

Performance Audit

**DEPARTMENT OF PUBLIC SAFETY**

**BUREAU OF FIRE**

Report by the  
Office of City Controller

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December 2012



MICHAEL E. LAMB

CITY CONTROLLER

First Floor City-County Building • 414 Grant Street • Pittsburgh, Pennsylvania 15219

December 13, 2012

To the Honorable: Mayor Luke Ravenstahl and  
Members of Pittsburgh City Council:

The Office of City Controller is pleased to present this Performance Audit of *Department of Public Safety Bureau of Fire* conducted pursuant to the Controller's powers under Section 404(c) of the Pittsburgh Home Rule Charter. This audit assesses Bureau compliance with National Fire Protection Association (NFPA) performance objectives, engine dispatch type and frequency, Bureau overtime and premium pay, fire fighter training and non-emergency program performance.

### EXECUTIVE SUMMARY

The Bureau of Fire by provides public safety services in the areas of fire suppression, first responder emergency medical care, fire prevention and hazardous materials mitigation. The Bureau works to reduce emergencies by providing programs related to public education, risk reduction and fire prevention.

### Findings and Recommendations

#### Bureau Performance Data

All City emergency calls are dispatched through the joint City-County Emergency Operations Center (EOD) Computer Aided Dispatch (CAD) system. The CAD system creates a time line of each emergency call. Times recorded include dispatch time, enroute time and on scene time. CAD information is downloaded into City Firehouse data system every fifteen minutes. This data is used by the Fire Bureau to compile performance reports.

**Finding:** Nearly one third (32%) of the 58,655 entries in the 2010 Firehouse database had missing or questionable times and were eliminated from analysis.

**Recommendation:** Fire personnel stated that missing times can sometimes be retrieved from other sources such as the CAD audio tapes. Fire Bureau Administration should make every effort to obtain correct data from the CAD audio tapes. This could be a good task for interns or other part time employees.

The 88 incident categories in Firehouse were combined by the auditors into four larger categories: Fire incident calls, Medical calls, Hazard calls, and 'Other' calls such as service calls, or false alarms.

### **NFPA Performance Objectives for Turn Out Time and Travel Time**

The NFPA Turnout Time objective for medical calls is 60 seconds or less for at least 90% of the vehicles. Turnout time is the interval between the time the call is received at the station from dispatch and the time the truck leaves the station. The auditors used 20,077 medical incidents from the 2010 Firehouse database for analysis.

#### **2010 Turnout Time**

**Finding:** Turnout time for medical calls did not comply with NFPA objectives. Only 34 percent of fire trucks dispatched on medical calls achieved a turnout time of 60 seconds or less.

The NFPA Turnout Time objective for fire suppression and special operations response is 80 seconds for at least 90% of the vehicles. The auditors used 3,352 fire incident vehicles and 3,835 hazard incident vehicles from the 2010 Firehouse database for analysis.

**Finding:** Turnout time for fire and hazard incident vehicles did not comply with NFPA objectives. Only 42% of fire trucks dispatched on fire calls achieved a turnout time of 80 seconds or less. Fifty percent (50%) of vehicles dispatched on hazard calls achieved a turnout time of 80 seconds or less.

#### **2010 Travel Time**

NFPA travel time objectives are 240 seconds (4 minutes) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident and for the arrival of the first arriving engine company at a fire. The travel time objective for arrival of the first full alarm is 480 seconds (8 minutes) or less. To comply with these objectives, at least 90% of vehicles must arrive within the time standards.

**Finding:** Travel time for medical calls did not comply with NFPA travel time objectives. Seventy one percent (71%) of fire vehicles dispatched on Medical calls achieved a travel time of 240 seconds or less.

The Fire Bureau Response Time Report data complied with Firehouse data entries and was used to calculate travel time for the first arriving engine at structure fires.

**Finding:** Travel time for the first arriving engines at structure fires complied with NFPA travel time objectives. Ninety four percent (94%) of first arriving engines achieved a travel/arrival time of 240 seconds or less.

**Finding:** Travel/arrival time for the first full alarm at structure fires did not comply with NFPA objectives. Eighty eight percent (88 %) of full alarms achieved a travel/arrival time of 480 seconds or less.

### **Fire Bureau Monthly Performance Reports**

The Fire Bureau monthly performance reports combine travel times for the first arriving vehicle and the first full alarm at structure fire incidents.

**Finding:** The Fire Bureau's combined travel time report does not appear to comply with NFPA objectives which lists separate travel time objectives for the first arriving vehicle and for the first full alarm.

**Finding:** The Fire Bureau also limits its medical response time analysis to incidents coded 321, 322 and 323.

**Recommendation:** The Fire Bureau should include times for all medical calls with valid time entries to compile its Response Time reports. The NFPA objectives are not limited to specific categories of medical incidents

**Finding:** Although NFPA response time objectives apply to all fire suppression incidents, Fire Bureau performance reports are limited to structure fires (incident code 111).

**Recommendation:** The Fire Bureau should include times for all fire suppression incidents with valid time entries to compile its Response Time reports. The NFPA objectives are not limited to structure fires.

### **2011 Travel Time**

The 2011 Firehouse database was not available as of March 8, 2012. The auditors used 2011 Fire monthly performance report data to assess NFPA travel time compliance. The Fire Bureau does not compile turnout time results.

**Finding:** In 2011, travel time for the first arriving engines at structure fires complied with NFPA travel time objectives. Ninety five (95) percent of first arriving engines achieved a travel/arrival time of 240 seconds or less.

**Finding:** In 2011, travel/arrival time for the first full alarm at structure fires did not comply with NFPA objectives. Eighty seven percent (87%) of full alarms achieved a travel/arrival time of 480 seconds or less.

**Finding:** In 2011, travel time for medical calls did not comply with NFPA travel time objectives. Only 71 percent of fire vehicles dispatched on First Responder calls achieved a travel time of 240 seconds or less.

### **Roll Time and Arrival Time Recording Issues**

**Finding:** Radio jam can interfere with accurate roll and travel time reporting.

**Finding:** Automatic recording of departure (roll) times and arrival times would help eliminate missing time data and data input error by EOC personnel.

**Recommendation:** The Mobile Data Terminals (MDTs) on each fire vehicle are connected to 911 dispatches and provide incident address, cross streets and other relevant information to the firefighters. These computers should have the capability to automatically record roll and arrival times. The Fire Bureau should investigate installing an automatic recording device on the MDTs that is activated by pressing a button or other simple mechanical input device.

### **Call Frequency by Type of Incident**

The eradication of slums through urban renewal programs and reduction in unsafe structures through building codes enforcement greatly reduced the number of structure fires. City firefighters trained to respond to other non-fire emergencies.

Call frequency data was taken from the 2010 Firehouse database. Entries with invalid or blank times are not included in the following findings.

**Finding:** Medical emergency incidents comprise the majority of calls for Fire Bureau assistance. In 2010, medical emergency calls comprised 54 % of total incident calls. Fire incidents comprised the least number of calls (4%).

**Finding:** The 246 calls for structure fire comprised 18% of all fire calls but less than one percent (<1%) of all Fire Bureau incident calls.

**Finding:** The category with the second highest call volume is 'other'. The 'other' category includes calls for false alarms, service calls, severe weather, natural disasters and good intent calls. An example of a good intent call is someone smelling smoke but unsure if the smoke is from a fire.

## **Vehicle Incident Dispatch**

**Finding:** Fire engines or fire trucks are dispatched to all emergency incidents. Multiple fire trucks and engines are dispatched according to Zone Transfer system protocols.

### All Vehicles in 2010 Firehouse Database

**Finding:** Prior to deletion of entries with invalid or blank times, in 2010 the most fire engine and trucks were dispatched on Other type calls (39% of vehicles). Seven percent (4,205 dispatched vehicles) were cancelled en route.

