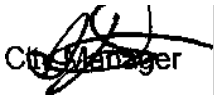
CITY MANAGER
MEMORANDUM

TO: Honorable Mayor Costello and City Commissioners

FROM: Isaac D. Turner, 

DATE: May 28, 2008

SUBJECT: Fire Department Staffing

Introduction: The City is being faced with a recurrent problem of declining revenue caused by several conditions including statewide tax reform measures and an unprecedented down turn in the housing market. These conditions have forced each department, including public safety services, to scrutinize budgetary items to find cuts, where possible, in an effort to meet the fiscal challenges being faced by the City and its citizens. Staff has been directed to make cuts without reducing services, if possible.

Background: During each of the last several years, the Fire Department has made significant reductions in every area possible to reduce the fiscal burden on the City's taxpayers, without significantly impacting our delivery of services. Changes have been made, to date, that have saved over $800,000 annually. At the April 1, 2008, City Commission meeting commissioners asked for more information and further evaluation regarding fire services staffing, recognizing that any additional fire department savings would need to come from staff reductions. This memorandum, combined with the attachment, is intended to provide that analysis and answer those questions posed regarding the impact a reduction in staffing would have on service delivery and firefighter safety.

Discussion: The Ormond Beach Fire Department responds to a diverse variety of emergencies, totaling nearly 6,000 events per year, averaging more than 15 events per day. No matter how large or how small, there is the expectation that we will be able meet the unique challenges as each emergency unfolds. **Common emergencies include; significant weather events, wildfires, medical emergencies, hazardous material incidents, structural fires, automobile crashes, assaults (shootings/stabbings/fights), domestic disturbances, etc.** The Fire Department responds to each of these emergencies in the most efficient manner possible given the limited resources available. A common misunderstanding is that the Fire Department staffs for structural fires while 70% of the calls responded to are medical incidents. This is simply not the case; the Fire Department currently maintains minimum staff to manage the day-to-day medical emergencies. Staffing for structural fires would require an additional 12+ personnel to meet minimum reasonable national standards in a suburban community such as Ormond Beach.

In discussing fire department staffing with surrounding eastern Volusia communities, staff found that none are proposing reducing fire department staff this year. New

Smyrna Beach considered fire service staff reductions several weeks ago and rejected that proposal for the immediate future. All communities surveyed planned on maintaining three-person staffing and continuing with the East Coast Cities Agreement that provides closest unit response. Daytona Beach was the exception, having four personnel on some units and a goal of four-person staffing on all units in the future. Participation in the East Coast Cities Agreement requires a minimum of three certified firefighters on a unit, one being a paramedic.

It is important to recognize that fewer than three persons on a unit will reduce existing service levels to our community. Reduced staffing would extend response times, which would occur more frequently awaiting the arrival of adequate personnel to manage the emergency and/or awaiting for initial response personnel from more geographically remote locations due to the creation of more service voids (units displaced by other calls). Two persons on a unit would simply require more units to be dispatched to an emergency, thereby displacing local units more frequently. For example, two units would be needed to respond to typical EMS emergencies, as was the case when we utilized two-person units nine years ago. We currently send one three-person unit to an EMS emergency, which is one firefighter less than what is recommended by reasonable national standards. All structural fires, which are managed by Ormond Beach units, would require outside the City assistance. That assistance would come at a cost of roughly $900 per call (per assisting jurisdiction) once a threshold balance of 25 + calls has been exceeded.

Simply put, reducing fire services personnel would impair the prompt and current level of emergency medical care we can provide. It will also impact our capabilities of responding safely to fires and other types of emergencies. And lastly, it would place properties at greater risk and will likely increase fire insurance costs through changes in our Insurance Service Office (ISO) ratings. A comprehensive analysis is attached to this staff memorandum that answers the questions posed by City Commissioners and other important information that will assist in decision making.

Budget Impact: The proposed 2008-09 budget does not include any reductions in the Fire Department budget. Therefore, there is no impact unless the Commission wishes to increase or decrease staffing.

Recommendation: The strong staff recommendation is to leave staffing at the current level for the reasons cited in this memorandum.

Prepared by: Barry Baker, Fire Chief

FIRE DEPARTMENT STAFFING ANALYSIS

Staff was charged with answering the following issues in this analysis as recorded in the April 1, 2008, City Commission meeting:

1. Although Mayor Costello agreed that ALS service was better, he asked for statistics as to why ALS service was superior. Dr. Peter Springer, Volusia County Medical Director, will provide information at the workshop. (Pg. 1)
2. The Mayor asked for statistics as to why three persons on a truck were better than two on a truck. Several studies have been provided to address this matter and a scenario to show how staffing is utilized. (Pg. 3)
3. The Mayor asked for a response from the Firefighters Union regarding the early retirement proposal by a Department member. The response is attached to this memorandum. (Attachment)
4. Commissioner Kent requested information on the possible additional risk to Fire Department personnel by reducing staffing. Detailed information has been provided on this matter. (Pg. 8)
5. Mayor Costello asked for information on how many times in the past five years more than one fire had occurred at the same time or when Ormond Beach acted as a back-up. Detailed statistics have been provided. (Pg. 14)
6. The Mayor requested an educational workshop, which has been scheduled for June 4 at 6 PM.

Emergency Medical Services

When asked to evaluate staffing needs, one must consider all types of alarms to which fire services are required to manage. All emergencies require prompt and specific actions to minimize their impact, including the protection of life and property. Often, a successful outcome is dependent on many complex tasks being done simultaneously. Any delay in providing critical care or actions, can have devastating results. Response delays of a single minute or two will have the greatest impact on people who are critically ill or injured. These people also require the most definitive care if a positive outcome is expected. To provide proper patient care, we must evaluate the patient's medical history, current medications, events surrounding the illness or injury, patient complaints, blood pressure, pulse rate, respiratory rate, lung sounds, oxygen saturation, cardiac monitoring, blood glucose levels, and other things specific to the patient's medical situation. Usually, all of these assessments need to be done before medications are given or other invasive care provided.

