douglas City Housing Authority
313 Bryan Street E
Douglas, GA 31533
douglashousingauthority@windstream.net

Dublin Housing Authority
PO Box 46
Dublin, GA 31040
dhousing@bellsouth.net

East Point Housing Authority
3056 Norman Berry Drive
East Point, GA 30344
klemish@eastpointha.org

Eastman Housing Authority
834 Griffin Avenue SW
Eastman, GA 31023
cyawn@bellsouth.net

Eatonton Housing Authority
208 Lawson Drive
Eatonton, GA 31024
eha@communicomm.com

Elberton Housing Authority
410 Elbert Street
Elberton, GA 30635
ehahous@elberton.net

Etowah Area Consol Housing Authority
240 Stonewall Street
Cartersville, GA 30120
philya@etowahha.org

Fitzgerald Housing Authority
314 S. Sherman Street
Fitzgerald, GA 31750
judynelms@windstream.net

Flint Area Consol Housing Authority
542 Richardson Street
Montezuma, GA 31063
a.webb@facha.net

Fort Oglethorpe Housing Authority
PO Box 2034
Fort Oglethorpe, GA 30742
foha@catt.com

Fort Valley Housing Authority
201 W Church Street, Ste. B
Fort Valley, GA 31030
ftvha@georgiaspeed.net

Franklin Housing Authority
900 S. River Road
Franklin, GA 30217
swilliams12@charterinternet.com

Fulton County Housing Authority
4273 Wendell Drive
Atlanta, GA 30336
fstewart@hafc.org

Gainesville Housing Authority
750 Pearl Nix Parkway
Gainesville, GA 30501
gainhous@bellsouth.net

Gibson Housing Authority
347 Project Street
Gibson, GA 30810
gha@bellsouth.net

Glennville Housing Authority
PO Box 37
Glennville, GA 30427
hacg@windstream.net

Glenwood Housing Authority
PO Box 237
Glenwood, GA 30428
glenwoodha@gtconline.com

Grantville Housing Authority
Glanton Street
Grantville, GA 30220
hg_h@bellsouth.net

Greensboro Housing Authority
PO Box 217
Greensboro, GA 30642
gha30642@bellsouth.net

Greenville Housing Authority
3041 Highway 100
Greenville, GA 30222
gnvlh1@bellsouth.net

Griffin Housing Authority
518 Nine Oaks Drive
Griffin, GA 30224
grif_ha@bellsouth.net

Hampton Housing Authority
20 College Street
Hampton, GA 30228
ga110@Bellsouth.net

Hartwell Housing Authority
116 W Franklin Place
Hartwell, GA 30643
hha@hartcom.net

Hawkinsville Housing Authority
38 Progress Avenue
Hawkinsville, GA 31036
hha@cstel.net

Hazlehurst Housing Authority
Wildwood
Hazlehurst, GA 31539
ga137@mchsi.com

Hinesville Housing Authority
301 Olive Street
Hinesville, GA 31313
hhaph@coastnow.net

Hogansville Housing Authority
200 West Boyd Road
Hogansville, GA 30230
hg_h@bellsouth.net

Homerville Housing Authority
110 Crescent Drive
Homerville, GA 31364
mtstalvey@hotmail.com

Jasper Housing Authority
164 Landrum Circle #147
Jasper, GA 30143
jasperha@windstream.net

Jesup Housing Authority
327 Bay Acres Road
Jesup, GA 31545
jha@bellsouth.net

LaFayette Housing Authority
300 Oak Street
LaFayette, GA 30728
rblha@windstream.net

LaGrange Housing Authority
201 Chatham Street
LaGrange, GA 30240
lagranha@mindspring.com

Lavonia Housing Authority
13032 Jones Street
Lavonia, GA 30553
rwhitworth@lavoniahousing.com

Lincolnton Housing Authority
311 Moss Street
Lincolnton, GA 30817
lincolntonhousingauthority@yahoo.com

Louisville Housing Authority
710 W Nelms Street
Louisville, GA 30434
wborobm@bellsouth.net

