

Executive Analysis of Fire Service Operations in Emergency Management

Colleyville, TX Fire Department Staffing and
Apparatus Availability Impact on Organizational Capabilities

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CERTIFICATION STATEMENT

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

Signed: _____

Abstract

Adequate staffing and equipment is an issue in most fire departments across the United States. The problem is the Colleyville, TX Fire Department (CFD) has diminished response capabilities during structural fires due to staffing and available apparatus. This diminished response increases risk to firefighters and civilians alike. The purpose of this descriptive research effort was to identify current conditions in the CFD, compare them to both neighboring communities and nationwide agencies, identify standards addressing staffing and apparatus response and compare the current conditions in Colleyville to those recommendations. The research was completed through literature review, personal communications, and a nationwide survey. The results have provided substantiation of suspected conditions and a recommended avenue of correction and improvement has been provided.

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Colleyville, TX Fire Department Staffing and Apparatus Impact on Organizational Capabilities

Introduction

Staffing and apparatus availability are two common problems that exist across the fire service today. Fire companies across America are closed or temporarily shut down due to short staffing on a regular basis. In small town America, fire department staffing in most cases has never been, nor will it likely ever be adequate to provide proper protection to the citizens and safety for the firefighters operating in these communities without assistance from surrounding agencies. Discussion among elected officials is rampant regarding reduction in staff and decreases in personnel costs, yet call volume and expectations from the fire service continue to increase. According to International Association of Fire Chiefs [IAFC] (2005) 61% of survey respondents cited staffing as their greatest challenge moreover 23% cited increased service demands which are directly impacted by available staffing and resources as their greatest challenge.

The problem is the Colleyville, TX Fire Department (CFD) has a diminished response capability level during structural fire operations due to current staffing levels and available apparatus. The diminished staffing level and lack of additional apparatus creates increased risk to our firefighters during these operations as well as negatively impacting their ability to affect rescues of trapped civilians. The purpose of this research is to evaluate the current fire ground capabilities of the CFD, identify the components of a community capability assessment that should be addressed when encountering structural fires, determine if other fire departments across the country are experiencing with similar difficulties and their

possible causes and finally to identify potential actions or resources to improve the effectiveness and safety of CFD members at these incidents. Utilizing a descriptive research format, the researcher will attempt to answer the following questions:

- What are the current capabilities of the CFD regarding personnel and apparatus?
- What are the personnel and apparatus capabilities of other fire service organizations similar in size to the CFD and how does the CFD compare to these organizations?
- Are other Departments around the country experiencing diminished response capabilities similar to the CFD, and what are their causes?
- What are the nationally recognized standards and guidelines related to staffing and apparatus at structural fires?
- How does the CFD compare to the recommendations given in these guidelines and what, if any are the current shortfalls?

Background & Significance

The Colleyville Fire Department is a sub-urban department located in the Mid-Cities area between Dallas and Fort Worth, Texas. The Department is bordered on its eastern limits by Dallas-Fort Worth (DFW) Airport. The Department began more than 50 years ago as an all volunteer agency and has transitioned over the last 25 years to an all career staff of 30 personnel with 5 additional administrative staff. Shift staffing consists of ten personnel covering two engines, one ambulance, and a 65' quint responding out of three stations. Colleyville is considered one of the most affluent communities in North Texas and is home to more than 24,000 people dispersed across more than 13 square miles. All Operations personnel work a standard three platoon rotation with one day on duty and two days off duty.

Colleyville, like many other communities its size struggles with adequate monetary resources to fund all necessary equipment and personnel. Despite being an affluent community

where the median home price exceeds \$450,000.00, Colleyville boasts one of the area's lowest ad valorem tax rates and elected officials have not raised taxes in more than 13 years City of Colleyville (2007). This struggle has translated into a shortfall of manpower and equipment within the CFD. The Department opened its third fire station in January 2008, however, it did not receive any additional staffing to cover the third fire apparatus in service at this new station. In addition, a twelve year old reserve fire engine was placed back into front line service due to financial constraints making it impossible to purchase a new apparatus for the new fire station. To further complicate the situation, the City Administration has informed the organization that it will be several years before any resources can be allocated to begin the process of correcting the current manpower and apparatus deficiencies. According to National Fire Academy [NFA] (2007), failure to assess capabilities adequately and honestly can slow or stop mobilization of resources in an emergency situation. Under current staffing capabilities, the CFD will have a full staff of ten per shift and a minimum staffing of eight per shift. These eight personnel will be distributed in the following manner:

- 3 personnel assigned to Engine 242
- 3 personnel assigned to Quint 243
- 2 personnel assigned to Engine 241 or Medic 241 depending on the call type.

When staffing is full, two personnel will be assigned to each of Medic 241 and Engine 241.

When either Medic 241 or Engine 241 is on a call and staffing for the station is at two, the other apparatus is out of service until the previous call is completed. It is this researcher's opinion that even when fully staffed, the CFD does not meet minimum recommended staffing guidelines of national fire service organizations, nor does it meet the standard of service from surrounding communities in the area and across the country. In addition to CFD staffing, outside agencies are

heavily relied upon to provide additional personnel and equipment in order to attempt to meet recognized response time and manpower guidelines. The CFD has automatic aid agreements with the cities of Southlake, Bedford, and Keller and has mutual aid agreements with the cities of North Richland Hills, Grapevine, Euless, and Hurst. The addition of companies from these cities allows the CFD to add nine personnel automatically to any structural fire response in the City. The long term goal of the CFD is to meet the response time needs and manpower requirements of nationally recognized standards without the current heavy reliance on outside agencies. One of the key components within the Executive Fire Officer Program (EFOP) third year course titled Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM) is the need to conduct a capability assessment of fire service resources available not only in front line service, but total capabilities including reserve apparatus and off duty personnel NFA (2007). It is the hope of this researcher that this effort will provide necessary insight to the appropriate people to affect change in our community toward a more resource prepared organization centered on providing the utmost in customer service to our citizens. According to Goldfeder (2007) it is a fact that additional firefighters can make a difference, a real, measurable “customer service” difference when the critical services a department provides are urgently needed. Not only will this research serve to reduce the risk of death and injury to the firefighters of Colleyville, it will allow us to serve as a component of our comprehensive multi-hazard risk reduction plan for the community both of which serve as operational objectives of the United States Fire Administration NFA (2005).

Literature Review

The topic of staffing and resources is one of great interest in the United States fire service today. Resources for conducting this research proved to be quite plentiful. The resources

available came from a variety of sources and were used to answer the following research questions: (1) What are the current capabilities of the CFD regarding personnel and apparatus? (2) What are the personnel and apparatus capabilities of other fire service organizations similar in size to the CFD and how does the CFD compare to these organizations? (3) Are other Departments around the country experiencing diminished response capabilities similar to the CFD, and what are their causes? (4) What are the nationally recognized standards and guidelines related to staffing and apparatus at structural fires? (5) How does the CFD compare to the recommendations given in these guidelines and what, if any are the current shortfalls?

In answering the first question regarding the response capabilities of the CFD in the areas of personnel and apparatus there are zero external sources for gathering this information. The researcher relied on internal documents within the CFD Standard Operating Procedures and information obtained firsthand from my involvement in the organization. According to CFD (2008) the authorized current staffing within the CFD is ten personnel per shift with a minimum staffing of eight per 24 hour shift. These personnel are spread out across three stations staffing an engine at fire station two with three personnel, a 65' quint at station three with three personnel, and four personnel assigned to station one staffing an engine and an ambulance. When staffing is below four, the engine in this station is left out of service anytime the assigned personnel are answering an emergency medical call. During these periods, apparatus from the two other fire stations cover the fire district of station one. Personnel at fire station one may answer a fire call in their district if they are in the station at the time of the call.