Patients experiencing severe respiratory depression require immediate oxygenation and airway management to survive their illness. For this type of patient, a rescuer must be dedicated to provide an adequate airway with supplemental oxygen. This effort is necessary to keep the patient alive long enough to determine the underlying cause so it can be correctly addressed and treatment begun. Vital signs, cardiac monitoring, oxygen saturation readings, lung sounds, physical assessment, and an accurate medical history are all needed to determine the underlying problem. In addition to the above, we would also need to establish intravenous (IV) access for giving medications. If this patient were in the controlled environment of a hospital

emergency room, at least the following would be providing care to the patient: a physician, a respiratory therapist, an x-ray technician, and one or two registered nurses. On the other end of the spectrum, firefighters work on these patients everywhere except in controlled environments: bathroom floors, living rooms, automobiles, in the streets, alleys, waterways and on upper floors requiring the patient to be carried down stairs. Having patients who are critically ill or injured is not a rare occurrence; it happens every day, and often several times a day. In 2007, we had 184 patients in respiratory distress; 16 of them went into respiratory arrest regardless of our efforts. We also had 223 cardiac (heart attack) related emergencies; 38 of them were in cardiac arrest.

Automobile crashes require a large number of personnel to care for the injured and minimize hazards. While doing so, we must protect the scene (for victims, firefighters and bystanders) from oncoming traffic. What makes automobile crashes so challenging is that rarely is there only one patient. Many times we have to perform a triage of the injured to determine which one gets no or minimal care until more help arrives, which could be as long as nearly five minutes. Reducing the staffing so that only two firefighters arrive on the scene first (currently three respond) means that only one of the injured can get minimal care. The others would have to wait, and we would have nobody to oversee safety of the scene. Traffic crashes are extremely dangerous for emergency workers, particularly on our highways. The Ormond Beach Fire Department treated 231 patients involved in automobile crashes last year.

Advanced Life Support

A comprehensive study published in the New England Journal of Medicine included 8,138 patients experiencing respiratory distress. They made a comparison between pre-hospital care at the Basic Life Support (BUS) versus Advanced Life Support (ALS) levels. They concluded that the mortality rate in patients treated with pre-hospital ALS care was 12.4%, while the mortality rate for the patients treated with pre-hospital BLS care was 14.3%. If the results of this study is a representation of the ALS care we provide, 3 additional lives were saved in 2007, because of the high level of pre-hospital care they received.

Another study by Karl A. Sporer, MD, evaluated the impact of ALS treatment in the pre-hospital setting in patients with Congestive Heart Failure (CHF) presenting with Acute Cardiogenic Pulmonary Edema (ACRE). They concluded that the in-hospital mortality rate decreased from 15.4 percent to 6.7 percent.

12-lead Electrocardiogram (EGG) monitoring, which is an ALS skill, has proven beneficial to patients presenting with chest pain caused by a blocked artery in the heart muscle. When blood is not able to circulate to all parts of the heart muscle, the affected part will die. This can cause a fatal reduction in cardiac output. There are medications available that can clear blocked arteries, but they must be given before the damage to the heart muscle is permanent. The benefits of this therapy are most realized if given within 60 minutes of onset of symptoms. The method used to determine patients with this type of problem is to conduct a 12-lead EGG. This is recognized by an ST segment elevation along with other signs and symptoms.

Without the ability to conduct 12-lead ECG in the field, the diagnostic procedures would not be done until the patient arrives at the emergency department, adding valuable minutes to the delay. This additional time would deny many patients the full benefit from this life saving treatment.

When this medication is given within 30-60 minutes after onset of symptoms, there is a 6-8% increase in survival rates. It is more common than uncommon to find a patient who has had chest pain for quite some time before calling for help. This initial delay makes it even more important that a 12-lead ECG be performed in the field. Not all hospitals in our area are designated receiving centers for this type of patient, so it is also critically important that these patients are identified during pre-hospital care.

There are many different types of medical emergencies we respond to. Some require ALS care and others don't. Other types of medical emergencies that require ALS include:

1. Unresponsive Diabetic Coma: These patients require glucose to feed their brain. Without it, irreversible damage or even death will occur. When these patients are awake, they can usually take the glucose orally. But often they are not responsive enough, and need it to be given intravenously. This is an ALS procedure performed by Paramedics in the field.
2. Irregular heart rate: There are a number of heart problems that are deadly without ALS intervention. Heart rates can be too fast (Supraventricular Tachycardia), or too slow (bradycardia or heart block) to pump an adequate volume of blood. To convert these rhythms to one that can support life, medications can be given to speed up or slow down the heart rate. We can also perform a cardioversion to slow the heart rate or put them on an external pacemaker to increase their rate. Cardioversion and pacing utilize electrical impulses that differ from defibrillation. All of these procedures are at the ALS level and require ECG monitoring.
3. Narcotic Overdose: An overdose of narcotics can cause many problems. One of the most common is for the patient to breathe too slowly, or not at all. Medication can be administered by a paramedic in the field that will reverse the effect of the narcotic with profound results, again an ALS procedure.

Of the 3,841 Rescue or EMS calls in Ormond Beach in 2007, 839 (22% of alarms) required Advanced Life Support care, 356 (9% of alarms) required a 12-lead ECG.

STAFFING STANDARDS

The National Fire Protection Agency (NFPA) 1500 was created in 1987, and was the first document to set standards specific to firefighting Occupational Safety and Health programs. Prior to 1987 the fire service was subject to regulations that were established for general industry. General industry standards did not address the complex needs of the fire service. A growing number of firefighter deaths and injuries were attributed to the lack of standards dealing with firefighter safety and health.

NFPA 1710 was the first standard to define levels of service, deployment capabilities and staffing levels. A technical committee was organized to conduct research and perform empirical studies throughout North America as a basis for the standards contained in NFPA 1710.