### Vehicles with Valid Time Entries

**Finding:** Excluding the cancelled vehicles, twenty nine (29%) of vehicles dispatched listed in the 2010 Firehouse database had missing or incorrect time entries. Time problems are due to incorrect entries by EOC staff or failure by departing engine personnel to call the CAD center.

**Finding:** Fire Bureau personnel listen to call tapes and try to fill in times missing from the raw CAD data sent to Firehouse software for structure fire incidents.

**Finding:** Half of the fire engines and trucks dispatched in 2010 with valid time data were dispatched to emergency medical calls.

**Finding:** A new First Responder Procedure, effective February 10, 2010, resulted in increased medical call dispatches.

**Finding:** The database does not list the priority rating of the medical calls to which First Responders are dispatched.

**Recommendation:** Firehouse Software should be modified to include the priority rating of all medical calls to which First Responders are dispatched. This would provide more useful information about the types of medical emergency certification most needed on medical response calls.

## **Premium Pay**

**Finding:** In 2010 and 2011 actual premium pay expenditures were 5% and 14% over budgeted amounts.

**Finding:** Premium pay actuals represent 21% of the Bureau's total 2010 expenditures and 21% of total wage expenditures.

**Finding:** Premium pay actuals represent 23% of the Bureau 2011 total expenditures and 23% of total wage expenditures.

**Finding:** The Fire Bureau was budgeted for \$3,041,745 more premium pay than the police, even though the police had 414 more budgeted positions.

**Finding:** The Fire Bureau had a 9.07% higher premium pay budget compared to the Police Bureau. This is high considering the Police Bureau total budget is \$15,707,296 higher than Fire budget.

### **Understaffing and Premium Pay**

**Finding:** Understaffing of the Fire Bureau is the biggest reason for premium pay. The minimum staffing requirement of 163 employees at all times cannot be met unless premium pay is given out. In 2011 the Fire Bureau was understaffed by 54 people. The Bureau was budgeted for a staff of 676 and only had 622 positions filled. Fire Bureau personnel that man the fire houses were budgeted for 657 positions but only 604 positions were filled.

**Finding:** Callbacks to maintain required staffing levels accounted for 54.8% of premium pay in 2010 and 62.4% in 2011.

**Finding:** Firefighters are receiving overtime for training even though the contract permits the Bureau “to schedule an employee for specialized training or an employee as an instructor on a workweek consisting of 40 hours”.

**Recommendation:** All employees receiving specialized training and all instructors providing such training should be scheduled during regular work hours. This would help reduce City overtime costs.

### **Premium Pay Pension Implications**

**Finding:** Premium pay has ominous consequences for Fire Bureau pension calculations. State statute permits premium pay to be included in City firefighter pension earnings calculations.

**Finding:** Premium pay is not included in Police or Paramedic pension calculations.

**Finding:** Premium pay represented 23% of total Fire Bureau wages in 2011. Premium pay can increase pension payments substantially.

**Recommendation:** Minimum staffing, the number of employees on duty at one time, is a mandatory subject of collective bargaining. Fire Administration and the Fire Union should work toward a collective bargaining agreement that offers more flexibility than the current minimum staffing requirement of 163 personnel. Granting the Fire Administration more flexibility on minimum staffing could reduce the number of call backs, premium pay costs and pension costs.

## **Firefighter Training and Emergency Medical Certifications**

**Finding:** City firefighters have varying levels of emergency medicine training and certification. The majority are certified First Responders (226) and Emergency Medical Technicians (371). The Bureau employs two persons with First Aid training only and 20 persons with advanced medical training. This latter group includes 17 Paramedics and 3 nurses.

**Finding:** Emergency Medical Technicians and Paramedics are trained to perform higher levels of care and must undergo more training than First Responders to obtain certification.

**Finding:** Not all firefighters are required to have the same emergency medical certification. According to the firefighters contract with the City, all firefighters must be certified First Responders but only firefighters hired after January 1, 2005 are required to earn and maintain EMT certification.

**Finding:** As of December 7, 2011, only 16% of the firefighters not required to be certified EMTs voluntarily obtained EMT or higher certification. The remaining 84% of this group (349 firefighters) are First Responders.

**Finding:** The Fire Bureau is proposing to hold an EMT bridge course in 2012. The 40 hour course is designed to provide credit toward EMT certification. Course attendance is optional but the Bureau anticipates 140 attendees.

**Finding:** The first EMT bridge course appears to have been well received. As of June 2012 an additional 124 firefighters voluntarily obtained EMT certification.

## **Workers Compensation Claims**

**Finding:** The Fire Bureau saw a significant jump in the number of medical and lost time injuries from 2010 to 2011. The number of injuries requiring medical treatment increased by 41% and the number of lost time injuries (injuries requiring medical treatment and indemnity payments for being unable to work) increased by 72.5%.

**Finding:** In 2011, twisting/stretching/overexertion and smoke inhalation accounted for the biggest injury categories. From 2009 to 2011, twisting/stretching/overexertion injuries requiring medical care increased by 44% and the number of lost time injuries from these injuries increased by 113%. Smoke inhalation requiring medical treatment increased by 633% percent during that same time frame.

**Recommendation:** Fire Administration should work with the City Risk Manager to add mandatory safety classes to the Bureau's training programs. On-going training classes that cover general areas of safety and areas of specific injury prevention could help reduce bureau workers compensation claims.



## **Safety Programs for the Public**

The Fire Bureau website promotes a number of public safety programs offered to the community.

**Finding:** The smoke detector installation program does not appear to be well publicized. The Fire Bureau installed 360 smoke detectors in 2010 and 713 smoke detectors in 2011.

**Recommendation:** The Fire Bureau should use additional venues in addition to its webpage to publicize its free smoke detector program.

**Finding:** The Fire Bureau does not have a Fire Safety Education Officer available for fire safety programs and demonstrations.

**Recommendation:** The Bureau should fill the Fire Safety Education Officer position. If no firefighters are interested, serious consideration should be given to making this a civilian position.

**Finding:** In 2010, the Fire bureau used a grant to purchase and distribute Risk Watch program materials to 55 City schools and 55 parochial schools.

## **Fire Bureau Software**

City Fire Bureau performance data is generated by Fire House software, a proprietary Windows based application for fire department records management. Fire House has numerous software modules available including Incident and Investigation Reporting, EMS/Search and Rescue Reporting, Staff Members Activity and Training, Apparatus, Equipment and Inventory and Hydrant Management modules.

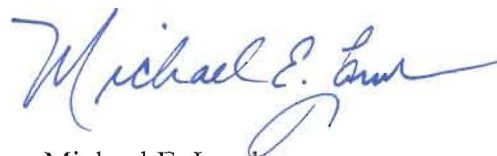
**Finding:** The Fire Bureau currently uses the Enterprise Edition which contains the following modules: Incident Reporting, Staff Scheduling, Occupancy Permits & Inspections and Staff Members Activity. The Bureau Chief Clerk said the Bureau is “looking at the Equipment Inventory, Maintenance & Usage” module.

**Finding:** A December 2010 audit of the Fire Supply Warehouse found numerous problems with the web based inventory system currently in use such as failure to track all warehouse inventory and inability to automatically update stock when items are received or dispersed.

**Recommendation:** The Fire Bureau should purchase and install the Firehouse Equipment, Inventory, Maintenance and Usage module as soon as possible. This module would provide the Bureau with a much needed effective inventory management system.

I would like to thank Chief Jones and the Fire Bureau for their cooperation with our audit.

Sincerely,

A handwritten signature in blue ink that reads "Michael E. Lamb". The signature is fluid and cursive, with a large initial "M" and a long, sweeping underline.