In addition to the frontline fire apparatus of the CFD, there is one reserve fire engine that is fully equipped, one brush fire unit, and one reserve ambulance. These apparatus can be staffed in an extreme emergency utilizing off-duty personnel working in an overtime capacity. The

response capabilities of off-duty personnel are hampered by the fact that many of the operational personnel within the CFD live 40 or more miles from the City creating a return time in excess of one hour in some cases. A few personnel within the organization live in excess of one hundred miles away and require two or more hours to return to the City if needed.

The second question researched involves the response capabilities of other fire service organizations similar in size to the CFD. This researcher utilized multiple sources to answer this question including a nationwide survey which will be discussed later in these research findings. Other information obtained was derived from national survey data collected by other fire service organizations. In addition, the seven communities bordering Colleyville provided capability assessment information via telephone with the researcher.

According to National Fire Protection Association [NFPA] (2007) 75% of fire departments protecting populations from zero to 49,999 have an inadequate number of fire stations or firefighters to meet widely recognized response time guidelines. This same report acknowledges that the greatest need for equipment, training, personnel, and other resources is in rural America which is identified as those communities with less than 2,500 population. International Association of Fire Chiefs [IAFC] (2005) identified through a nationwide email survey that 61% of survey respondents listed staffing as their greatest challenge in meeting the fire service needs of their respective communities. This was a three percent increase from IAFC (2004) which identified 58% of survey respondents listing staffing as their greatest challenge. IAFC (2004) also identified 10% of respondents listing replacement or additional equipment needs as a challenge. IAFC (2005) showed an increase of 1.9% over the 2004 report regarding replacement or additional equipment needs to a total of 11.9% of survey respondents.

The second phase of researching this question involved direct communication with the seven neighboring fire departments of Colleyville in order to obtain the on duty and full mobilization capabilities within their organizations. My initial contact was with the Bedford Fire Department, one of Colleyville's primary automatic aid partners. Their on duty capabilities from three fire stations include two engines, one ladder, three ambulances, and one battalion chief. Minimum staffing includes 16 per shift and full staffing equates to 19 per shift. Reserve apparatus include one engine, one ladder, and one ambulance. Full staff mobilization in the event of a disaster would be a total of 63 personnel (J. Richardson, personal communication, December 28, 2007).

The second contact was made with the Euless Fire Department which serves as a mutual aid agency for Colleyville. Their on duty strength from three fire stations includes one engine, two ladders, three ambulances, and one battalion chief. Minimum staffing is 16 per shift and full staffing is 20 per shift. Reserve apparatus included one engine, one ambulance, and one brush fire unit. Full staff mobilization would be 65 personnel for disaster response (R. Isbell, personal communication, December 28, 2007).

Next the researcher made contact with the Hurst Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from two fire stations includes two engines, one ladder, two ambulances, and one battalion chief. Minimum shift staffing is 14 and full staffing is 17 per shift. Reserve equipment includes one engine, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 55 if all personnel were recalled (D. Palla, personal communication, December 28, 2007).

Next the researcher contacted the North Richland Hills Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from four fire stations includes

three engines, two ladders, three ambulances, and one battalion chief. Minimum shift staffing is 22 and full staffing is 27 per shift. Reserve equipment includes one engine, two brush fire units, one ladder, and one ambulance. Emergency staffing for disaster situations would be 88 if all personnel were recalled (M. Rawson, personal communication, December 28, 2007).

Next the researcher made contact with the Grapevine Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from five fire stations includes three engines, three ladders, three ambulances, and one battalion chief. Minimum shift staffing is 26 and full staffing is 31 per shift. Reserve equipment includes one engine, one ladder, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 105 if all personnel were recalled (C. Jones, personal communication, December 28, 2007).

Next the researcher made contact with the Southlake Fire Department, another automatic aid agency bordering Colleyville. On duty minimum strength from two fire stations includes two engines, one ladder, and two ambulances. Minimum shift staffing is 15 and full staffing is 18 per shift. Reserve equipment includes one engine, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 58 if all personnel were recalled (M. Starr, personal communication, December 28, 2007).

The final neighboring agency this researcher contacted was the Keller Fire Department. Keller serves as an automatic aid agency and borders Colleyville on its northwest corner. Daily response capabilities from three fire stations include two quints, one ladder, three ambulances, and one battalion chief. Minimum daily staffing is 16 and full staffing is 20 per shift. Full recall of all personnel would provide a total of 65 response personnel. Reserve apparatus is limited to one engine, two brush fire units, and one ambulance (C. Blankenship, personal communication, December 28, 2007).

The third question considered in this review is the presence or lack thereof of diminished response capabilities from other fire service agencies, their causes, and their comparison to the issues facing the CFD. In answering this question, the researcher once again relied on national fire service data collection efforts to provide insight into current conditions across the country. Secondly, neighboring agencies were once again utilized to determine causes of diminished response capabilities on a more local level.

According to NFPA (2005) staffing, funding, and increased demands for service were the top three challenges creating diminished response capabilities among fire departments in the United States. Of the 8,295 departments who responded to the national survey, 65-75% of fire departments protecting less than 49,999 population had adequate fire stations and personnel to meet the needs of their communities. On average, communities which protect 10,000 to 24,999 population have 7.3 personnel on duty to respond to emergencies NFPA (2005). According to Goldfeder (2007), a department should have at minimum 20 firefighters on the initial dispatch of a structure fire and should anticipate doubling or tripling that number if the indications from callers and dispatch suggest or confirm that there is a working structure fire. In addition to personnel, NFPA (2005) identified that only 38% of departments protecting 10,000 to 24,999 population covered the replacement of fire apparatus from their normal budgets and at most 60% had replacement programs in place for the same population group. Regarding staffing, NFPA (2005) pointed out that over 30% of fire departments protecting 10,000 to 24,999 population had only one or two firefighters responding on an engine. That number increases to more than 49% providing one to two firefighters on a ladder apparatus. According to Clark (1991), time trials conducted several years ago in Wisconsin found that on average it requires three firefighters 34%

longer to complete a task than four firefighters and it required 82% longer for two firefighters to complete the same task as four firefighters.

The second portion of this research question was focused on neighboring agencies. The cities of Hurst, Bedford, Keller, and Euless reported that funding was the greatest obstacle to overcoming shortages in staffing and equipment in their respective agencies. Despite all four cities having constant staffing of three personnel or more on all fire apparatus, efforts to increase that number to a minimum of four firefighters at all times had proved difficult as all city departments fight for tax dollars to meet increased service demands and equipment needs (Palla, D., Richardson, J., Blankenship, C., and Isbell, R., personal communication, December 28, 2007). Once again, the remaining agencies which border Colleyville were unavailable to respond to the information requested.

The fourth question researched in this review included identifying the nationally recognized standards and rules regarding staffing and apparatus in response to structural fire situations. The two agencies most directly related to these standards are the NFPA and the Occupational Safety & Health Administration (OSHA). Investigation into these two agencies provided a wealth of information on the subject in question.