STAFFING LEVELS REQUIRED IN NFPA 1710

5.2.3.1 Fire companies whose primary functions are to pump and deliver water and perform basic fire fighting at fires, including search and rescue, shall be known as engine companies.

5.2.3.1.1 These companies shall be staffed with a minimum of four on-duty personnel.

5.2.4.2.1 The fire department shall have the capability to deploy an initial full alarm assignment within an 8-minute response time to 90 percent of the incidents as established in Chapter 4.

5.2.4.2.2 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 of 1520 L/min (400gpm) for 30 minutes. Supply line(s) shall be maintained by an operator who shall ensure uninterrupted water flow applications.*
3. *Establishment of an effective water flow application rate of 1140 L/min (SOOgpm) from two hand lines, each of which shall have a minimum of 380 L/min (100 gpm) each attack and backup line shall have a minimum of two individuals 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 individuals.*
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 individuals.*
7. *If an aerial device is used in operations, one person shall function as an aerial operator who shall maintain primary control of the aerial device at all times.*
8. *Establishment of an IRIC (2 out) that shall consist of a minimum of two properly equipped and trained individuals.*

As demonstrated above, 15 fire fighters are required for the initial alarm assignment. Ormond Beach's initial response for a residential fire is 12, (3 engines with three personnel each, 1 ladder truck with 2 personnel, and 1 battalion commander) below the NFPA standard.

The NFPA 1710 technical committee reviewed many studies to determine staffing levels for career fire departments. Below is a sample of the studies used by the committee.

American Insurance Association, "Fire Department Efficiency," Special Interest Bulletin No 131, December 1975.
This bulletin states that "companies staffed with two or three personnel, they cannot perform the required functions of either an engine or Ladder company".

Cushman, Jon, Seattle, WA Fire Department's "Abstract: Report to Executive Board, Minimum Manning as Health Safety Issue," 1981.
The study analyzed the relationship between staffing levels and fire fighter injuries. Severity of injuries (hours lost from work) were compared using engine companies with staffing of four or more and engine companies staffed with three or less. It was concluded that the firefighters on engine companies of fewer than four, had a 54% greater chance of being injured on a fire scene than engine companies of four or more. Engine companies staffed with five personnel had injury rates 1/3 less than that of four person companies.

McMannis Associates and John T. O'Hagan and Associates, "Dallas Fire Department Staffing Level Study," June 1984; pp. 1-2 & 11-1 through 11-7.
The Dallas study was performed as a series of controlled evolutions and fire situations using companies staffed from four to six fire fighters. The study found that "fatigue was a serious problem for smaller groups."

Morrison, Richard C., "Manning Levels for Engine and Ladder Companies in Small Fire Departments," 1990.
This study confirmed that the findings of the Dallas study were relevant to small fire departments. The study showed that engine companies with four firefighters were able to perform rescue (locating and removing a victim from a structure) of a potential victim 80% faster than a crew of three.

National Fire Academy, Executive Development Program III, "Fire Engines are Becoming Expensive Taxi Cabs: Inadequate Manning," February 1981; PP 2 & 4.
This report summarizes a study in which engine companies of three, four and five firefighters conducted evolutions to determine how long it took to get water on a fire located on a third floor of an old school. Each firefighter's physical condition was assessed after performing the evolution. The study found; "Three-person teams averaged 18.8 minutes. All personnel were exhausted; rubber-legged, had difficulty standing up and were unfit for further fire fighting. The four-person teams, conducting the very same test, averaged 10.29 minutes and upon completion, were nearing exhaustion. The five-person team averaged 6.15 minutes, and showed little evidence of fatigue at the end of the exercise."

Mr. M.E. Nines, Director of the Texas Commission on Fire Protection, requested from the NFPA an interpretation of how four fire fighters should be assembled. The formal

response was: "...when a company is dispatched from a fire station together as a unit (which includes both personnel responding on or arriving with apparatus), rather than from various locations, the standard recommends that the company should contain a minimum of 4 fire fighters."

Figure 1. Results of the Dallas study evaluating efficiencies of engine companies with staffing of 3, 4, and 5 fire fighters with the assumption of 5 firefighters being 100% effective.

	1ST ENGINE COMPANY		2ND ENGINE COMPANY		TRUCK/LADDER COMPANY		
CREW SIZE	CHARGE AND ADVANCE INT. ATTACK LINE	LOCATE AND RESCUE VICTIM	CHARGE AND ADVANCE oND HOSELINE	CHARGE AND ADVANCE EXT. HOSELINE	ROOF VENT	SEARCH AND RESCUE	CHECK FOR FIRE EXT
5 Firefighters	100%	100%	100%	100%	100%	100%	100%
4 Firefighters	84.70%	96.10%	77.90%	72.90%	79.00%	90.30%	80.20%
3 Firefighters	71.30%	82.80%	0%	0%	0%	79.60%	0%

This report stated that 3-person crews were not able to complete critical tasks within the given time frame. Regarding three-person crews: "at this level there was little margin for error and any appreciable delay in arrival might place the control of the fire beyond their capability." Due to these findings two firefighter crews were not even studied.

In 2000, Phoenix Fire Department conducted a survey of data received from 257 fire departments throughout North America. 110 of the respondents were from agencies with a population below 100,000, 98 of which were career departments. The survey found the average staffing level was 1.78 fire fighters per one-thousand population. Ormond Beach, with a population of 40,941, should have 73 career personnel if we met average staffing levels. We currently employ 54 career personnel, a ratio of 1.32 per 1,000 population.