Lumber City Housing Authority
Church Street
Lumber City, GA 31549
ga155@bellsouth.net

Lyons Housing Authority
208 N Lanier Street
Lyons, GA 30436
lyonsha@bellsouth.net

Macon Housing Authority
2015 Felton Avenue
Macon, GA 31201
executivedirector@maconhousing.com

Madison Housing Authority
509 Madison Avenue
Madison, GA 30650
monrogapha@aol.com

Manchester Housing Authority
PO Box 110
Manchester, GA 31816
mha@windstream.net

Marietta Housing Authority
95 Cole Street NE
Marietta, GA 30060
hudinfo@mariettahousingauthority.org

McCaysville Housing Authority
160 Briggs Street
McCaysville, GA 30555
lindabmha@etcmail.com

McRae Housing Authority
109 W Willow Creek Lane
McRae, GA 31055
mcha@mchsi.com

McDonough Housing Authority
345 Simpson Street
McDonough, GA 30253
mcdonha@bellsouth.net

Menlo Housing Authority
77 Ralph Chamblee Drive
Menlo, GA 30731
menlohousing@windstream.net

Metter Housing Authority
PO Box 207
Metter, GA 30439
hametter@pineland.net

Milledgeville Housing Authority
545 Martin Luther King
Milledgeville, GA 31061
anitra1@windstream.net

Monroe Housing Authority
808 Marable Street
Monroe, GA 30655
monrogapha@aol.com

Monticello Housing Authority
405 Funderburg Drive
Monticello, GA 31064
monthousing@bellsouth.net

Moultrie Housing Authority
800 4th Avenue SE
Moultrie, GA 31768
miboatwright@windstream.net

Mt Vernon Housing Authority
101 West Underwood Drive
Mount Vernon, GA 30445
mvha@windstream.net

Nahunta Housing Authority
101 Burton Terrace
Nahunta, GA 31553
juliah@btconline.net

Nashville Housing Authority
409 Hull Avenue
Nashville, GA 31639
nashvillehousing@windstream.net

Newnan Housing Authority
48 Ball Street
Newnan, GA 30263
sstrozier@numail.org

NE Georgia Housing Authority
437 S. Pond Street
Toccoa, GA 30577
negaha@negeorgiahousing.com

NW Georgia Housing Authority
800 North 5th Avenue
Rome, GA 30162
shudson@nwgha.com

Ocilla Housing Authority
534 N. Adler Street
Ocilla, GA 31774
pamlpayne@windstream.net

Palmetto Housing Authority
152 Grant Street
Palmetto, GA 30213
housing.authorities@prodigy.net

Pelham Housing Authority
548 Palmer Street SW
Pelham, GA 31779
mary_culbreth@bellsouth.net

Perry Housing Authority
822 Perimeter Road
Perry, GA 31069
jjoyner@windstream.net

Quitman Housing Authority
609 N Highland Circle
Quitman, GA 31643
quitmanha@windstream.net

Reidsville Housing Authority
PO Box 618
Reidsville, GA 30453
reidsvilleha@g-net.net

Ringgold Housing Authority
137 Circle Drive
Ringgold, GA 30736
rhousing@catt.com

Roberta Housing Authority
20 CF Willis Drive
Roberta, GA 31078
crha616@aol.com

Rochelle Housing Authority
792 Second Avenue
Rochelle, GA 31079
jgreene39@yahoo.com

Roswell Housing Authority
766 Myrtle Street
Roswell, GA 30075
butchpel@aol.com

Royston Housing Authority
216 Hartwell Street
Royston, GA 30662
acothranrha@att.net

Sandersville Housing Authority
419 Morningside Drive
Sandersville, GA 31082
sha2@washemc.net

Savannah Housing Authority
1407 Wheaton Street
Savannah, GA 31404
info@savannahpha.com

Soperton Housing Authority
700 Eastman Road
Soperton, GA 30457
budbrantley@bulloch.net

Sparta Housing Authority
52 Dyer Drive
Sparta, GA 31087
spartahousingaut@bellsouth.net