According to OSHA (2006) any time interior firefighting operations are necessary, a minimum of two personnel must enter the structure maintaining verbal or visible contact with one another. In addition, there must be two additional personnel outside the structure available to provide rescue to the personnel entering the structure if they should require assistance. This rule is commonly referred to as the “two in, two out” rule. OSHA (2006) does not provide any information regarding minimum staffing of fire apparatus or minimum numbers of personnel necessary to effectively extinguish a fire in a structure.

According to Goldfeder (2007) the following personnel are necessary on the initial dispatch for a structure fire in a 1,000 square foot residence:

- Water supply (1 firefighter on the hydrant)
- Pump operator (1 firefighter)
- 3 handlines (3, 1 ¾ inch lines with 3 firefighters each = 9 firefighters)
- Force Entry, Search (2 firefighters)
- Vent (2 firefighters)
- Command (1 incident commander in front and a rear sector supervisor to allow for a 360 view of the building) (2 firefighters)
- RIT (3 firefighters)

He goes on to say that while these numbers are a good start, they are for a small, single family dwelling fire. If this fire were in a larger building you would need double or even triple this number of firefighters to ensure safety and effectiveness.

Harkes (1991) recommends the following deployment of personnel to handle a one or two room fire in an average dwelling:

- Command positions – three personnel
- Pump operator – one person
- First attack line – two personnel
- Backup attack line/search – two personnel
- Ventilation/Second search – two personnel
- RIT – two personnel initially increased to four as soon as possible
- Staging – six personnel

This is a total of 18 personnel on scene initially increased to 20 personnel as soon as possible to increase the staffing of RIT. Harkes (1991) goes on to say that if you have less than 18 personnel responding on initial reports of a structure fire, you should reconsider your Standard Operating Procedures (SOP's).

According to *NFPA Standard 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (2001) the following list of information should be used to determine necessary firefighting forces:

“On-duty fire suppression personnel shall be comprised of the numbers necessary for fire-fighting performance relative to the expected fire-fighting conditions. These numbers shall be determined through task analyses that take the following factors into consideration:

- (1) Life hazard to the populace protected
- (2) Provisions of safe and effective fire-fighting performance conditions for the firefighters
- (3) Potential property loss
- (4) Nature, configuration, hazards, and internal protection of the properties involved
- (5) Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene.”

In addition to these guidelines for determining firefighting forces, NFPA (2001) goes on to say that the fire department should identify minimum staffing requirements necessary to comply with the standards minimum staffing requirements for various fireground activities.

NFPA 1710 recommends that “The fire department’s fire suppression resources shall be deployed to provide for the arrival of an engine company within a four minute response time and/or the initial full alarm assignment within an eight minute response time to 90% of the incidents.” (NFPA, 2001).

When it comes to necessary on scene firefighters to complete needed tasks, NFPA (2001) recommends the following breakdown of resources:

“The initial full alarm assignment shall provide for the following:

- (1) Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment. A minimum of one individual shall be dedicated to this task.
- (2) Establishment of an uninterrupted water supply of a minimum 1480 L/min (400 gpm) for 30 minutes. Supply line(s) shall be maintained by an operator who shall ensure uninterrupted water flow application.
- (3) Establishment of an effective water flow application rate of 1110 L/min (300 gpm) from two handlines, each of which shall have a minimum of 370 L/min (100 gpm). Attack and backup lines shall be operated by a minimum of two personnel each to effectively and safely maintain the line.
- (4) Provision of one support person for each attack and backup line deployed to provide hydrant hookup and to assist in line lays, utility control, and forcible entry.

- (5) A minimum of one victim search and rescue team shall be part of the initial full alarm assignment. Each search and rescue team shall consist of a minimum of two personnel.
- (6) A minimum of one ventilation team shall be part of the initial full alarm assignment. Each ventilation team shall consist of a minimum of two personnel.
- (7) If an aerial device is used in operations, one person shall function as the aerial operator who shall maintain primary control of the aerial device at all times.
- (8) Establishment of an initial rapid intervention crew (IRIC) that shall consist of a minimum of two properly equipped and trained personnel.”

According to this section of NFPA 1710, a minimum of 15 personnel should be on the initial full alarm assignment (NFPA, 2001).

The final question researched during this review consists of determining how the CFD compared to nationally recognized standards and to identify any shortfalls that may exist. The primary document utilized for researching this question was the CFD Standard Operating Procedures. Within this document, it was determined that the CFD has the following personnel responding on the initial full alarm assignment:

- Colleyville Fire Department – 9 personnel minimum, 11 maximum
- Bedford Fire Department – 3 personnel minimum, 4 maximum
- Southlake Fire Department – 3 personnel minimum, 4 maximum
- Keller Fire Department – 3 personnel minimum, 4 maximum

Utilizing the preceding breakdown of resources, the initial full alarm assignment of the Colleyville Fire Department has a minimum of 18 personnel responding and a maximum of 23 personnel responding (CFD, 2008). Of these 18 to 23 personnel, 9 to 12 of them respectively are provided by automatic aid companies who can only respond if they are not currently on an incident when the emergency in Colleyville arises. The second part of the NFPA 1710 recommendations calls for the full initial alarm assignment to be on scene within 8 minutes during 90% of the incidents. According to CFD (2008) during the period of 2004 to 2007, the average response time to structure fires within the City of Colleyville by department included:

- Colleyville Fire Department – 4.1 minutes
- Bedford Fire Department – 7.6 minutes
- Southlake Fire Department – 9.3 minutes
- Keller Fire Department – 13.5 minutes.

Average response times for structure fire response from other surrounding agencies were eliminated during this portion of the research. This research is centered only on the initial full alarm assignment which is filled utilizing automatic aid from the three other fire departments listed.

According to CFD (2008) “All personnel are to comply with two in, two out guidelines at all times unless authorized to deviate from this policy by the Incident Commander on scene.” Zero documentation pertinent to OSHA regulations regarding staffing was found within departmental documents that were researched.

Procedures

This research was conducted utilizing the descriptive research method. The purpose of this research was to determine the staffing and apparatus capabilities of the CFD, compare it to

other agencies both locally and throughout the country, and finally to compare the current conditions in Colleyville to nationally accepted standards and guidelines presently in use. The procedures for conducting this research utilized multiple sources and several forms of media. The major components of this research effort included a nationwide survey, personal communications with neighboring communities, and extensive library and internet searches for sources related to this topic. The following is a breakdown of how this research was conducted.

The first step in the research process included the use of the Learning Resource Center (LRC) on the National Fire Academy campus. Searches utilizing the keywords “staffing”, “capability assessment”, and “fireground efficiency” produced multiple initial sources for review. The resources located in the LRC were limited to primarily magazine articles written over the last five years. Search efforts for books on the topic proved to be extremely limited in the LRC.

The second step in the research process took place upon returning home from the NFA campus. Library searches at both the Hurst Public Library and the Fort Worth Public Library proved to be fruitless in identifying any additional sources of information on the topic. At this point, the researcher shifted his focus to internet sources using the same search keywords as previously discussed. Internet sources were plentiful, but the researcher was cautious to identify primary sources only from the vast list of internet items that were retrieved. Again, most of these sources were related to magazine articles. The internet sources also identified several NFPA publications which provided a vast amount of data for review.