DEPLOYMENT CAPABILITIES REQUIRED IN NFPA 1710

4.1.2.1 The fire department shall establish the following time objectives:

1. *One minute (60 seconds) for turnout time*
2. *Four minutes (240 seconds) or less for the arrival of the first arriving engine company at a fire suppression incident and/or 8 minutes (480 seconds) or less for the deployment of a full first alarm assignment at a fire suppression incident.*
3. *Four minutes (240 seconds) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident.*

4. *Eight minutes (480 seconds) or less for the arrival of an advanced life support unit at an emergency medical incident, where this service is provided by the fire department.*

4.1.2.2 The Fire department shall establish a performance objective of not less than 90 percent for the achievement of each response time objective specified in 4.1.2.1.

The length of time it takes emergency responders to arrive at an incident is critical to minimizing property damage and to rescue victims. The 2000 Phoenix Fire Department study looked at arrival times of the first arriving fire engine and how long it took the entire first alarm assignment to arrive on scene. The study found the average arrival time for the first unit was 4:05, and 5:41 for the arrival of the full first alarm assignment. In 2007, our average arrival time for the first unit was 5:54 (354 seconds). The NFPA 1710 standard of four minutes was met on 13.1 percent of the alarms. Arrival of the full first alarm assignment averaged 10:17, meeting the standard of eight minutes 33.3 percent of the alarms. The time span between the first and second arriving units averaged 2:02, with the longest span of 4:42.

"Turnout" time is the amount of time it takes the responders to receive the notification and begin driving to the incident. Ormond Beach Fire Department's 2007 average "turnout" time for all responses was 56 seconds.

Although the City of Ormond Beach is not required to adopt NFPA standards, courts frequently rely upon NFPA standards to determine industry standards for fire protection and safety issues.

Dallas Fire Department analyzed when rescues occurred and how successful they were. They concluded that when rescue occurred between 12 and 15 minutes of the fires ignition, it produced a survival rate of 46.6%. The rate dropped to 5.5% when rescue occurred between 15 and 17 minutes.

IMPACT OF FIRE

Fire is a very destructive force that constantly evolves, causing property damage as well as making the environment dangerous for occupants and firefighters. To understand the importance of having a rapid response with adequate resources, one must be familiar with fire behavior and how it can impact the stability of a building.

Fire can double in size every 30 seconds and increased 1000 percent every four minutes until fuel is expended. In residential structures there is a direct correlation between how long a fire is allowed to burn and destruction of the building. Ten percent of a structure is destroyed from smoke and heat three minutes after the initial ignition. At approximately 8 minutes, the fire will be extended beyond the area of origin and have destroyed 50% of the structure.

When a building and its contents heat up, they give off combustible gasses. When these combustible gasses reach their ignition point, the entire area explodes into flame. Temperatures immediately increase to over 1000 degrees F. Fire protection

gear used by firefighters provides no protection from these temperatures. This phenomenon is called "Flashover." When a flashover occurs, the fire rapidly extends throughout the structure. Any occupants inside the structure have very little chance of survival.

In 2004 the National Institute of Standards and Technology (NIST) conducted research sponsored by the Federal Emergency Management Agency, Department of Homeland Security and the United States Fire Administration. The purpose of the research was to determine how long a fire will burn before a partial or complete collapse of a structure can occur. They had constructed four buildings identically (except for roof coverings), and furnished them as a residential home. They found that flashover temperatures were present in each of the four structures three to four minutes after ignition, and in each exercise, structural collapse occurred approximately 17 minutes after ignition.

According to a 2008 report published by the United States Fire Administration on "Fire-Related Firefighter Injuries in 2004," 5,974 firefighters were injured by "fire development" and 3,024 were injured by "collapse or falling objects."

The most effective way to reduce firefighter injuries, limit property damage and improve survivability for victims, is with a rapid response with adequate resources to attack the fire or conduct a rescue.

TWO-IN, TWO-OUT

Florida Firefighters Occupational Safety and Health Act (FFOSHA) was signed into law on June 12, 2002. The Act includes, by reference, OSHA standards including 29 CFR 1910.134, "OSHA Respiratory Protection Standard," which includes two-in, two-out. The two-in, two-out standard is designed to provide safety to firefighters working in a dangerous environment.

The "Two-out" personnel are a designated rescue team of no less than two firefighters, to be deployed in the event the entry team experiences an emergency. Because our staffing does not allow for an adequate first alarm assignment, during the early stages of the event, the two out team must take on other responsibilities such as: pump operations and incident command. The "Two-in" part of the rule requires that no firefighter can work alone when in a dangerous atmosphere.

It is important to understand that the intent of the law is for the two-out team to not be part of the firefighting force. They are a standby team that is to be prepared and staged to perform a rescue of firefighters if they get lost, trapped, or injured. This two-firefighter team is the minimal requirement, and is intended to be used only for the initial phases of an incident. In the standard this team is referred to as the "Initial Rapid Intervention Crew" (IRIC). Once resources from a second alarm assignment arrive on scene (15 to 20 minutes after arrival of first unit), this IRIC should be upgraded to a "Rapid Intervention Team" (RIT) which is larger and have no other assignments other than to be prepared for a firefighter rescue situation.

STRUCTURE FIRE INITIAL RESPONSE

Ormond Beach Fire Department should have staffing levels as required in NFPA 1710. Last year we responded to 788 fire calls. Generally, we have multiple significant structural events nearly every month, with that trend increasing. In the recent past several significant structure fires resulted in millions of dollars in property damage and three fatalities. For instance, two separate fires were in a high rise condominium that destroyed the residence where the fires originated and caused severe damage to many others. Fortunately, the building had open air hallways that allowed residents to escape the smoke and flames. Several of the residents required rescuing by firefighters.

No fire scene is exactly the same, but there are similarities to the tasks needed to be accomplished. The strategies for completing the tasks, and the order in which they are completed change with each fire. The following is a list of the normal tasks that need to be completed at a fire.

Establish the Incident Command System

- Builds the framework for managing the incident
- Performs an initial evaluation of the building and fire conditions (size-up)
- Relays size-up information and gives orders to incoming units over the radio
- Identifies objectives and establishes a strategy for meeting the objectives
- Directs all fire ground activities
- Constantly evaluates safety issues
- Evaluates resource needs (firefighters, fire engines, ladder trucks, ambulances, utility companies etc.)