SE Georgia Consul Housing Authority
PO Box 526
St. Marys, GA 31558
mew@tds.net

Statesboro Housing Authority
PO Box 552
Statesboro, GA 30458
statesga@frontiernet.net

Stewart County Housing Authority
PO Box 327
Lumpkin, GA 31815
schal@bellsouth.net

Swainsboro Housing Authority
PO Box 265
Swainsboro, GA 30401
sha131@bellsouth.net

Sylvester Housing Authority
411 N Jefferson Street
Sylvester, GA 31791
sbennett@shauthority.com

Tallapoosa Housing Authority
304 Arbacoochee Road
Tallapoosa, GA 30176
tallapha@mindspring.com

Tennille Housing Authority
300 E Church Street
Tennille, GA 31089
tennilemay@bellsouth.net

Thomaston Housing Authority
574 Triune Avenue
Thomaston, GA 30286
thomastonha@windstream.net

Thomasville Housing Authority
216 S College Street
Thomasville, GA 31792
tha@rose.net

Thomson Housing Authority
219 Pecan Avenue
Thomson, GA 30824
kelly.evans@thomsonhousing.org

Tifton Housing Authority
15 E. 16th Street
Tifton, GA 31794
tiftonhousing@bellsouth.net

Toccoa Housing Authority
605 S. Pond Street
Toccoa, GA 30577
toccoahousing@alltel.net

Tri-City Housing Authority
33A Martin Luther King Jr. Dr.
Woodland, GA 31836
contalco@alltel.net

Unadilla Housing Authority
282 Second Street
Unadilla, GA 31091
anniemar@sowega.net

Vidalia Housing Authority
907 Morris Street
Vidalia, GA 30474
vidaliaha@bellsouth.net

Vienna Housing Authority
907 Morris Street
Vienna, GA 31092
vhadc@sowega.net

Warner Robins Housing Authority
112 Memorial Terrace
Warner Robins, GA 31093
sfrazier@warnerrobinsha.com

Washington Housing Authority
103 Cheney Parkway
Washington, GA 30673
Washington, GA 30673
hacw@nu-z.net

Waycross Housing Authority
1130 Tebeau Street
Waycross, GA 31501
wayxpha@accessatc.net

Waynesboro Housing Authority
570 Wallace Street
Waynesboro, GA 30830
wborobm@bellsouth.net

Winder Housing Authority
11 Horton Street
Winder, GA 30680
winderha@aol.com

Appendix G Public Housing Authority Survey

Hello: You are invited to participate in my survey of public housing authorities in Georgia. In this survey, approximately 100 housing authorities will be asked to complete a survey that asks questions about the fire problem in public housing. It will take approximately 10 minutes to complete the questionnaire. Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Lt. Andrew Dykes at 770-267-4446 or by email at adykes@monroega.gov. Thank you very much for your time and support. Please start with the survey now by clicking on the Continue button below.

How many housing developments does your housing authority manage?

How many dwelling units does your housing authority manage?

Approximately how many persons are served by your housing authority?

The United States Fire Administration has identified five high-risk groups that are susceptible to injury and death from fire. Which of the following high-risk populations are currently served by your housing authority? (Select ALL that apply)

- Children less than 5 years of age
- Impoverished households
- Adults age 65 and above
- People with disabilities
- People that speak little or no English

What is the approximate annual dollar loss from fire in your housing authority? (Damage to property owned by the housing authority.)

As a public housing official, which of the following causes of fire would you rate as being the primary culprit of fire in your housing authority over the past 5 years?

- Cooking
- Heating Equipment
- Electrical Malfunction
- Open Flame (Lighters, Matches, Candles)
- Smoking
- Intentional (Arson)
- Other Unintentional / Careless Cause
- There are no reported cases of fire in the housing authority
- Unknown

As a public housing official, which of the following causes of fire would you rate as being the most common cause of fire related injury and death in your housing authority over the past 5 years?