The next step in the research process involved development of the survey tool that would be utilized to collect data from nationwide sources. A copy of the survey instrument is available in Appendix A. This survey was submitted to multiple Fire Chief’s Associations across the

country as well as to the National Society of Executive Fire Officers (NSEFO). The list of survey submittal points is available in Appendix B. In addition, a list of survey respondents is available in Appendix C. The researcher allowed a period of six weeks for survey results to be returned for compilation. According to NFPA (2002), there are 30,542 fire departments in the United States. Based on that number, utilizing survey sample information from Krejcie & Morgan (1970), a minimum of 379 respondents would be necessary to provide 95 percent confidence in the survey results. At the conclusion of this effort, 56 departments from 27 different states responded to the survey. Despite additional efforts, no additional surveys were returned for this research. Though the survey responses were limited compared to what was anticipated, a relative trend can be drafted from the information provided.

Several of this researcher's questions center on current conditions and capabilities within the Colleyville Fire Department. The next step in the research was to retrieve the various reports and internal documents necessary to conduct a comparative analysis to data retrieved from other research efforts. Copies of this information are available upon request from the researcher at the following email address: shelleyc@ci.colleyville.tx.us. The documents used included departmental SOP's and reports from fire incident reporting software utilized by the agency being researched. This similar information would likely be available from any agency wishing to use this research internally to identify strengths and weaknesses regarding staffing and apparatus capabilities within their respective department.

The final step in the research process involved personal communication with chief officers from agencies which directly border Colleyville and serve as automatic and mutual aid agencies during structural fire responses. Colleyville borders seven other communities and responses were obtained from all seven cities in question. The departments responding to the

personal communication questionnaires were Keller, Bedford, Hurst, North Richland Hills, Grapevine, Southlake, and Euless Fire Departments. Of these seven cities, Keller, Southlake, and Bedford serve in an automatic aid capacity and Euless, North Richland Hills, Grapevine, and Hurst assist in a mutual aid capacity. A copy of the personal communication questionnaire is available in Appendix D for review.

Limitations:

The limitations of this research effort are isolated to two main concerns. The first of these concerns is the lack of published information on fire department staffing recommendations outside the realm of magazines and nationally recognized standards by national or federal agencies. This researcher found only one actual book with any reference to fire department staffing as it relates to fire ground capabilities and efficiency. The second limitation to this study is centered on the minimal response to the nationwide survey despite the volume of agencies contacted for assistance.

Researchers wishing to duplicate this effort may want to consider other contact groups beyond the state fire chief's associations. These groups have proven very beneficial in survey responses during previous research efforts, however their responses were sporadic at best to this particular research endeavor. The minimal response limits the confidence level of the survey in representing a true consensus of the nation's fire service organizations. For the purposes of providing a reasonable feedback instrument for use in the Colleyville Fire Department, the survey will be sufficient to meet the needs of our organization by including the information obtained from our bordering agencies with whom we are so often compared locally.

Definition of Terms:

Automatic Aid – resources received from neighboring communities through written agreements which are dispatched by the requesting agency as if those resources were a part of the agency needing assistance (NFPA, 2001).

Mutual Aid – resources from neighboring communities offered through written agreements, yet without simultaneous dispatching capabilities (NFPA, 2001).

Full Alarm Assignment – The total amount of personnel and fire apparatus sent to structural fire emergencies on the initial dispatching of the incident (NFPA, 2001).

Results

The first research question centered on the response capabilities of the CFD regarding personnel and apparatus. According to CFD (2008) the authorized current staffing within the CFD is ten personnel per shift with a minimum staffing of eight per 24 hour shift. These personnel are spread out across three stations staffing an engine at fire station two with three personnel, a 65' quint at station three with three personnel, and four personnel assigned to station one staffing an engine and an ambulance. When staffing falls below four, the engine in this station is left out of service anytime the assigned personnel are answering an emergency medical call. During these periods, apparatus from the two other fire stations cover the fire district of station one. Personnel at fire station one may answer a fire call in their district if they are in the station at the time of the call.

In addition to the frontline fire apparatus of the CFD, there is one reserve fire engine that is fully equipped, one brush fire unit, and one reserve ambulance. These apparatus can be staffed in an extreme emergency utilizing off-duty personnel working in an overtime capacity. The response capabilities of off-duty personnel are hampered by the fact that many of the operational

personnel within the CFD live 40 or more miles from the City creating a return time in excess of one hour in some cases. A few personnel within the organization live more than one hundred miles away and require two or more hours to return to the City if needed. The total response capability of the Colleyville Fire Department is 33 personnel, three engines, one quint, one brush fire unit, and two ambulances if all personnel were called back to work, able to return, and all apparatus were operational.

The second research question centered on comparing the staffing and response capabilities of similarly sized fire service agencies to Colleyville. This was done through phone interviews with neighboring departments and through a nationwide survey. My first contact was with the Bedford Fire Department, one of Colleyville's primary automatic aid partners. Their on duty capabilities from three fire stations include two engines, one ladder, three ambulances, and one battalion chief. Minimum staffing is 16 per shift and full staffing is 19 per shift. Reserve apparatus include one engine, one ladder, and one ambulance. Full staff mobilization in the event of a disaster would be 63 personnel (J. Richardson, personal communication, December 28, 2007).

The second contact was made with the Euless Fire Department which serves as a mutual aid agency for Colleyville. Their on duty strength from three fire stations includes one engine, two ladders, three ambulances, and one battalion chief. Minimum staffing is 16 per shift and full staffing is 20 per shift. Reserve apparatus included one engine, one ambulance, and one brush fire unit. Full staff mobilization would be 65 personnel for disaster response (R. Isbell, personal communication, December 28, 2007).

Next the researcher made contact with the Hurst Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from two fire stations includes two

engines, one ladder, two ambulances, and one battalion chief. Minimum shift staffing is 14 and full staffing is 17 per shift. Reserve equipment includes one engine, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 55 if all personnel were recalled (D. Palla, personal communication, December 28, 2007).

Next the researcher made contact with the North Richland Hills Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from four fire stations includes three engines, two ladders, three ambulances, and one battalion chief. Minimum shift staffing is 22 and full staffing is 27 per shift. Reserve equipment includes one engine, two brush fire units, one ladder, and one ambulance. Emergency staffing for disaster situations would be 88 if all personnel were recalled (M. Rawson, personal communication, December 28, 2007).

Next the researcher made contact with the Grapevine Fire Department, another mutual aid agency bordering Colleyville. On duty minimum strength from five fire stations includes three engines, three ladders, three ambulances, and one battalion chief. Minimum shift staffing is 26 and full staffing is 31 per shift. Reserve equipment includes one engine, one ladder, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 105 if all personnel were recalled (C. Jones, personal communication, December 28, 2007).

Next the researcher made contact with the Southlake Fire Department, another automatic aid agency bordering Colleyville. On duty minimum strength from two fire stations includes two engines, one ladder, and two ambulances. Minimum shift staffing is 15 and full staffing is 18 per shift. Reserve equipment includes one engine, one brush fire unit, and one ambulance. Emergency staffing for disaster situations would be 58 if all personnel were recalled (M. Starr, personal communication, December 28, 2007).

The final neighboring agency this researcher was able to contact was the Keller Fire Department. Keller serves as an automatic aid agency and borders Colleyville on its northwest corner. Daily response capabilities from three fire stations include two quints, one ladder, three ambulances, and one battalion chief. Minimum daily staffing is 16 and full staffing is 20 per shift. Full recall of all personnel would provide a total of 65 response personnel. Reserve apparatus is limited to one engine, two brush fire units, and one ambulance (C. Blankenship, personal communication, December 28, 2007).