Establish a water supply

- Locate the fire hydrant; the closest fire hydrant is not always the best one to use
- Stretch hose between fire hydrant and fire engine, can exceed 1000'
- Make connections at both ends and open hydrant
- Engage fire pump and have water flowing

Attack the fire

- Pull a hose line that is 200' long to the point of entry. Point of entry is often not the front door, and depending on location, the hose may have to be extended. Hose diameter is 1-3/4" (requires two firefighters) or 2-1/2" (requires two or three firefighters depending on how much it needs to be moved)
- They need to carry forcible entry tools with them to make entry into the building and to expose concealed spaces
- If fire has extended beyond the room of origin, including attic space, multiple hose lines are required
- This team often functions in areas with temperatures of a few hundred degrees and zero visibility
- Air supply will allow them to work for a maximum of 20 to 30 minutes

Perform a primary and secondary search

- The primary and secondary searches are conducted by two different teams
- A primary search is a rapid search to find victims that are conscious or easily found and needing assistance in getting out
- A secondary search is a methodical search to locate victims that may be protecting themselves from fire conditions (hiding under beds or in closets etc)

Ventilation

- Ventilation is done to reduce the amount of heat and toxic smoke inside the building. It's intended to improve chances of survival for victims, increase visibility, reduce the threat of a flashover or backdraft, and to improve working conditions for firefighters
- Several methods can be used; often more than one is employed
- Often requires firefighters to put a ladder to the building and carry saws and tools to the roof to cut a large ventilation hole. This is a very dangerous assignment. We don't always know the effect the fire has had on the structure beneath where the firefighters are working. Many firefighters have fallen through the roof
- Another method used in most cases is positive pressure, often used in conjunction with a roof cut. A large fan is placed in an opening; the fan pressurizes the structure forcing the heat and smoke out

Control utilities

- Any natural gas or Liquefied Petroleum gas lines need to be located and closed
- Electrical power needs to be shut off in the building to prevent firefighters from being electrocuted, and the power company needs to shut power off to the building preventing the lines to be re-energized

Protecting exposures

- Exposure can be another part of the building or an adjacent building. This requires a hose line to keep the exposed building cool. Radiant heat can ignite combustible material from great distances

Checking for fire extension

- Fire travels in hidden spaces and must be located. This requires ceilings and walls to be pulled down. Sometimes it requires firefighters to crawl through attic spaces in search of fire. Checking for extension is a very strenuous activity that requires two to four firefighters

Injuries

- When a firefighter becomes injured, even a minor injury removes them from available resources and at least one other firefighter to care for them until they can be transferred to an ambulance
- Civilian injuries also pull from our on-scene resources

When a building is burning and/or lives are in danger, there are many tasks that must be performed immediately to rescue occupants and put a stop to property loss. The

most effective and safest way to mitigate the incident is to provide a rapid response, with enough responders and equipment to perform all the tasks at the same time. Unfortunately, most fire departments do not have the resources to get everything done simultaneously. Therefore, it is critical that priorities be set based on what is needed to be done and what resources you have available. To establish priorities there are a number of things that must be considered. This is one of the most important steps to be taken, because the decisions made during the initial minutes on scene set the stage for the success or failure of the incident.

Considerations

- Potential victims (is there a need to perform a rescue and how many victims?)
- Type and size of the structure (is there a need for additional resources?)
- Location of the fire. Helps determine where entry will be made and if there are any hazards associated with the location
- Extent of the fire. Used to determine: the number of hose lines needed, additional resources that may be needed, structural integrity, and if a flashover or backdraft condition may be present
- Smoke/heat conditions will dictate when and how ventilation should be accomplished. Ventilation can intensify and spread the fire. Care needs to be taken to evaluate all the conditions that effect ventilation
- Structural stability. This will help determine if we can send anyone into the building, or if a portion of the building should be avoided
- Available water supply. Conditions may require more that one fire hydrant. It may also require a relay pumping operation, where two fire engines are used to increase pressure and/or volume of water
- Personnel and equipment resources will determine how many tasks can be accomplished. It will also help determine if addition personnel or equipment will be needed
- Exposures to be protected. If there is a threat to an exposure, how to protect that exposure is a critical decision. Protecting exposures limits the resources available to fight the fire. Not assembling enough resources to protect exposures can lead to another structure catching fire

Prior to making entry into a building that is burning, a series of initial critical tasks need to be completed. The list of initial critical tasks does not take into consideration the complexity and the dynamic nature of fighting fires inside a structure. They are intended to be the absolute minimum that must be accomplished. Based on the considerations listed above, other tasks may, and often do get added to the list of initial tasks.

Initial Tasks

1. Two hose lines need to be placed between the fire hydrant and the fire engine for water supply.
2. Fire hose needs to be connected at the water source (fire hydrant) and the fire engine.
3. A size-up report over the radio (providing information and orders to incoming units).

4. A walk around the structure (to evaluate the considerations listed above, and to determine a strategy for attacking the fire).
5. Forcible entry and other tools need to be carried to the point of entry.
6. Attack hose line needs to be stretched to the point of entry.
7. Fire engine needs to be put into pump to flow water to the nozzle.
8. Face piece needs to be put on and connected to their air supply.
9. Identify the two people outside who will be "Two -out."

The first fire engine that arrives at the fire will need to get as many of the initial tasks completed as possible. As mentioned earlier, it often takes several minutes for a second fire engine to arrive at the scene. A three-firefighter crew can get most if not all of the initial tasks completed before the second unit is on scene. A two-firefighter crew would not be able to acquire a water supply and would not be able to adequately evaluate items such as fire conditions, structural integrity, extent of the fire and safety. The Incident Command structure would not be adequately established, which would cause problems with setting priorities, determining strategies and instituting the plan.