- Cooking
- Heating Equipment
- Electrical Malfunction
- Open Flame (Lighters, Matches, Candles)
- Smoking
- Intentional (Arson)
- Other Unintentional / Careless Cause
- There are no known cases of fire related injury or death in the housing authority
- Unknown

When a fire occurs in your housing authority and damage to the dwelling unit(s) occurs, is your housing authority notified? Example: An unattended pot of oil on the stove ignites and extends to the cabinets before being extinguished by the fire department.

- Yes
- No

When a fire occurs in your housing authority and no damage to the dwelling unit(s) occurs, is your housing authority notified? Example: An unattended pot of oil on the stove ignites but is extinguished by the dwelling occupant by placing a lid over the pot prior to the fire department's arrival. No damage to the stove or cabinets occurs.

- Yes
- No

When an injury or death occurs in your housing authority as a result of fire, is your housing authority notified?

- Yes, under all circumstances
- Yes, but only when damage occurs to the dwelling unit(s)
- No

Does your housing authority require a mandatory fire safety education course as a part of the lease agreement?

- Yes
- No

Has your housing authority hosted or sponsored a fire safety education course for residents in the past 5 years?

- Yes
- No

Has your housing authority sponsored a fire evacuation drill for residents in the past 5 years?

- Yes

- No

Are housing authority residents trained in the proper use of portable fire extinguishers?

- Yes
 No

As a public housing official, who do you believe is ultimately responsible for ensuring that the occupants of public housing are properly educated in fire safety?

- The local fire department
 The local housing authority
 Equal responsibility between the local housing authority and fire department

Does the lease between your housing authority and the residents include an eviction clause if a fire originates within their dwelling unit and the occupant is found to be responsible?

- Yes
 No

Is smoking banned inside the dwelling units of your housing authority?

- Yes
 No

Are candles and other open flames banned inside the dwelling units of your housing authority?

- Yes
 No

What types of engineering strategies have been implemented in your housing authority to reduce fire related injury and death? (Select ALL that apply)

- Sprinkler Systems
 Fire Alarm Systems
 Smart Stoves / Stove Cover Plates (Examples: Stove Guard and Safe-T-element®)
 Stove Extinguisher System (Example: StoveTop FireStop®)
 Battery Operated Smoke Alarms
 Hard Wired Smoke Alarms
 None
 Other

Are portable fire extinguishers located in each dwelling unit?

- Yes
 No

As a public housing official, what suggestions or recommendations would you give to the fire service as a whole to decrease the incidence of fire and fire related injuries in public housing?

Appendix H
Email to Georgia PHA's

Dear Public Housing Administrator:

I am writing to request your help with an important project. As a second year student in the National Fire Academy's Executive Fire Officer Program I am required to complete an applied research project based on the fundamentals of the Executive Analysis of Community Risk Reduction course. As a prerequisite to this course, I was required to perform a community risk analysis on the jurisdiction served by my fire department. What I discovered was a higher risk of fire and fire related injury in public housing versus the other residential occupancies in my jurisdiction. I am attempting to identify the current levels of fire education, engineering, and enforcement within Georgia housing authorities. I am conducting a survey of public housing authorities in Georgia to ask about the actions that they have taken to reduce the incidence of fire and fire related injuries.

You were selected to be part of this project because you are registered on the HUD website with a valid email contact address. I know that you are extremely busy, but I hope that you (or a designee) will take just a little time to participate in this brief 21 question web survey that I have created.

To complete the survey online, please go to <http://DykesEACRRarp.questionpro.com> and enter the password **R274** to access the survey. The survey should only take approximately 10 minutes to complete and will be available online until April 11, 2011.

Your participation is voluntary and there are no correct or incorrect responses. All responses will be treated confidentially and will in no way be traceable to the individual respondent. The results of the survey will be reported in a summary format, so again no one will link you to your response.

Thank you in advance for your participation in this important project. If you have any questions about the survey or data request, please contact me at 770-267-4446 or adykes@monroega.gov.

Sincerely,

Andrew Dykes
Lieutenant
City of Monroe Fire Department