The second portion of this research question was to compare Colleyville to similarly sized agencies from across the country. A total of 14 survey respondents or 25% of total respondents were from communities which protect a similarly sized population to Colleyville. Those same communities were responding from an average of 2.2 stations where Colleyville currently has three fire stations. On average, these fire service agencies were protecting more than 37 square miles of response territory. Colleyville has a jurisdictional responsibility of 13.4 square miles. These same 14 responding agencies had an average full staffing crew of 10 personnel on duty and an average minimum staff of eight personnel on duty at all times. These numbers correspond exactly to Colleyville's full staffing of 10 and minimum staffing of eight. Overall survey results indicate that 21 departments or 38% of respondents have conducted a capability assessment on their organization.

The third research question was answered utilizing the survey instrument as well as the personal communications with neighboring agencies to Colleyville. According to the survey, 12 departments or 55% of respondents who have conducted a capability assessment acknowledged that they do indeed have a diminished response capability within their organization. Overall, 60% of survey respondents have not conducted a capability assessment on their organization, and

60% of all survey respondents believe their organization to have a diminished response capability. In the overall survey results, 19 departments or 33% of total respondents cited the reason for their diminished response capability to be lack of adequate staffing. Eleven departments or 77% of the similarly sized respondent departments cited lack of adequate staffing as the reason for their diminished response capabilities. The seven neighboring fire departments to Colleyville all acknowledged a diminished response capability within their organizations and all seven agencies cited manpower as the primary causal factor and funding as the second causal factor creating the concern (Palla, D., Richardson, J., Blankenship, C., Isbell, R., Rawson, R., Starr, M., and Jones, C. personal communication, December 28, 2007).

The fourth and fifth research questions are linked together and concerned with any nationally recognized standards or requirements for fire departments related to staffing and response capabilities and how the Colleyville Fire Department measures up to those standards. NFPA 1710 and OSHA's Respiratory Protection regulations both pertain to fire department staffing and response capabilities. Both agencies recommend/require a minimum of four personnel on responding fire apparatus to provide for a minimum of two personnel available outside the structure before interior firefighting operations are started (NFPA, 2001).

In addition, NFPA (2001) and Goldfeder (2007) both recommend increasing the size of the Rapid Intervention Crew (RIC) to at least four personnel as soon as enough personnel are available on scene to do so safely. NFPA (2001) recommends a minimum of 15 personnel on the initial full alarm assignment and Goldfeder (2007) recommends a minimum of 20 personnel on the first alarm and is quick to point out that this is just for a normal sized residential structure fire. Harkes (1991) gives a similar breakdown of resources to both NFPA and Goldfeder, but its

recommendation is for 18 personnel on the first alarm assignment in order to create the most efficient initial fireground operation possible.

Analyzing the current first alarm assignment in the CFD, a minimum of 18 personnel is automatically dispatched and during optimal times of full staffing in all responding agencies, 23 personnel would be responding (CFD, 2008). Of these, only nine personnel or 50% are from Colleyville during minimum staffing and only 11 personnel or 44% of responding personnel are from Colleyville when full staffing is in place (CFD, 2008). In other words, currently, the CFD is only able to provide 50% or less of the needed firefighters responding on an initial alarm for a structural fire in their jurisdiction. Colleyville is able to comply with recognized federal standards regarding personnel responding to a structural fire, but only through the use of automatic aid from three outside agencies. If any of these agencies are unable to respond due to emergencies in their own city, the minimum personnel requirements would not be met. In addition to these numbers, based on response time requirements in NFPA (2001), only one of the three outside fire agencies responding with CFD to structure fires is able to arrive within the specified response time in the standard (CFD, 2008).

Discussion

The purpose of this research effort was to answer the following questions: (1) What are the current capabilities of the CFD regarding personnel and apparatus? (2) What are the personnel and apparatus capabilities of other fire service organizations similar in size to the CFD and how does the CFD compare to these organizations? (3) Are other Departments around the country experiencing diminished response capabilities similar to the CFD, and what are their causes? (4) What are the nationally recognized standards and guidelines related to staffing and apparatus at structural fires? (5) How does the CFD compare to the recommendations given in

these guidelines and what, if any are the current shortfalls? In doing so, the following synopsis of the data collected and literary sources reviewed is presented.

Initially, it was necessary to determine the current response capabilities of the CFD considering only apparatus and personnel. CFD (2008) identifies a current full staffing capability of 10 personnel and a minimum staffing capability of eight personnel per shift. Having this information available, it was possible to carry over directly into the response capabilities of similarly sized organizations both in the area and around the country. NFPA (2007) found that 75% of fire departments responding to their survey that protected less than 50,000 in population did not have adequate numbers of fire stations or firefighters to meet the widely recognized response time standards across the country. Colleyville currently has three stations in place which were located utilizing the city's Geographic Information Systems (GIS) personnel to ensure proper location of fire stations to ensure five minute or less response times across more than 90% of the City.

Colleyville is able to meet the response time standards for the initial fire company based on NFPA (2001), but falls short of the staffing recommendations of the same document without the help of outside agencies. Currently, the CFD is staffing its frontline apparatus with only three personnel instead of the recommended four personnel based on NFPA (2001). In addition, CFD (2008) showed that the Colleyville Fire Department can meet the staffing numbers for the initial full alarm assignment using automatic aid companies, but cannot currently meet the response time requirement of eight minutes or less for the initial full alarm assignment also identified in NFPA (2001). Currently, only one of the three automatic aid companies has an average response time of eight minutes or less per CFD (2008). In addition, the only neighboring community to Colleyville which has a daily minimum staffing of less than 16 is the

Hurst Fire Department which has a minimum daily staffing of 14 personnel (Palla, D., personal communication, December 28, 2007). Based on the responses to the nationwide survey conducted by this researcher, departments similar in size averaged slightly less fire stations than Colleyville, but the same average full and minimum staffing amounts as Colleyville. The survey also showed that survey departments similar in size to Colleyville averaged 2.3 frontline fire engines and .55 aerial ladders per respondent, six of the 14 respondents from the same population data set did not identify an aerial in the frontline fleet at all. Colleyville has two frontline engines and one frontline aerial currently in service. The disparity between the nationwide survey and the responses from neighboring agencies is likely based on two factors: (1) the minimal number of survey responses received from departments in the same grouping by population as Colleyville and (2) the survey instrument called for cities between 10,000 and 30,000 which has created the potential for results from considerably smaller and likely more rural agencies than Colleyville which offered a skewed data set. Despite these setbacks, a reasonable amount of data was still available to allow for drawing some conclusions about Colleyville's current staffing and resource issues.

The third question raised related to whether or not other departments across the area and country were experiencing similar diminished response capabilities and what the causes of those diminished capabilities were believed to be. According to the survey results of this researcher, only 38% of survey respondents said they had conducted a capability assessment of their department, and 60% of those departments said their response capabilities were diminished due to short staffing and financial constraints prohibiting the hiring of additional personnel. These results are right in line with both IAFC (2004) and IAFC (2005) which identified more than 58% and 61% respectively of survey respondents who listed staffing as their greatest challenge to

meeting the needs of their communities. In addition, 10% and 11.9% respectively of survey respondents in these two documents also identified replacement or purchase of needed apparatus and equipment as a great challenge before them. Colleyville would fall into these categories as well based on the financial constraints which have kept personnel from being hired and the delays placed on the purchase of needed new apparatus. Another document NFPA (2005) identified staffing, funding, and increased service demands as the three greatest challenges facing the American fire service. These results are also in line with the current situation in the CFD. NFPA (2005) also pointed out that over 30% of fire departments protecting 10,000 and 24,999 population, had only one or two firefighters responding on an engine. Colleyville currently has only two personnel responding on Engine 241 when staffing is full. Any other time, the engine is completely out of service. Currently, all surrounding agencies to Colleyville staff their fire apparatus with a minimum of three personnel at all times, but efforts to increase to four man staffing have met with similar difficulties due to funding issues (Palla, D., Richardson, J., Blankenship, C., Isbell, R., Rawson, M., Starr, M., and Jones, C. personal communication, December 28, 2007).