A strategy used with a fire engine staffed with three firefighters (Officer, Driver Engineer, and a Firefighter), is as follows:

Firefighter

- Dropped off at the fire hydrant
- Pulls two supply hoses from hose bed to the hydrant
- Retrieves hydrant connection tools
- Remove caps from the hydrant and connect both lines
- Advances to the location of the fire engine (can be as far a 1000 ft.)
- Pull an attack hose line to the point of entry (often not the front door)
- Return to the engine to retrieve forcible entry tools
- Returns to the attack hose line to prepare for entry

Driver Engineer

- Once the fire engine is properly placed, the driver engages the apparatus for pumping
- Secures the vehicle with wheel chocks
- Retrieves a hose clamp and attaches it to the two supply hoses. This allows the hydrant to be opened prior to the next step
- Pulls the hose down from the hose bed (hose storage on top of fire engine) and disconnect each one from the excess sections of hose and pulls them around to make the connections to the intake port at the pump panel
- Open the clamps to allow water to flow to the fire engine
- Performs a check to assure all hose lines are deployed without kinks that would constrict water flow
- Prepares to be part of the "two-out" team
- Operates pump panel, monitoring incoming water pressure and pressure going to the attack hose lines

Officer

- Establishes the Incident Command system
- Directs water supply operations. There are several layouts that can be used depending on the situation
- Directs placement of the fire engine considering other responding units, and the layout of the fire scene. Improper placement can jeopardize the ability to expand the incident if needed
- Performs a "size-up" (evaluates the scenario based on the considerations) of the incident and relays this information and instructions to incoming units
- Performs a walk-around the structure to determine the strategy for attacking the fire, identifying safety concerns (structural instability, potential flashover or back-draft conditions, extent of the fire, and heat and smoke conditions). During the size-up and walk-around priorities are established. A good size-up and walk-around is critical to mitigating the incident successfully. The Officer would also identify any utilities (gas and electric) they can rapidly shut off
- Continually communicating information and assignments to units as they are en route and/or arriving on scene

All of the above tasks must be completed before they are ready to make entry. Once we get a second unit staffed with three additional firefighters on scene, we have six firefighters to work with. Two firefighters will be the two-out team; two will be an entry team to attack the fire, and another two could be an entry team that can perform a critical function of searching for victims, attacking the fire, ventilating, or protecting a building that is being threatened by fire. Both entry teams would be ready to make entry just moments after the second unit arrives at the incident. With fire engines staffed with two fire fighters, all the initial tasks cannot be performed by the time the second unit arrives. The second unit would need to assist in completing the required tasks before entry can be made. This could delay entry by up to two minutes, depending on how long it takes the second unit to arrive on scene. Two units would only provide the two-out team and one entry team; a third unit would be needed to have a second entry team. In 2007, our average arrival of the second unit is two minutes two seconds after the first unit. The longest time between arrival of the first and second units was nearly five minutes.

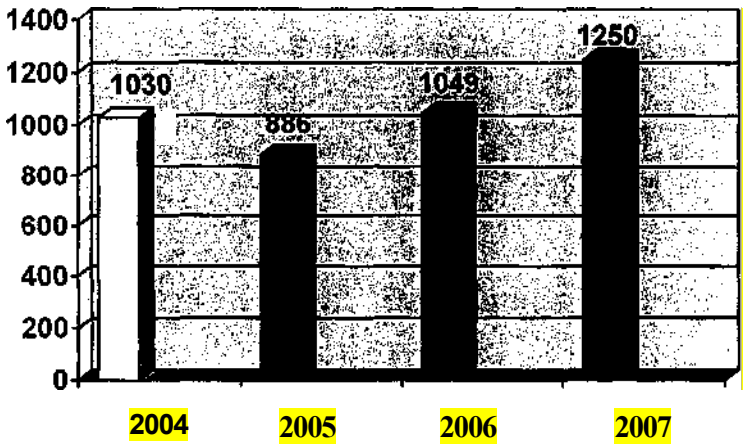
Aside from chief officers whose response is for command and control, having firefighting personnel respond in vehicles without the capability of carrying fire hose and pumping water does not reduce the amount of time it takes to get water on the fire, it actually increases it. Critical tasks cannot be completed without water and fire hose. According to the study conducted by the Dallas Fire Department a two minute delay in getting water on the fire can reduce survivability for victims from 46.6% to 5.5%. A small delay can have devastating results when considering that from the time of ignition, fire can destroy 50 percent of the structure in eight minutes, flashover temperatures can be reached in a little as 3 minutes, and a collapse can occur in 17 minutes.

SIMULTANEOUS ALARMS

The Ormond Beach Fire Department's call volume for 2007 was 5,602 alarms, including 788 fire calls with an estimated fire loss of $2,318,160, and 3,841 for rescue/EMS. Simultaneous or overlapping alarms occur when we respond to more than one alarm at a time. When this happens, resources busy on an alarm are not available for subsequent calls.

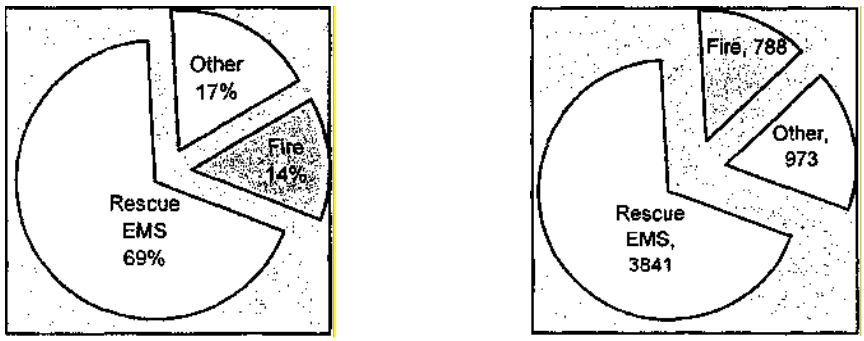
Of the 5,602 alarms, 1250 (22.3%) overlapped with other alarms. 1,100 (19.6) had two simultaneous alarms; 144 (2.6%) had three simultaneous alarms; and on six (.1%) occasions we had four simultaneous alarms. 65 alarms were responded to while already responding to or working a structure fire. Many of these responses required multiple units. It is not uncommon to have all our units busy on alarms at the same time. Not only do overlapping calls drain our resources, but they also increase our response time by requiring responding units to travel from greater distances. The largest impact on response times is when the simultaneous alarms occur in the same district, which happened 199 times in 2007. When this happens we have to send a unit from another district or jurisdiction. In order for any unit to respond into another district, they must utilize at least one of our major roadways. These roadways become very congested, particularly during rush hour and special events, adding further to the response times.