Michael E. Lamb  
City Controller

## **INTRODUCTION**

This performance audit of the Department of Public Safety Bureau of Fire was conducted pursuant to section 404(c) of the Pittsburgh Home Rule Charter. This audit assesses Bureau compliance with National Fire Protection Association standards, non-emergency programs, fire fighter training and overtime.

## **OVERVIEW**

According to its website, the Pittsburgh Bureau of Fire develops, implements, and administers public safety to protect the life, property and environment of the city. The Bureau provides services in areas of fire suppression, first responder emergency medical care, fire prevention and hazardous materials mitigation. The Bureau encourages its staff to take a proactive role in reducing emergencies by providing programs related to public education, risk reduction, fire prevention, community relations, disaster planning and operational training.

### **Fire Bureau Organization**

The Pittsburgh Fire Bureau divides the City into four districts and 109 zones that contain 29 fire stations. The stations are strategically located throughout the city and operate a fleet of 29 fire engines (including 3 quints), 11 fire trucks, 1 mobile air compressor unit and one hazmat truck. Fire engines are equipped with hoses and water needed to aggressively fight fires. Fire trucks carry ladders, rescue equipment, and other tools to support firefighter activities. The Fire Bureau also has three quint vehicles that are included under the engine company category. Quints are a combination of an engine and ladder truck that provide five functions: pump, water tank, fire hose, aerial device, and ground ladders. A mobile air compressor unit is a vehicle that transports an air compressor to the scene of an incident to fill air bottles of fire fighters breathing apparatus. A list of fire stations and locations can be found in the Appendix.

The Bureau is organized according to a rank structure. Ranks up to and including Deputy Chief are promotable under civil service rules. The Chief and Assistant Chief are appointed by the Mayor. The rank structure of the Bureau is as follows: Chief, Assistant Chief, Deputy Chief, Battalion Chief, Captain, Lieutenant and Firefighter. In 2011, the Fire Bureau was budgeted for 675 positions but had 622 positions filled. Actual filled positions consisted of 1 Chief, 1 Assistant Chief, 5 Deputy Chiefs, 17 Battalion Chiefs, 4 Fire Instructors, 52 Captains, 108 Lieutenants, 120 Master Firefighters, 255 4<sup>th</sup> year Firefighters, 52 3<sup>rd</sup> year firefighters, 1 Chief Clerk 2, 1 Administrative Assistant, 1 Administrative Specialist, 1 Clerical Assistant 2 and 3 Account Clerks.

Firefighters have an average 42 hour work week, working a 24 hour shift and having the next 72 hours off. The City contract with the Firefighter Union requires minimum shift staffing. During a 24 hour daily work shift the Fire Bureau is required to have the following 163 people on duty at all times: 1 Deputy Chief, 4 Battalion Chiefs, 12 Captains, 28 Lieutenants, 119 firefighters.

#### 911 Combined City-County Emergency Operations Center (EOC)

On January 1, 2005, the City and Allegheny County 911 Centers merged. This combined Emergency Operations Center (EOC) is located in City's East End and is responsible for receiving, processing and dispatching all 911 emergency calls in Allegheny County.

Calls are received and dispatched through the Center's Computer Aided Dispatch (CAD) system.

## **SCOPE**

Audit scope is years 2010 and 2011 for Bureau compliance with National Fire Protection Association Standard 1710 and Bureau overtime payments, training and safety programs.

## METHODOLOGY

The auditors interviewed the Fire Chief and Director of Public Safety about Bureau organization and operations. Some of the areas covered at the meeting were National Fire Protection Association (NFPA) standards, training, staffing, computer software used, station locations, fire vehicles, deployment and programs offered to the community. The auditors requested information needed for the audit.

The auditors reviewed a print out of all 2010 calls for engine and truck station 8. Data consisted of incident number, alarm date and time, arrival date and time, clear date and time and total time for all the different type of incidents in year 2010. An excel spreadsheet for all 30 stations with the same information as station number 8 was requested. The Fire Bureau provided an excel database of all 2010 incident calls from the Bureau Firehouse database. Similar data for 2011 was requested but was not available.

The 2010 incident data was more detailed and included Incident number, Alarm date, Street number, street name, street type, Zone, Incident type, Alarm type, Unit, Shift, Alarm time, Dispatch time, Roll time and Arrival time. The database listed 88 incident types. The auditors combined the 88 types into 4 categories: medical, fire, hazard and other.

The spreadsheet consisted of 58,655 entries but various problematic entries were eliminated by the auditors. Eighteen thousand, eight hundred fifty four (18,854) entries had varying amounts of missing and questionable information. Travel times for some of these incidents started one day and ended the next day, resulting in a negative value. In addition, one thousand four hundred twenty one vehicles (1,421) were cancelled enroute.

The auditors received a copy of NFPA 1710 which gave definitions and standards for turnout time and travel time. Turnout time standards apply to 90% of all vehicles dispatched to an incident and travel time standards apply to the first vehicle and first full alarm arriving on scene at a fire suppression incident or emergency medical incident.

Before calculating turnout time and travel time, the auditors deleted the entries with missing or questionable times and the calls that were cancelled enroute. The auditors used 20,077 vehicles in all medical, fire and hazmat categories to test turnout time. Turnout time was calculated by subtracting dispatch time from roll time.

The auditors wanted to simultaneously test compliance with Bureau zone transfer card dispatch protocol and NFPA travel time objectives. The auditors requested and received a copy of the Zone Transfer Book. In 2011, some fire zones were eliminated and some were combined with other zones. The 2011 zone transfer cards did not always match the zones listed in the 2010 database. Consequently, the auditors could not determine if the first arriving vehicle complied

with the zone card dispatch pattern. Only vehicles dispatched for medical emergencies were used to test travel time compliance. Travel time for medical calls was determined by subtracting roll time from arrival time.

The auditors verified the data used by the Fire Bureau to compile its 2010 Response Time report with the spreadsheet data provided by the Fire Bureau. This data was used to calculate structure fire travel times for NFPA compliance. Because the 2011 Firehouse data was unavailable, the auditors used the Bureau 2011 Response Time report for NFPA compliance.

The auditors also reviewed a copy of the contract between the City of Pittsburgh and the Firefighters Union. The City Risk Manager provided Fire Bureau injury data for 2009-2011. Data was organized by injury type, injuries requiring some sort of medical treatment and lost time injuries.

A walkthrough of Engine House 4 was conducted and fire fighter staff was interviewed. Topics discussed included the engine dispatch and deployment process and firefighter training.

Firefighter certification information was requested to compare the EMT/First Responder ratio and the number of firefighters who voluntarily obtained EMT certification. An EMS certification spreadsheet was provided that listed each firefighter name, assign number and level of EMS certification. EMT certification is voluntary for firefighters with assign numbers of 2740 and lower (firefighters hired prior to January, 1, 2005). The data was sorted by assign number to determine the number of firefighters who voluntarily obtained EMT certification and by EMS certification to determine by EMT/First Responder ratio.

Other data requests included a list of fire fighter training classes in 2010 and 2011, the number of attendees per class and whether the training was required or optional; a list of new classes being offered in 2012; the number of smoke detectors installed in 2010 and 2011 by district and the number of Fire Safety presentations in 2010 and 2011 and name of the group or organization requesting the presentation.

The auditors toured the County Emergency Operations Center (EOC) with the Fire Bureau Communications Officer and EOC Quality Assurance Liaison. The Center is the link between the public and all public safety agencies in Allegheny County. The Center's process for dispatching City Fire personnel was demonstrated and explained.

The auditors contacted First Vehicle (the City's fleet management contractor) to obtain a list of current Fire Bureau vehicles. This list includes 44 fire trucks, engines, pumpers and aerials for a total of 82 vehicles. A vehicle inventory provided by the Fire Bureau listed 65 in service and 18 reserve vehicles for a total of 81 vehicles. Active or in service vehicles included 25 engines, 11 fire trucks, 3 quints, 12 SUVs, 9 sedans and 4 pickup trucks. Eleven engines, 6 fire trucks and one quint were listed as reserves.