The fourth area of research centered on identifying nationally recognized standards and guidelines for the proper staffing necessary to operate effectively and safely at structural fires and the final area of research involved comparing current conditions in Colleyville to the standards and recommendations previously discussed. These two areas will be discussed in tandem as they are directly related. The two most significant components of this research area were the *OSHA Respiratory Protection Standard* and *NFPA Standard 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*. In addition, several other

documents were found during the research effort that provides additional insight into effective staffing for fireground operations.

OSHA (2006) calls for a minimum of four personnel arriving on the initial fire company at a working structure fire and requires that any time personnel enter the structure for interior firefighting operations, it is to be done in groups of no less than two and two additional personnel must be available outside the structure for rescue purposes if the first team gets into trouble. Currently, Colleyville complies with this standard, but due to three man staffing on fire apparatus, crews must wait for a second crew to arrive before interior firefighting operations can begin. The only caveat to this procedure is in instances where there is a confirmed or potential life safety situation inside the structure. These situations place our personnel in great peril to ensure no one is trapped inside or left without rescue.

Currently, the CFD staffs two of its frontline fire apparatus with three personnel and one fire apparatus with two personnel when staffing is full. When staffing is less than full, two fire apparatus remain at three personnel and the third fire apparatus is placed out of service. There is never a time when fire apparatus are staffed with less than two personnel. NFPA (2001) and OSHA (2006) both recommend a minimum of four personnel on first arriving fire apparatus to a working structure fire. In addition to the recommendations for first due fire company staffing, NFPA (2001) also recommends a minimum number of fire personnel on the initial full alarm assignment of 15 personnel on scene within eight minutes. This researcher has previously discussed the issues regarding response times and the focus at this point will be on staffing. Currently, Colleyville can place eight to ten personnel on a fire scene depending on staffing for the day. Including all automatic aid companies, the CFD can put 18 to 23 people on a fire scene with the first alarm, however, the response times for two of the three automatic aid companies

are outside the recommended time frame of NFPA 1710. Currently, all neighboring fire departments to Colleyville can place a minimum of 14 personnel on an initial full alarm assignment without the assistance of outside agencies. Colleyville can only place a minimum of eight personnel on a scene without assistance. This comparison shows a minimum net shortage of six firefighters on the initial full alarm assignment as compared to its immediate neighboring departments. To further complicate this issue, recommendations from NFPA (2001), Harkes (2005), and Goldfeder (2007) all include in their manpower recommendations that the staffing numbers given are for a one to two room fire in an average 2000 square foot home. The average home in Colleyville is in excess of 3,500 square feet and that average continues to grow. These same three sources, recommend a minimum of 15, 18, and 20 personnel respectively and the CFD can currently only provide eight to ten personnel alone. If the neighboring automatic aid companies are busy on other emergencies, the response times for outside assistance increase even more as companies from further away are summoned to respond.

The results of this research have identified the following facts about response capabilities in Colleyville, Texas:

- The CFD cannot currently meet fireground staffing and response time criteria found in multiple nationally accepted standards and regulations without outside assistance.
- The CFD is understaffed by a minimum of six personnel per shift as compared only to its neighboring communities.
- Two of the three automatic aid departments currently in place have average response times greater than the recommended initial alarm assignment times based on nationally recognized standards.

- Colleyville compares relatively even to similarly sized fire departments across the country based on survey data with the noted limitations.
- Colleyville's staffing shortage and its root causes are similar to those of respondents to a nationwide survey by this researcher and multiple surveys by national organizations with similar conclusions.

Having identified the current shortfalls and weaknesses in the current response capabilities of the Colleyville Fire Department, the next section will provide this researcher's recommendations to improve these capabilities in the coming years of the organization.

Recommendations

Based upon the findings of this researcher after conducting a literature review of the topic, comparative analysis to surrounding communities, and a nationwide survey, the following are the recommendations of this researcher based on the results identified in the previous section:

- Develop a short term plan over the next one to three years to improve staffing of the third fire apparatus to a minimum of three personnel at all times.
- Develop a three to five year plan to improve staffing to levels that would allow the CFD to dispatch a full initial alarm assignment of at least 15 personnel at all times without reliance on outside agencies until subsequent alarms were needed.
- Work to improve response times with automatic aid agencies by re-examining the current companies being used and looking for alternatives that might also improve response times and coverage to the citizens of Colleyville.
- Develop a long range plan for the CFD to become an innovator in the immediate area regarding fire department staffing, deployment, and customer service.

The first step in this process is to share the findings of this research with the administrators and policymakers who have the authority to authorize these changes and set the wheels of improvement in motion. It is this researcher's anticipation that staffing improvements and apparatus replacement will benefit the organization in multiple ways including better customer service, more efficient and safe fire ground operations, improved morale, and decreased employee turnover. It will be important to re-evaluate this situation annually after each of the improvements are made to ensure changes are adequate and appropriate for the demographics and response needs of the community at that time. In conclusion this researcher would offer the following recommendations to those wishing to embark on a similar research effort:

- Make sure recordkeeping within your organization is thorough to ensure data is available regarding staffing and response times to support analysis and drawing of conclusions.
- Make sure to glean as much data from surrounding communities on this topic to provide for a more thorough comparison to the communities around you.
- Be as exhaustive as possible in attempting to gain survey responses from nationwide agencies. Start survey efforts early in the process to allow for a greater collection time from those who might be delayed in responding to your requests.
- Utilize all resources available to you including the LRC at the National Fire Academy for collection of literature review items.

It is the sincere hope of this researcher that a positive effect will be found both in Colleyville, Texas and any other fire service organization embarking on a similar effort within their agency.

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Appendix A:

Survey Instrument

National Fire Academy
Executive Fire Officer Program

My name is Russell Shelley and I am a Battalion Chief with the Colleyville, Texas Fire Department. I am currently enrolled in the Executive Fire Officer Program at the National Fire Academy. I am doing my research project on diminished response capabilities in our Department. Your completion of this survey is greatly appreciated.

1. Department Name:
2. State:
3. Size of Population: ☐ <10K ☐ 10K-30K ☐ 31K-50K
☐ 51K-100K ☐ >100K
4. Number of Fire Stations:
5. Size of Jurisdiction: square miles
6. Full Staffing per Shift:
7. Minimum Staffing per Shift:
8. Staffing for each of the following:

Staffing Type	Engine	Truck	Squad/Rescue/Medic
Full			
Minimum			

9. Number of Staffed Units by Type per Shift:

Engine	Truck	Squad/Rescue/Medic

10. Number of Reserve Units by Type:

Engine	Truck	Squad/Rescue/Medic

11. Have you completed a capability assessment of your organization?

☐ Yes ☐ No

12. Do you think your organization has a diminished response capability?

☐ Yes ☐ No

13. If you answered “Yes” to number 12, what do you think to causes of that diminished capability are?

Thank you for taking the time to complete this survey. A copy of the results will be available by email upon completion of the project. Please copy and paste the completed survey into a new email and return to shelleyc@ci.colleyville.tx.us. You may also return the surveys by fax to (817) 488-2943 attention Russell Shelley. Thank you again for your assistance with this project.