The volume of overlapping calls is not an isolated situation. The chart below demonstrates a trend of overlapping calls.



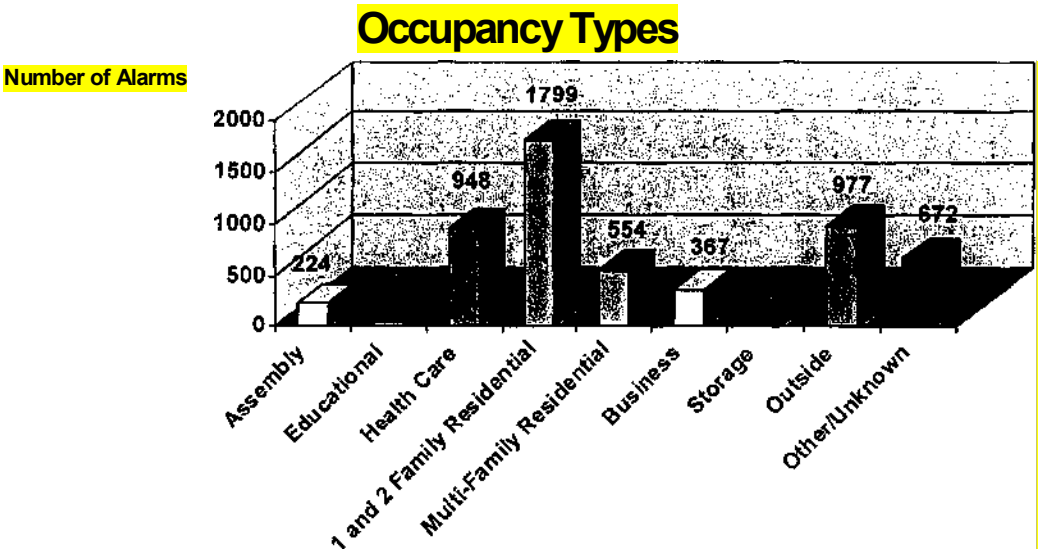
The following chart represents the distribution of alarms by call type.

Call Types



The following graph represents the distribution of alarms by occupancy types.

Occupancy Types



Any time a unit is busy working an incident, it leaves a gap in coverage and resources. Many alarms have a long duration, increasing our exposure to extended response times. The following chart represents the duration of our alarms.

INCIDENT TIME	OCCURRENCES
1-29 Minutes	5034
30-59 Minutes	449
60-89 Minutes	57
90-119 Minutes	21
2 hours and greater	41

If our minimum staffing is reduced from three firefighters to two, we would have to increase the number of units that respond in order to have enough personnel resources to mitigate the emergency. Recently EVAC submitted their budget to the County Council for approval. That request reduced the number of in-service units to 15 from the normal 22 on the road. Fewer in-service ambulances will require our units to remain on medical incidents for longer durations awaiting medical transport. This would further increase the gap in coverage we currently experience. With the closest unit agreement in effect countywide, we can pull resources from other jurisdictions, although as we experience overlapping alarms, our surrounding jurisdictions experience them as well. In 2007 we received aid from other jurisdictions 707 times and we gave aid to other jurisdictions 657 times. The volume of automatic aid calls demonstrates how often coverage gaps need to be filled. These gaps occur because of either geographical boundaries or overlapping calls. The need for more units will require units to respond from much greater distances, and our reliance on other jurisdictions will increase. This may prove costly in accordance with the existing automatic aid agreement reimbursement schedule. This problem will be compounded if other jurisdictions begin reducing their staffing.

The chart below represents how the number of units needed will increase to provide the same personnel resources that we dispatch with three-firefighter engine companies.

TYPE OF ALARM THREE FIREFIGHTERS	CURRENT # OF ENGINES RESPONDING WITH	# OF ENGINES NEEDED WITH TWO FIREFIGHTERS
EMS- Advanced Life Support	1	2
Auto Accident (Normal)	1	2
Auto Accident (Major)	2	3
Structure Fires (Residential)	3	5
Structure Fires (Commercial)	4	6
Brush Fires	2	3

CONCLUSION

Over the last few years, our county has been challenged with hurricanes, tornados and wildfires. These incidents are incredibly labor intensive. Because of the magnitude of these events, we cannot rely on our neighbor jurisdictions for assistance in the early phases of an incident. Hurricanes can take days for assistance to arrive, and wildfires often take hours.

Current staffing levels allow us to care for one patient or mitigate a small incident adequately. We routinely have to rely on our neighbors for help with all complex incidents. The national debate of having two firefighters on a fire engine ended many years ago. It is simply an industry-accepted fact that two person engine companies are not effective or recommended. No study could be found where effectiveness of two-firefighter engines were evaluated against three-firefighter engines. Part of the reason is that most jurisdictions are providing more responsible protection to their

communities, and no longer question the fact that two person staffing is severely inadequate and is very dangerous to those willing to risk their lives for others and to others who depend on their fire services to perform for protection.