Fire Bureau fuel usage reports for 2010 and 2011 were requested from the Department of Finance.

Other data requests included the number of permits issued by the Fire Bureau, Safety Program data and overtime/premium pay data. Auditors reviewed the Firemen's Relief and Pension Fund statute, City code pension provisions and case law to determine the authority for including overtime in fire pension calculations.



## **OBJECTIVES**

1. To assess Bureau turnout time and arrival time compliance with National Fire Protection Association (NFPA) Standard 1710.
2. To assess call frequency by District.
3. To assess non emergency program performance.
4. To assess use of overtime.
5. To assess firefighter training and certification requirements.
6. To make recommendations for improvement.

## FINDINGS AND RECOMMENDATIONS

### Fire Bureau Software

City Fire Bureau performance data is generated by Fire House software, a proprietary windows based application for fire department records management. Fire House has numerous software modules available including Incident and Investigation Reporting, EMS/Search and Rescue Reporting, Staff Members Activity and Training, Apparatus, Equipment and Inventory and Hydrant Management modules.

**Finding:** The Fire Bureau currently uses the Enterprise Edition which contains the following modules: Incident Reporting, Staff Scheduling, Occupancy Permits & Inspections and Staff Members Activity. The Bureau Chief Clerk said the Bureau is “looking at the Equipment Inventory, Maintenance & Usage” module.

**Finding:** A December 2010 audit of the Fire Supply Warehouse found numerous problems with the web based inventory system currently in use such as failure to track all warehouse inventory and inability to automatically update stock when items are received or dispersed.

That audit recommended that the Fire Bureau implement a modern and effective inventory management system for all items in the Supply Warehouse. This system would give the Warehouse Logistics Manager the ability to know exactly what is in the warehouse, as well as what equipment has been issued to each fire fighter.

### **RECOMMENDATION No. 1:**

The Fire Bureau should purchase and install the Firehouse Equipment, Inventory, Maintenance and Usage module as soon as possible. This module would provide the Bureau with a much needed effective inventory management system.

### Zone Transfer System

**Finding:** The Fire Bureau utilizes a Zone Transfer System to deploy engines, trucks and other emergency vehicles to fire suppression incidents. On its face, the Zone Transfer System ensures that all zone districts have coverage if multiple incidents occur.

When an incident call comes in, the engine stationed closest to the incident is dispatched to the scene. Engines and trucks from nearby stations also are dispatched to help assist in case the incident escalates. For a first alarm fire, usually three engines and one truck arrive at the incident. Additional vehicles are dispatched to each alarm increase. Whenever this occurs, all these fire stations sending additional vehicles would become empty. To alleviate this problem

other engines are transferred to these stations fighting the fire to cover any new calls in that zone. Firefighters know what station to get dispatched to by the zone card system and book.

The zone card book is located on the dashboard of the engine. The book breaks down the City of Pittsburgh into four districts. Each district is further broken down into smaller geographic zones. Each zone has its own page and chart which shows what engines, trucks, and transfers are supposed to be dispatched up to a five alarm fire. For example, for zone 1-2, engine station # 32, 3, 38, and truck 32 are to arrive at the incident for a first alarm fire. For back up coverage, engine #37 gets transferred to station #32 and engine # 30 gets transferred to station #37. This way there is coverage in each zone if another incident occurs.

### **Fire Bureau Vehicle Dispatch**

All City emergency calls are dispatched through the joint City-County Emergency Operations Center (EOC) Computer Aided Dispatch (CAD) system. Calls come into the Emergency Center by calling 911 or a seven digit number that rings into 911. The seven digit number is used by commercial alarm companies whose internal dispatch center is located outside the County 911 call area.

**Finding:** The Emergency Operation Center Computer Aided Dispatch system enables timely emergency vehicle dispatch.

When a call comes into 911 the municipality of the caller is identified and the call is directed to the appropriate intake staff. One section is designated for City emergency calls. If all City call staff are busy, intake staff in the City-County section take City calls. The time a call comes into the 911 center is recorded by CAD as the 'create' time.

**Finding:** The CAD system creates a time line history of each emergency call. Times recorded include the create time, entry time, dispatch time, en route time and on scene time. Dispatch, enroute, arrival and other times are entered by EOC staff into the database and the call-in conversations are also recorded on audio tape.

### **In Service and Arrival Times**

When an engine leaves the station the driver is supposed to call in "engine XX in service"; when the engine arrives on scene the driver is to call in "engine XX on scene" over the vehicle radio.

## **Incident Caller Location Identification**

**Finding:** The 911 CAD system can identify incident caller location by land line number being used and by cell phone tracking.

A tracking device for cell phone callers allows 911 dispatchers to identify the cell phone caller's telephone number and his or her physical location. Calls for Fire Bureau emergencies that come in over the 911 line are sent to the Fire Specialists stationed at the center.

## **Entry Time and Departure Time**

### Non Medical Emergencies

EOC intake operators ask each caller uniform questions, type code the event according to the answers received and enter the information into the system. The incident 'entry' time is recorded when the operator enters all incident information into the CAD system. The system automatically identifies the City division and zone where the event is occurring.

### Medical Emergencies

The Center uses a computerized Medical Priority Dispatch System based on internationally accepted Standard Operating Guidelines or SOGs. The system assigns medical priority to each call after the caller answers a number of questions that automatically appear on the operator's computer screen. Based on the caller's answers, the computer assigns the call a nature code and priority number.

These computer generated coding protocols are based on guidelines set by the City's Medical Director, EMS and Fire Bureau. There are four priority rankings for medical emergencies: E0, E1, E2 or E3. E0 is the highest priority and is considered life threatening in nature.

**Finding:** Prior to February 2010, firefighters were dispatched in addition to City paramedics only on E0 calls. After February 2010, Fire Bureau First Responders or Emergency Medical Technicians are dispatched to all E1 calls and E2 calls that have been pending for 30 minutes.

First Responders are City firefighters who are trained in basic CPR and defibrillator usage. EMTs have a higher level of medical training. City paramedics are dispatched simultaneously by the paramedic dispatcher stationed at the Emergency Operations Center.

Medical and non-medical emergencies involving the City Fire Bureau are sent to the Fire dispatch specialist who puts out a zone alert over Public Safety radio channel 5. Emergency dispatch information is preceded by an alert tone to get everyone's attention. The radio dispatch identifies the fire zone, incident address and vehicles to be dispatched.

**Finding:** All Fire personnel are equipped with portable radios. Vehicle information is called into the EOC by the engine crew over a portable radio when the vehicle leaves the station. CAD personnel enter the departure time (enroute time) and which engine or engines are dispatched.

**Finding:** Data entry omissions and errors regarding times and other information for structure fires are sometimes corrected by Fire Bureau staff after listening to the audio tape incident recordings.

### **CAD and Firehouse Software**

CAD information is downloaded into City Firehouse data system every fifteen minutes. This data is used by the Fire Bureau to compile its performance reports.

### **National Fire Protection Association Response Time Compliance**

The National Fire Protection Association (NFPA) is a fire safety organization that creates and publishes standards and codes for usage and adoption by local governments. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*, sets minimum requirement for deployment.

### **Turnout Time and Travel Time Objectives**

Turnout and travel time objectives are found in NFPA 1710 444.1.2.1. The NFPA defines turnout time as the time interval that begins when the notification process begins by either an audible alarm, visual annunciation or both and ends at the beginning point of travel time. In other words, turnout time is the time interval between the time the call is received at the station from dispatch and the time the truck ‘rolls out’ or leaves the station. NFPA objectives are “80 seconds for turnout time for fire and special operations response and 60 seconds turnout time for EMS response”.