Appendix B:

Survey Submittal List

Alabama Fire Chief's Association	Arizona Fire Chief's Association
Arkansas Fire Chief's Association	California Fire Chief's Association
Colorado Fire Chief's Association	Florida Fire Chief's Association
Idaho Fire Chief's Association	Illinois Fire Chief's Association
Indiana Fire Chief's Association	Kansas Fire Chief's Association
Louisiana Fire Chief's Association	Massachusetts Fire Chief's Association
Minnesota Fire Chief's Association	Missouri Fire Chief's Association
Nevada Fire Chief's Association	New Hampshire Fire Chief's Association
New Mexico Fire Chief's Association	North Carolina Fire Chief's Association
Ohio Fire Chief's Association	Oklahoma Fire Chief's Association
Oregon Fire Chief's Association	Tennessee Fire Chief's Association
Texas Fire Chief's Association	Virginia Fire Chief's Association
Washington Fire Chief's Association	Wisconsin Fire Chief's Association
Wyoming Fire Chief's Association	International Assoc. of Fire Chiefs
National Society of Executive Fire Officers	

Appendix C:

Survey Respondents/Results

City	Population				
	<10 K	10K-30K	31K-50K	51K-100K	>100K
Hoover, AL	1			1	
Kingman, AZ		1			
Cottonwood, AZ		1			
Salt River, AZ		1			
Little Rock, AR					1
San Manuel, CA		1			
North County FPD, CA				1	
Longmont, CO				1	
St. Petersburg, FL					1
Tamarac, FL				1	
Caldwell, ID				1	
Glenview, IL			1		
McHenry Twp., IL			1		
White River, IN			1		
Leawood, KS		1			
St. George FPD, LA					1
Cotuit, MA	1				
Roseville, MN			1		
Stillwater, MN		1			
N. Kansas City, MO	1				
Clark County, NV					1
Derry, NH			1		
Carlsbad, NM		1			
Wilmington, NC				1	
Shelby, NC		1			
Deerfield, OH			1		
Tulsa, OK					1
Oklahoma City, OK					1
Norman, OK					1
Edmond, OK				1	
Bethany, OK		1			
Frederick, OK		1			
Owasso, OK				1	
Enid, OK				1	
Salem, OR					1
Pendleton, OR		1			
Germantown, TN			1		
Bedford, TX			1		
College Station, TX				1	
Trophy Club, TX	1				
Lewisville, TX				1	
Arlington, TX					1
Flower Mound, TX				1	
Keller, TX			1		
N. Richland Hills, TX				1	
Hampton, VA					1
Ashburn, VA			1		
Vancouver, WA					1
Cheney, WA		1			
Watertown, WI		1			
Kenosha, WI				1	
Beloit, WI			1		
Janesville, WI			1		
Rock Springs, WY		1			
Totals:	4	14	12	14	11

City	Stations	Land Area	Full	Minimum	Engines	
			Staff	Staff	Full	Minimum
Hoover, AL	8	45	44	44	3	3
Kingman, AZ	4	32	14	12	4	3
Cottonwood, AZ	1	11	4	3	4	3
Salt River, AZ	4	92	25	24	4	4
Little Rock, AR	20	119	117	117	4	3
San Manuel, CA	1	2	9	8	4	3
North County FPD, CA	6	100	20	20	3	3
Longmont, CO	6	22	26	20	4	3
St. Petersburg, FL	13	62	105	80	4	3
Tamarac, FL	3	12	30	22	3	3
Caldwell, ID	3	130	13	8	3	3
Glenview, IL	5	22	27	22	3	3
McHenry Twp., IL	4	56	13	12	3	3
White River, IN	3	26	21	15	4	3
Leawood, KS	3	14.7	16	14	4	3
St. George FPD, LA	8	65	40	34	4	3
Cotuit, MA	1	5	3	2	3	2
Roseville, MN	3	13.5	8	5	3	2
Stillwater, MN	1	61	5	2	3	2
N. Kansas City, MO	2	4.2	19	15	4	3
Clark County, NV	40	3776	192	184	4	4
Derry, NH	4	37	18	16	3	3
Carlsbad, NM	6	29	15	13	4	3
Wilmington, NC	11	54.3	66	58	4	4
Shelby, NC	3	20.4	17	14	4	3
Deerfield, OH	3	19.3	15	12	2	2
Tulsa, OK	30	214	211	144	4	3
Oklahoma City, OK	35	634	273	177	5	4
Norman, OK	7	196	39	33	5	4
Edmond, OK	5	100	35	27	4	4
Bethany, OK	1	6	7	5	4	2
Frederick, OK	1	75	3	2	1	1
Owasso, OK	3	75	13	9	2	1
Enid, OK	5	40	25	23	3	3
Salem, OR	10	78	40	40	3	3
Pendleton, OR	2	15	6	5	2	2
Germantown, TN	4	19.1	20	17	4	3
Bedford, TX	3	10	19	16	4	3
College Station, TX	5	53	35	27	4	3
Trophy Club, TX	1	5	4	3	4	3
Lewisville, TX	6	43	40	32	3	3
Arlington, TX	16	100	86	76	3	3
Flower Mound, TX	3		20	16	4	3
Keller, TX	3	20	16	10	4	3
N. Richland Hills, TX	4	19	26	21	4	3
Hampton, VA	10	54	76	58	4	3
Ashburn, VA	2	36	18	18	3	3
Vancouver, WA	9	92	41	41	3	3
Cheney, WA	1	5	2	2	2	2
Watertown, WI	1	101	7	5	3	3
Kenosha, WI	7	28	47	39	5	3
Beloit, WI	3	6	20	15	3	3
Janesville, WI	5	33.5	28	24	3	3
Rock Springs, WY	3	65	11	9	3	3
Totals:	6.481481481	131.1698113	37.944444	54	3.4814815	2.9074074