CITY MANAGER
MEMORANDUM

TO: Honorable Mayor Costello and City Commissioners

FROM: Isaac D. Turner, City Manager

DATE: March 27, 2008

SUBJECT: 2008-09 Fire Department Staffing and Budget Reduction Strategies

Introduction: Economic conditions facing the City of Ormond Beach have necessitated the comprehensive review of all department budgets with an emphasis on reducing expenditures. The recent "tax reform" measures have challenged local governments in continuing to provide critical services with limited funding. This review of Fire Department staffing and budget reduction strategies seeks to both educate the Commission and public regarding Fire Department operations, associated expenditures, and to seek direction for the FY2008-09 Fire Department budget.

Background: Over the past several years, the Fire Department has made significant changes to reduce expenditures. Those reductions included severely curtailing overtime utilization ($853,000 in FY 2003-04 to $410,000 in FY 2006-07), contracting with the Volusia County Sheriffs Office for fire dispatching services ($219,000 savings over three years), elimination of two fire inspectors and combining building and fire inspection divisions into one shop ($120,000 savings per year), elimination of a division chief, and the most recent restructuring of the Fire Department ($130,000 annual savings). These changes totaled over $800,000 in annual savings. During this same period, the Fire Department has taken over much of the City's emergency management preparedness and response functions and now does critical fire safety inspections with line personnel.

Opportunities for reduction in the Fire Department's budget are very limited unless there are reductions in the number of line personnel. Further staff reductions within the Fire Department will result in service delivery loss through extended response times and/or lack of needed personnel and equipment, which would be contrary to the City Commission's goals. Therefore, it is critical that any budget reductions first focus on methods to control and/or reduce costs without affecting services. It is further understood that after non-personnel related reductions are exhausted and additional reductions are necessary, positions will need to be eliminated. Because the Fire Department had already significantly reduced expenditures in the FY 2006-07 budget ($137,000 in overtime and $73,000 for consolidated dispatch) and the FY 2007-08 budget ($120,000 in eliminating fire inspectors, $130,000 in elimination of a division chief in conjunction with department restructuring), the focus of this memorandum is limited.

Discussion: Similar to most service related organizations, the majority of the Fire Department budget is for personnel providing those services. Given the heavy dependence on personnel it is important to understand how fire services staffing is

decided. In general, fire department staffing standards come from several sources. The National Fire Protection Association (NFPA), Insurance Services Organization (ISO), and comparisons with like jurisdictions with similar demographics are the most common. The NFPA calls for four firefighters to be assembled on an incident within four minutes 90% of the time with the full complement of responding staff arriving within eight minutes. A full complement is risk based, dependent on the type of emergency. For example, a structural fire requires an initial response of 15-17 emergency responders, where a traffic accident would require 5-8 responders dependent on information received. Ormond Beach Fire Department has an average response time of nearly 6 minutes and maintains a minimum of 15 personnel on duty 24 hours per day. ISO utilizes staffing as one portion of the three major components to set fire insurance rates. Our last ISO rating was received in February 2002, resulting in a split rating of "4/9". The "4" rating is in areas of the city with a municipal water supply. Typically, the ISO "9" rating would be in areas that have no municipal water supply. The ISO grading scale runs from 1-10 with a grading of "1" being most favorable. Lower ratings result in lower insurance premiums for residents and businesses and are an indicator of more advanced fire services. Of the 15 points possible for fire service staffing, we only received 6.17 points. In order to achieve the highest ISO rating, you need to maximize your credited points in each category.

In September 2002, Volusia County hired TriData, a fire services consulting company, to study Volusia County fire services. The report, which utilized national standards and comparisons to other fire departments, strongly recommended increased staffing for all of Volusia County, including Ormond Beach. Ormond Beach recommendations included maintaining three-person staffing in our slower stations and increasing our two busier stations to four-person staffing. In 2005 at the request of VCOG, the Volusia County Fire Chiefs produced a report that utilized a matrix consisting of demand for service, population density, and hazard/risk to project staffing needs. That analysis cited a minimum need of three-person staffing, but recommended four-person staffing in Ormond Beach. These recommendations, if adopted, would achieve a closer match to recognized national fire service standards in providing responsible response times, personnel and apparatus to emergency incidents. We currently maintain three-person staffing in all stations. Any reduction to existing personnel would result in a service loss to our community. We could expect to experience an increase in response times to assemble the necessary numbers of personnel to initiate a rescue or an effective interior fire attack. Part of the decision-making process for making an interior attack on a fire in a structure is based on how long the building has been exposed to the heat and flames. An increased response time would result in an additional risk to our personnel and community served. To further assist in understanding this loss, I have attached examples of equipment and personnel required for select emergencies (attachment).

Fire Department Personnel and Apparatus Response to Select Emergencies

The attached response scenarios are derived from national standards and recognized practices that have been time proven to provide adequate resources to meet the specific service requirements.

Emergency Medical (one patient) - 1 three-person engine company and 1 two-person transport unit = 5 personnel

Auto Accident (normal) -1 three-person engine company and 1 two-person transport unit = 5 personnel

Auto Accident (major) - 2 three-person engine companies, 1 command officer and 2+ two-person transport units =11+ personnel

Structural Fire (residential) - 3 three-person engine companies, 1 two-person ladder company, 1 two-person transport unit and 1 command officer = 14 personnel

Structural Fire (commercial) - 4 three-person engine companies, 1 two-person ladder company, 1 two-person transport unit and 1 command officer = 17 personnel

** As you can see from the above, we are able to manage the initial response to typical incidents if all units are available. We fully depend on surrounding jurisdictions for additional resources when our units are committed, for additional alarms within our city, and for other specialized equipment and operations. Any reduction in personnel will require additional dependence on other jurisdictions for normal responses, resulting in increased response times to get adequate resources on incidents to safely conduct operations. That dependence on other jurisdictions may prove costly in accordance with the existing automatic aid agreement reimbursement schedule.