Travel time is defined by NFPA as the time interval that begins when a unit is en route to the emergency incident and ends when the unit arrives at the scene. In other words, travel time is the time interval between roll time and arrival time. Travel time objectives are 240 seconds or less travel time for the arrival of a **unit with first responder or higher level capability at an emergency medical incident** and for the arrival of the **first arriving engine company at a fire suppression incident**. Travel time objectives for arrival of the first full alarm are 480 seconds (8 minutes) or less.

The NFPA states that each fire department shall establish a performance objective of not less than 90 percent for the achievement of each turnout time and travel time objectives specified in 4.1.2.1

### **Pittsburgh Fire Bureau Compliance with NFPA Objectives**

The 2010 incident data supplied by Fire Administration organizes service calls into 88 categories. These various categories were grouped by the auditors into the following larger categories: Fire incident calls, Medical calls, Hazard calls, and 'Other' calls such as service calls, or false alarms.

Hazard calls involve the removal of hazardous materials, i.e., dangerous solids, liquids or gases which can harm people and other living organisms and hazardous conditions such as downed wires. EMS calls are all emergency medical calls to which the Fire Bureau responds.

### **Response Time Findings**

**Finding:** Nearly one third (32%) of the 58,655 Firehouse database entries had missing or questionable times. Of the 18,854 entries eliminated from response time analysis, 2,675 were missing roll time, 14,413 were missing arrival time, 120 had negative times and 1646 entries had the same dispatch, roll and arrival times.

**Finding:** The high percentage of faulty entries can skew any performance analysis.

The auditors were told that Fire Bureau staff can retrieve or find some missing times from other sources such as the CAD audio tapes.

### **RECOMMENDATION No. 2:**

Fire Bureau Administration should make every effort to obtain correct data from the CAD audio tapes. This could be a good task for interns or other part time employees.

### **Turnout Time**

The NFPA Turnout Time objective for First Responder or medical calls is 60 seconds or less for at least 90% of the vehicles. The auditors calculated turnout time by subtracting dispatch time from roll time. The following table shows the turnout time for all fire vehicles dispatched on First Responder emergency medical calls in 2010. The auditors used 20,077 medical incidents from the 2010 Firehouse database for analysis.

2010 FIRST RESPONDER/MEDICAL CALLS TURNOUT TIME

UNIT	#of Calls time= $\leq$ 60"		#of Calls time $>$ 60"	
MEDICAL	6,912	34%	13,165	66%

Source: Firehouse data 2010

**Finding:** In 2010, Fire Bureau turnout time for medical calls did not comply with NFPA objectives. Only 34 percent of fire trucks dispatched on medical calls achieved a turnout time of 60 seconds or less.

The NFPA Turnout Time objective for fire suppression and special operations response is 80 seconds for at least 90% of the vehicles. Special operations are emergency incidents that require specific and advanced training and specialized tools and equipment. Hazardous materials and hazardous incident calls are special operations. This number includes all fire incidents in addition to structure fires, such as dumpster fires, trash fires, vehicle fires, grass fires and cooking fires. The auditors used 3,352 fire incident vehicles and 3,835 hazard incident vehicles from the 2010 Firehouse database for analysis.

2010 FIRE SUPPRESSION AND HAZARD VEHICLES TURNOUT TIME

UNIT	#of Calls time= $\leq$ 80"		#of Calls time $>$ 80"	
FIRE	1,414	42%	1,938	58%
HAZARD	1,928	50%	1,907	50%

Source: Firehouse data 2010

**Finding:** In 2010, Fire Bureau turnout time for fire and hazard incident vehicles did not comply with NFPA objectives. Only 42% of fire trucks dispatched on fire calls achieved a turnout time of 80 seconds or less. Fifty percent (50%) of vehicles dispatched on hazard calls achieved a turnout time of 80 seconds or less.

Travel Time

NFPA travel time objectives are 240 seconds (4 minutes) or less for the arrival of a unit with first responder or higher level capability at an emergency medical incident and for the arrival of the **first arriving engine company at a fire**. Travel time objectives for arrival of the first full alarm are 480 seconds (8 minutes) or less. To comply with these objectives, at least

90% of vehicles must arrive within the time standards. Travel time is calculated by subtracting roll time from arrival time.

### Medical Incidents Travel Time

#### 2010 FIRST RESPONDER/MEDICAL CALL VEHICLES TRAVEL TIME

UNIT	No. of vehicles time= $\leq$ 240"		No. of vehicles time $>$ 240"	
MEDICAL	13,559	71%	5,664	29%

Source: Firehouse data 2010

**Finding:** In 2010, Fire Bureau travel time for medical calls did not comply with NFPA travel time objectives. Seventy one percent (71%) of fire vehicles dispatched on Medical calls achieved a travel time of 240 seconds or less.

### Travel Time and Zone Transfer System Compliance

The auditors wanted to use the 2010 Firehouse database and Zone Transfer Cards to test travel time and zone transfer deployment compliance for the first arriving vehicle at a structure fire. In 2011, some fire zones were eliminated and some were combined with other zones. The 2011 zone transfer cards given to the auditors did not always match the zones listed in the 2010 database. Zone transfer cards for 2010 were not available.

Consequently, the auditors could not determine if the first arriving vehicle at a structure fire in the 2010 Firehouse database complied with the zone card dispatch pattern. Therefore, the 2010 Firehouse data was used only to test travel time compliance for vehicles dispatched on medical calls. The auditors used the Bureau 2010 Performance report data to calculate travel time compliance for the first arriving vehicle at a structure fire. Fire Bureau Performance data was checked against the Firehouse data.

### Fire Bureau Combined Response Time Report

The Fire Bureau uses Firehouse data to prepare monthly response time performance reports. The Fire Bureau reports combine travel times (called 'enroute to onscene time') for the first arriving vehicle and the first full alarm at structure fire incidents. The Bureau also limits medical response times to incidents coded 321, 322 and 323.

**Finding:** Although NFPA response time objectives apply to all fire suppression incidents, Fire Bureau performance reports are limited to structure fires (incident code 111).



**RECOMMENDATION No. 3:**

The Fire Bureau should include times for all fire suppression incidents with valid time entries to compile its Response Time reports. The NFPA objectives are not limited to structure fires.

**Finding:** The combined first arriving vehicle/first full alarm report does not appear to comply with NFPA objectives which list separate objectives for each.

First Arriving Engine and First Full Alarm Travel Time

The auditors separated first engine arrivals from full alarm engine arrivals and calculated arrival percentages for both categories by month and for the year 2010. Because the first arriving engine is part of the first full alarm, its arrival time was included in the full alarm travel times. The results are shown in the tables below.

**2010 STRUCTURE FIRE FIRST ENGINE TRAVEL/ARRIVAL TIME**

UNIT	No. of calls time= $\leq$ 240"		No. of calls time $>$ 240"	
FIRST ENGINE	211	94%	13	6%

Source: Fire Bureau Response Time Report 2010

**2010 Monthly Structure Fire First Engine Travel/Arrival Times**

Incidents per month		1st. Engine arrived 4 minutes or less		1st. Engine not arrived within 4 minutes	
Month	Number	Number	Percent	Number	Percent
January	14	11	79	3	21
February	10	8	73	2	18
March	30	29	97	1	3
April	34	33	97	1	3
May	18	16	89	2	11
June	14	14	100	0	0
July	18	16	89	2	11
August	18	18	100	0	0
September	15	15	100	0	0
October	16	15	94	1	6
November	16	16	100	0	0
December	21	20	95	1	5
<b>Total</b>	<b>224</b>	<b>211</b>	<b>94</b>	<b>13</b>	<b>6</b>

Source: Fire Bureau Response Time Report 2010

**Finding:** In 2010, Fire Bureau travel/arrival time for the first arriving engines at a structure fire complied with NFPA travel time objectives. Ninety four (94) percent of first arriving engines achieved a travel/arrival time of 240 seconds or less.