City	Trucks		Rescue/Medic		Frontline Apparatus		
	Full	Minimum	Full	Minimum	Engines	Trucks	Squads
Hoover, AL	3	3	2	2	8	3	3
Kingman, AZ	3	3	2	2	4	1	1
Cottonwood, AZ	0	0	0	0	1	0	0
Salt River, AZ	4	3	2	2	3	1	4
Little Rock, AR	4	3	5	5	20	8	1
San Manuel, CA	4	4	0	0	1	1	0
North County FPD, CA	0	0	2	2	5	0	2
Longmont, CO	4	3	2	2	5	1	0
St. Petersburg, FL	4	3	2	2	13	4	10
Tamarac, FL	3	0	3	2	3	0	4
Caldwell, ID	5	5	2	2	2	1	1
Glenview, IL	4	3	2	2	4	1	3
McHenry Twp., IL	3	3	3	3	4	0	4
White River, IN	5	4	0	0	3	1	0
Leawood, KS	3	3	3	3	3	1	3
St. George FPD, LA	4	4	0	0	8	2	0
Cotuit, MA	0	0	3	2	1	0	1
Roseville, MN	0	0	2	2	1	0	1
Stillwater, MN	0	0	0	0	1	0	0
N. Kansas City, MO	4	2	2	2	2	2	2
Clark County, NV	4	4	2	2	25	6	22
Derry, NH	2	1	2	2	4	1	2
Carlsbad, NM	4	3	3	3	4	1	5
Wilmington, NC	4	3	4	3	11	2	3
Shelby, NC	4	3	0	0	3	1	0
Deerfield, OH	2	2	2	2	2	1	3
Tulsa, OK	4	4	0	0	30	13	0
Oklahoma City, OK	4	3	5	4	35	14	1
Norman, OK	4	0	4	0	7	1	1
Edmond, OK	4	2	2	2	5	1	1
Bethany, OK	0	0	0	0	2	0	0
Frederick, OK	2	2	2	2	2	1	1
Owasso, OK	0	0	6	6	2	0	3
Enid, OK	1	1	3	3	5	1	1
Salem, OR	4	4	2	2	10	2	10
Pendleton, OR	2	2	2	2	2	0	2
Germantown, TN	4	3	1	1	4	1	1
Bedford, TX	4	3	2	2	2	1	3
College Station, TX	5	4	2	2	5	1	3
Trophy Club, TX	4	3	2	2	1	1	1
Lewisville, TX	5	4	2	2	6	1	4
Arlington, TX	4	3	0	0	16	5	0
Flower Mound, TX	0	0	2	2	3	0	3
Keller, TX	4	3	2	2	1	2	2
N. Richland Hills, TX	3	2	2	2	4	1	3
Hampton, VA	4	4	2	2	10	2	9
Ashburn, VA	4	4	2	2	2	1	2
Vancouver, WA	4	4	2	2	9	2	2
Cheney, WA	0	0	0	0	2	0	0
Watertown, WI	1	0	2	2	1	1	1
Kenosha, WI	4	3	4	3	5	3	4
Beloit, WI	3	3	3	2	3	1	3
Janesville, WI	3	3	2	2	3	2	4
Rock Springs, WY	0	0	0	0	3	0	0
Totals:	2.9259259	2.3333333	2	1.8148148	5.9444444	1.7962963	2.5925926

City	Reserve Apparatus			Capability Assessment		Diminished Capability	
	Engines	Trucks	Squads	Yes	No	Yes	No
Hoover, AL	4	1	3	1		1	
Kingman, AZ	2	0	0	1		1	
Cottonwood, AZ	1	0	0	1		1	
Salt River, AZ	3	1	2	1		1	
Little Rock, AR	5	1	0		1	1	
San Manuel, CA	1	0	1	1			1
North County FPD, CA	3	0	2		1		1
Longmont, CO	3	1	1		1		1
St. Petersburg, FL	4	0	4		1	1	
Tamarac, FL	2	1	4	1			1
Caldwell, ID	2	1	1	1			1
Glenview, IL	2	0	2		1		1
McHenry Twp., IL	0	0	0		1		1
White River, IN	1	0	0	1		1	
Leawood, KS	1	0	0	1		1	
St. George FPD, LA	2	1	0	1		1	
Cotuit, MA	0	0	0		1	1	
Roseville, MN	4	2	2		1		1
Stillwater, MN	0	0	0	1		1	
N. Kansas City, MO	1	0	0		1		1
Clark County, NV	5	2	5		1		1
Derry, NH	1	0	2	1			1
Carlsbad, NM	1	1	2		1	1	
Wilmington, NC	3	1	1	1		1	
Shelby, NC	2	0	0		1		1
Deerfield, OH	0	0	1		1	1	
Tulsa, OK	8	3	0	1		1	
Oklahoma City, OK	0	0	0	1			1
Norman, OK	4	0	0		1	1	
Edmond, OK	0	2	1	1			1
Bethany, OK	1	0	1		1	1	
Frederick, OK	1	2	0		1	1	
Owasso, OK	1	0	1		1	1	
Enid, OK	1	0	0		1		1
Salem, OR	3	1	4	1			1
Pendleton, OR	2	0	2		1	1	
Germantown, TN	3	0	0		1	1	
Bedford, TX	1	1	1		1	1	
College Station, TX	2	1	2		1	1	
Trophy Club, TX	0	0	0		1	1	
Lewisville, TX	2	1	2	1		1	
Arlington, TX	5	2	0	1			1
Flower Mound, TX	2	0	1		1	1	
Keller, TX	1	0	1		1		1
N. Richland Hills, TX	3	3	2		1	1	
Hampton, VA	4	1	1		1		1
Ashburn, VA	3	1	3		1		1
Vancouver, WA	5	1	1		1	1	
Cheney, WA	2	1	0		1	1	
Watertown, WI	1	0	1		1	1	
Kenosha, WI	2	0	3	1		1	
Beloit, WI	1	0	1		1	1	
Janesville, WI	0	1	1	1		1	
Rock Springs, WY	1	0	0		1		1
Totals:	2.0740741	0.6296	1.148148	21	33	33	21

City	How Is Capability Diminished?
Hoover, AL	Staffing and station shortage.
Kingman, AZ	Staffing
Cottonwood, AZ	Funding for staffing.
Salt River, AZ	Rural community with urban issues.
Little Rock, AR	
San Manuel, CA	
North County FPD, CA	
Longmont, CO	
St. Petersburg, FL	No reserve Truck apparatus. Truck companies swap into Engines when Truck goes down for maintenance.
Tamarac, FL	
Caldwell, ID	
Glenview, IL	
McHenry Twp., IL	
White River, IN	Multiple False Alarms.
Leawood, KS	Annexations without new fire stations to cover the new areas.
St. George FPD, LA	Lack of manpower
Cotuit, MA	Staffing
Roseville, MN	
Stillwater, MN	Staffing shortages.
N. Kansas City, MO	
Clark County, NV	
Derry, NH	
Carlsbad, NM	Funding for manpower.
Wilmington, NC	Companies closed when unable to meet minimum manning.
Shelby, NC	
Deerfield, OH	Funding for Staffing.
Tulsa, OK	Short staffing on outlying companies.
Oklahoma City, OK	
Norman, OK	Lack of manpower.
Edmond, OK	
Bethany, OK	Staffing
Frederick, OK	Staffing
Owasso, OK	Manpower
Enid, OK	
Salem, OR	
Pendleton, OR	Staffing, and declining volunteer force.
Germantown, TN	Staffing.
Bedford, TX	Turnover
College Station, TX	Growth exceeding service availability.
Trophy Club, TX	Low Staffing
Lewisville, TX	Inadequate availability of mutual aid departments
Arlington, TX	
Flower Mound, TX	Community growth outpacing services.
Keller, TX	
N. Richland Hills, TX	Truck Company only staffed with 2 people.
Hampton, VA	
Ashburn, VA	
Vancouver, WA	Inadequate funding to support needed personnel and equipment.
Cheney, WA	Budgetary constraints and unwillingness of city elected officials to support NFPA, OSHA, and NIOSH.
Watertown, WI	Lack of Manpower
Kenosha, WI	Staffing and Available apparatus.
Beloit, WI	Funding
Janesville, WI	Failing to meet response times.
Rock Springs, WY	

Appendix D:
Local Agencies Questionnaire
Colleyville Fire Department
Neighboring Fire Department Questionnaire

Name of Department: _____

Person Contacted/Rank: _____

Number of Stations: _____ Population Served: _____

Full Staffing: _____ Minimum Staffing: _____

Frontline Fire Apparatus:

Engines: _____ Trucks: _____ Ambulances: _____ Chiefs: _____

Reserve Fire Apparatus:

Engines: _____ Trucks: _____ Ambulances: _____ Brush Units: _____

Apparatus Staffing Full/Minimum:

Engine: _____ Truck: _____ Ambulance: _____ Chief: _____

Capability Assessment Completed? _____

Diminished Response Capability? _____

Causes for diminished response?