**Finding:** Three first arriving engines had missing time information and were eliminated. The three eliminated engines represent 1% of Response Time Report entries and would not materially affect the compliance rate.

**2010 STRUCTURE FIRE FULL ALARM TRAVEL/ARRIVAL TIME**

UNIT	No. of calls time= $\leq$ 480"		No. of calls time $>$ 480"	
FULL ALARM	175	88%	24	12%

Source: Fire Bureau Response Time Report 2010

**2010 Monthly Structure Fire Full Alarm Travel/Arrival Times**

Incidents per month		Full alarm Engine arrived within 8 minutes		Full alarm Engine not arrived within 8 minutes	
Month	Number	Number	Percent	Number	Percent
January	12	8	67	4	33
February	10	8	80	2	20
March	26	24	92	2	8
April	31	27	87	4	13
May	15	11	73	4	27
June	11	11	100	0	0
July	17	15	88	2	12
August	20	17	85	3	15
September	10	9	90	1	10
October	13	12	92	1	8
November	15	15	100	0	0
December	19	18	95	1	5
<b>Total</b>	<b>199</b>	<b>175</b>	<b>88</b>	<b>24</b>	<b>12</b>

Source: Fire Bureau Response Time Report 2010

**Finding:** In 2010, Fire Bureau travel/arrival time for the first full alarm at structure fires did not comply with NFPA objectives. Eighty eight percent (88 %) of full alarms achieved a travel/arrival time of 480 seconds or less.

**Finding:** Twenty eight full alarms (12% of 227 full alarms in the 2010 Response Time Report) did not record arrival times and were eliminated from analysis. Arrival times for this high percentage of unknowns could materially affect the full alarm compliance rate.

### 2011 Travel Time

As of March 8, the Firehouse database for 2011 was not available to the auditors. The Fire Bureau provided its monthly performance reports for 2011 and that data was used for the following tables. The auditors again compiled separate travel/arrival times for the first arriving engine and first full alarm from the combined data provided.

#### 2011 STRUCTURE FIRE FIRST ENGINE TRAVEL/ARRIVAL TIME

UNIT	No. of calls time= $\leq$ 240"		No. of calls time $>$ 240"	
FIRST ENGINE	216	95%	11	5%

Source: Fire Bureau Response Time Report 2011

Table below shows the monthly breakdown of first engine arrival/travel time in 2011.

#### 2011 Monthly Structure Fire First Engine Travel/Arrival Times

Incidents per month		1st. Engine arrived 4 minutes or less		1st. Engine not arrived within 4 minutes	
Month	Number	Number	Percent	Number	Percent
January	20	20	100	0	0
February	21	19	90	2	10
March	16	15	94	1	6
April	26	25	96	1	4
May	20	18	90	2	10
June	22	22	100	0	0
July	21	19	90	2	10
August	19	18	95	1	5
September	7	7	100	0	0
October	16	16	100	0	0
November	14	14	100	0	0
December	25	23	92	2	8
<b>Total</b>	<b>227</b>	<b>216</b>	<b>95</b>	<b>11</b>	<b>5</b>

Source: Fire Bureau Response Time Report 2011

**Finding:** In 2011, Fire Bureau travel/arrival time for the first arriving engines at a structure fire complied with NFPA travel time objectives. Ninety five (95) percent of first arriving engines achieved a travel/arrival time of 240 seconds or less.

2011 STRUCTURE FIRE FULL ALARM TRAVEL/ARRIVAL TIME

UNIT	No. of calls time= $\leq$ 480"		No. of calls time $>$ 480"	
FULL ALARM	171	87%	26	13%

Source: Fire Bureau Response Time Report 2011

2011 Monthly Structure Fire Full Alarm Travel/Arrival Times

Incidents Per month		Full alarm Engine arrived within 8 minutes		Full alarm Engine not arrived within 8 minutes	
Month	Number	Number	Percent	Number	Percent
January	17	14	82	3	18
February	18	16	89	2	11
March	15	14	93	1	7
April	20	19	95	1	5
May	18	14	78	4	22
June	16	15	94	1	6
July	18	16	89	2	11
August	17	13	76	4	24
September	6	4	67	2	33
October	15	15	100	0	0
November	14	11	79	3	21
December	23	20	87	3	12
<b>Total</b>	<b>197</b>	<b>171</b>	<b>87</b>	<b>26</b>	<b>13</b>

Source: Fire Bureau Response Time Report 2011

**Finding:** In 2011, Fire Bureau travel/arrival time for the first full alarm at structure fires did not comply with NFPA objectives. Eighty seven percent (87%) of full alarms achieved a travel/arrival time of 480 seconds or less.

**Finding:** Thirty full alarms (13% of the 227 full alarms in the 2011 Response Time Report) did not record arrival times and were eliminated from time analysis. Arrival times for this high percentage of unknowns could materially affect the full alarm compliance rate.

For 2011 medical call travel time, the auditors had to use the Fire Bureau Response Time Report which only consisted of data from medical call codes 321, 322, 323.

2011 FIRST RESPONDER/MEDICAL CALLS TRAVEL TIME

UNIT	No. of vehicles time= $\leq$ 240"	No. of vehicles time $>$ 240"
MEDICAL	13,129	71%

Source: Fire Bureau Response Time Report 2011

**Finding:** In 2011, travel time for medical calls did not comply with NFPA travel time objectives. Only 71 percent of fire vehicles dispatched on First Responder calls achieved a travel time of 240 seconds or less.

Comparison of 2010 Firehouse Data and 2010 Fire Bureau Response Time Reports

The auditors also compared the medical call travel times in the Fire Bureau 2010 Response Time reports to the 2010 Firehouse database results.

**Finding:** There is a discrepancy between the number of medical incidents used by the auditors and the Fire Bureau to analyze travel time performance. The auditors used all 16 medical code calls listed in the Firehouse database to calculate travel time for 19,223 vehicles. The Bureau used three medical code calls for 17,724 vehicles to prepare its travel time reports.

The tables below summarize travel time for the 17,724 medical calls from the 2010 Fire Bureau Response Time report and the 19,223 calls from the 2010 Firehouse database.

2010 FIRST RESPONDER/MEDICAL CALLS TRAVEL TIME

FIRE CODES 321, 322 AND 323

UNIT	No. of calls time= $\leq$ 240"	No. of calls time $>$ 240"
MEDICAL	12,678	72%

Source: Fire Bureau Response Time Report 2010

## 2010 FIRST RESPONDER/MEDICAL CALLS TRAVEL TIME

### ALL MEDICAL CODES

UNIT	No. of calls time="<240"	No. of calls time>240"
MEDICAL	13,559	5,664

Source: 2010 Firehouse database

**Finding:** Limiting the travel time analysis to three types of medical did not substantially affect the NFPA 2010 compliance rate. Including all medical calls lowered the compliance rate by 1 %.

#### **RECOMMENDATION No. 4:**

The Fire Bureau should include times for all medical calls with valid time entries to compile its Response Time reports. The NFPA objectives are not limited to specific categories of medical incidents.

#### **Roll Time and Arrival Time Recording Issues**

The auditors were told by firefighters that radio jam is a frequent reason for not calling in roll and arrival times. Radio jam occurs when multiple fire vehicles are trying to call in at the same time on the same channel and cannot get through. Firefighters can wait for the 'traffic' to die down and call in again or fail to call back.

**Finding:** Radio jam can interfere with accurate roll and travel time reporting.

**Finding:** Automatic recording of departure (roll) times and arrival times would help eliminate missing time data and data input error by EOC personnel.

#### **RECOMMENDATION No. 5:**

The Mobile Data Terminals (MDTs) on each fire vehicle are connected to 911 dispatches and provide incident address, cross streets and other relevant information to the firefighters. These computers should have the capability to automatically record roll and arrival times. The Fire Bureau should investigate installing an automatic recording device on the MDTs that is activated by pressing a button or other simple mechanical input device.

#### **Other Radio Issues**

The Fire specialists broadcast the pertinent 911 call information over radio channel 5. This information is broadcast 24 hours a day to each engine house. Radio broadcasts can be

heard in every room. Engine houses that must be deployed are alerted by a long tone to get everyone’s attention. Engine house personnel switch to channel 6 if the incident involves a structure fire or other working incident in their zone.

Engine house personnel designate a “night watch” person to stay up all night and listen to the radio while the other firefighters sleep. The auditors were told that other cities employ a ‘station alerting system” that automatically wakes everyone up if the call is for their station.

**RECOMMENDATION No. 6:**

Fire Administration should investigate feasibility of a “station alerting system” at fire houses.

**Vehicle Dispatch and Call Frequency by District**

As previously noted, the City is organized into four districts and numerous zones within those districts for engine deployment purposes. District 1 includes north and west City neighborhoods such as Central North Side and Sheraden and downtown Pittsburgh. District 2 includes central and east City neighborhoods such as Oakland, Squirrel Hill and Hazelwood. District 3 consists of eastern City neighborhoods such as Garfield, Morningside, Bloomfield, Friendship and Homewood. South City neighborhoods such as South Side, Hill Top communities, Brookline, Beechview and Lincoln Place comprise District 4.

The table below shows breakdown of calls by fire district in 2010.

DISTRICT	NUMBER OF INCIDENTS	PERCENT
1	9,960	26%
2	9,233	24%
3	9,543	25%
4	9,017	23%
Unreported district	66	Under 1%
TOTAL	37,819*	100%

Source: Firehouse data 2010

\*4,205 of these calls were cancelled enroute

**Finding:** Emergency calls to the Fire Bureau were fairly evenly distributed throughout the 4 districts. District 3 had the most calls (9,543) and District 4 had the least calls (9,017).

**Finding:** Sixty six calls were not identified by district.

## Call Frequency by Call Type

The role of City firefighters has evolved along with the types of emergencies the Bureau responds to. Pittsburgh's first fire station opened downtown in September 1793. City fire stations were staffed by volunteers until the fire department became a fully paid (professional) department on May 23, 1870. Firemen were needed to put out the frequent structure fires caused by crowded and substandard housing conditions. The eradication of slums through urban renewal programs and reduction in unsafe structures through building codes enforcement greatly reduced the number of structure fires. City firefighters trained to respond to other non-fire emergencies.

As stated previously, the auditors combined the 88 incident categories in the Fire Bureau database into 4 call types. The table below shows the number of incidents by type of call.

The table below shows breakdown of the calls by call type in 2010.

CALL TYPE	NUMBER OF INCIDENTS	
MEDICAL	20,577	54%
FIRE	1,384*	4%
HAZARD	3,545	9%
OTHER	12,313	33%
TOTAL	37,819	100%

\* 1,384 fire calls include 246 structure fire calls (18% of all fire calls).

Source: Firehouse Data

**Finding:** The majority of calls for Fire Bureau assistance are calls for medical emergency incidents. In 2010, medical emergency calls comprised 54 % of total incident calls. Fire incidents comprised the least number of calls (4%).

**Finding:** Calls to 911 for structure fires comprised 18% of all fire calls but less than one percent of all Fire Bureau incident calls.

**Finding:** The category with the second highest call volume is 'other'. The 'other' category includes calls for false alarms, service calls, severe weather, natural disasters and good intent calls. An example of a good intent call is someone smelling smoke but unsure if the smoke is from a fire.



## Vehicle Incident Dispatch

**Finding:** Fire engines or fire trucks are dispatched to all emergency incidents. Multiple fire trucks and engines are dispatched according to Zone Transfer system protocols.

The auditors sorted the 2010 Firehouse database by incident group and vehicles to determine the number of vehicles dispatched on each type of emergency call.

All Vehicles

*The table below shows the total number of vehicles dispatched by emergency incident type in 2010.*

CALL TYPE	NUMBER OF VEHICLES	
EMS	21,469	37%
FIRE	4,999	9%
HAZMAT	4,928	8%
OTHER	23,054	39%
DISP. CANCELED	4,205	7%
TOTAL	58,655	100%

Source: Firehouse data 2010

**Finding:** Prior to deletion of entries with invalid or blank times, in 2010 the most fire engine and trucks were dispatched on Other type calls (39% of vehicles).

Vehicles with Valid Time Entries

The auditors then calculated the number of vehicles dispatched that had a valid travel time. All other entries were deleted out of the calculation. These deletions included vehicles that had a blank or negative or zero travel time and vehicles that were cancelled in route (codes 611 6111 6112). The total number of vehicles dispatched went from 58,655 down to 38,668.

**Finding:** Seven percent (7%) of fire vehicles dispatched in 2010 were cancelled enroute.

**Finding:** Excluding the cancelled vehicles, twenty nine (29%) of vehicles dispatched listed in the 2010 Firehouse database had missing or incorrect time entries. Time problems are due to incorrect entries by EOC staff or failure by departing engine personnel to call the CAD center.

**Finding:** Fire Bureau personnel listen to call tapes and try to fill in times missing from the raw CAD data sent to Firehouse software for structure fire incidents.

*The table below shows the number of vehicles with valid time data dispatched by emergency incident type in 2010.*

CALL TYPE	NUMBER OF VEHICLES	
EMS	19,223	50%
FIRE	3,352	9%
HAZARD	3,835	10%
OTHER	12,258	31%
TOTAL	38,668	100%

Source: CAD/Firehouse data 2010

**Finding:** Half of the fire engines and trucks dispatched in 2010 with valid time data were dispatched to emergency medical calls.

**Finding:** A new First Responder Procedure, effective February 10, 2010, resulted in increased medical call dispatches.

Prior to February 18, 2010, First Responders were only dispatched on E0 medical calls, the highest priority calls that involve life threatening incidents such as cardiac arrests. After that date, First Responders are dispatched on all E1 medical calls and any E2 medical call that has been pending for 30 minutes.

E1 calls are graded Serious Emergency and involve potentially life threatening emergencies such as shortness of breath or birth in progress. E2 calls are Emergency calls for symptoms such as abdominal pain or pregnancy complications.

After February 18, 2010, transfer companies from other zones are also dispatched on First Responder calls.

**Finding:** The database does not list the priority rating of the medical calls to which First Responders are dispatched.

**RECOMMENDATION No. 7:**

The Firehouse Software should be modified to include the priority rating of all medical calls to which First Responders are dispatched. This would provide more useful information about the types of medical emergency certification most needed on medical response calls.

## **First Responder and EMS Calls**

**Finding:** City Bureau of Emergency Medical Services (EMS) paramedics responded to 56,469 calls in 2010. Fire Bureau performance data indicates First Responders were dispatched to 17,724 of those calls or 31% of the total. In 2011, EMS paramedics responded to 58,033 calls. Fire Bureau First Responders were dispatched on 18,619 of those calls or 32 % of the total.

## **Fuel Usage and Vehicle Deployment**

As of January 2012, the Fire Bureau inventory listed 82 vehicles. Forty four (44) of those vehicles are comprised of engines. These are the vehicles dispatched on all medical/First Responder calls.

The purpose of using fire engines to answer First Responder calls is to enable quick deployment of that engine to a fire if the First Responder call is resolved. Using smaller vehicles for First Responder calls would require fire fighters to return to the station, get the engine and then proceed to the fire.

## **Fire Bureau Fuel Consumption**

Fire Bureau fuel usage data for 2010 & 2011 was provided by the City Finance Department with a caveat that the data contains 8-10% error rate because of multiple computer failures during those years. The computer system that records fuel disbursement crashed numerous times at multiple fueling sites and no data was recorded during the crashes. The auditors also requested 2009 fuel usage data to compare with 2010 fuel usage to determine the impact of increased First Responder calls on fuel requirements.

**Finding:** Finance was unable to provide any 2009 fuel usage data. In 2009 the M4 server maintained by City Information Systems had a major failure. Any fuel usage data collected prior to the failure could not be recovered and no data was collected at all during the system failure.

**Finding:** Fuel usage estimates provided by the City Garage personnel indicate that fire pumpers and trucks, although diesel engines, at best get 4-6 miles per gallon due to pump usage at fires and idling time on all deployments. Support units with gas engines average 13-15 miles per gallon.

## **Firefighter Training and Certifications**

The most current Firefighter job description from City Personnel and Civil Service was issued December 29, 2011. All recruits must complete basic recruit training, including Firefighter II, Emergency Medical Technician and hazardous material training. In addition to having a valid Class C Pennsylvania Motor Vehicle Operator's license, recruits must obtain the following required certificates and licenses: Fire Bureau Driver's Certification of Emergency Apparatus, Cardiopulmonary Resuscitation Certification and PA Emergency Medical Technician Certification. Training for these requirements is conducted by the Fire Bureau at its facility on Washington Boulevard.

### Emergency Medical Training and Certifications

**Finding:** City firefighters have varying levels of emergency medicine training and certification. The majority are certified First Responders (226) and Emergency Medical Technicians (371). The Bureau employs two persons with First Aid training only and 20 persons with advanced medical training. This latter group includes 17 Paramedics and 3 nurses.

#### First Responder Certification

First Responder training is usually 58 hours for certification. First Responders provide medical care such as Cardiac Pulmonary Resuscitation (CPR) and basic First Aid such as, stabilization of fractures, control of bleeding, spinal immobilization, oxygen administration and AED (automated external defibrillator)

#### Emergency Medical Technician (EMT) and Paramedic Certification

**Finding:** Emergency Medical Technicians and Paramedics are trained to perform higher levels of care and must undergo more training to obtain certification than First Responders.

Emergency Medical Technician (EMT) - requires 140 hrs of training. EMTs can do everything done by First Responders plus perform complex immobilization procedures and airway management and give oral medications.

Paramedics- require 14 month to 2 years of training. Unlike EMTs. Paramedics are allowed to break skin to administer shots and are trained to give 30-40 medications. In addition to performing all first responder and EMT procedures, paramedics are trained in advanced patient assessment, airway management, intravenous fluid therapy, trauma management, pharmacology and cardiology.

**Finding:** Not all firefighters are required to have the same emergency medical certification. According to the firefighters contract with the City, all firefighters must be certified First Responders but only firefighters hired after January 1, 2005 are required to earn and maintain EMT certification.

**Finding:** As of December 7, 2011, only 16% of the firefighters not required to be certified EMTs voluntarily obtained EMT or higher certification. The remaining 84% of this group (349 firefighters) are First Responders.

**Finding:** The Fire Bureau is proposing to hold an EMT bridge course in 2012. The 40 hour course is designed to provide credit toward EMT certification. Course attendance is optional but the Bureau anticipates 140 attendees.

**Finding:** The first EMT bridge course appears to have been well received. As of June 2012 an additional 124 firefighters voluntarily obtained EMT certification.

### Formal Training

Formal training on a variety of topics is conducted by the Fire Bureau Training Academy at its Washington Boulevard facility. Some of the training is required by the Bureau but not mandatory for certification in that subject. Other training is required by the Bureau to obtain certification. The following tables show type of training, course hours, and the number of firefighters attending in 2010 (20,196 hours) and 2011 (27,060 hours). This information was provided by the Fire Bureau.

#### 2010 TRAINING

Type of training	Hours	Appox. student	Total hours	Mandatory Y/N
FF Survival-Bail Out Tech	8	575	4600	Y**
EMS Con-ed	4	575	2300	Y**
Decontamination	4	192	768	Y**
CPR	4	575	2300	Y
EMS Con-ed	4	575	2300	Y
Haz-mat refresher	4	575	2300	Y
Rescue core	32	14	448	N
BVR DAY 1	8	590	4720	Y*
Drug Testing Video	2	590	1180	Y

## 2011 TRAINING

Type of training	Hours	Appox. student	Total hours	Mandatory Y/N
EMS con-ed	4	615	2460	Y
BVR DAY 2	8	615	2920	Y*
BVR DAY3	8	615	2920	Y*
BVR DAY 4	8	615	2920	Y*
BVR DAY 5	8	615	2920	Y*
MSA Training	4	615	2460	Y
CPR Refresher	4	615	2460	Y

BVR = Basic Vehicle Rescue

MSA =Self contained breathing apparatus.

\*\* Indicates Training required by the bureau but not mandatory for certification.

\* Indicates Training required by the bureau to obtain certification.

### Monthly Company Training

Monthly company training is done informally in the engine houses. Topics include high-rise elevator operations, communications, tire chain installation, CO and gas emergencies and electrical emergencies.

**Finding:** In 2010 and 2011, only one monthly training session was mandatory. In July 2011, training based on a Protocol Update from the State Department of Health was mandatory to retain EMT and First Responder certification.

### Worker Compensation Claims and Bureau Training

A 2010 performance audit of the City Workers Compensation Program Management found that the Bureau of Police, Fire Department, Public Works, EMS and Environmental Services had the most injuries of all City Departments for years 2006-2009.

The Fire Bureau had the second highest number of worker compensation (WC) claims filed during those three years: 773 claims. The City classifies WC claims by the type of compensation paid out to the injured worker. Claims not requiring medical treatment or time off are classified as Incident Only. Claims requiring medical treatment but not indemnity payments are Medical Only claims. Restricted Duty claims involve medical treatment but no lost time

because the claimant is working at an alternative duty job. Lost Time claims are the most severe, requiring medical treatment and indemnity payments for not being able to work.

**Finding:** The Fire Bureau saw a significant jump in the number of medical and lost time injuries from 2010 to 2011. The number of injuries requiring medical treatment increased by 41% and the number of lost time injuries (injuries requiring medical treatment and indemnity payments for being unable to work) increased by 72.5%.

**Finding:** In 2011, twisting/stretching/overexertion and smoke inhalation accounted for the biggest injury categories. From 2009 to 2011, twisting/stretching/overexertion injuries requiring medical care increased by 44% and the number of lost time injuries from these injuries increased by 113%. Smoke inhalation requiring medical treatment increased by 633% percent during that same time frame.

#### **RECOMMENDATION No. 8:**

Fire Administration should work with the City Risk Manager to add mandatory safety classes to the Bureau's training programs. On-going training classes that cover general areas of safety and areas of specific injury prevention could help reduce the Bureau's workers compensation claims.

#### Safety Programs for the Public

According to its website, the Fire Bureau offers a variety of safety programs to the community. For instance, blood pressure screening is available to all city residents on the weekends at any First Responder Station. Fire Bureau personnel will also come out to City residents homes and install smoke detectors if requested. Requests can be made by contacting the 311 Service Center or calling the Fire Bureau. The website states that a Fire Safety Education Officer is available to present fire safety programs and demonstrations to community groups and schools.

**Finding:** The smoke detector installation program does not appear to be well publicized. The Fire Bureau installed 360 smoke detectors in 2010 and 713 smoke detectors in 2011.

#### **RECOMMENDATION No. 9:**

The Fire Bureau should use additional venues in addition to its webpage to publicize its free smoke detector program.

**Finding:** The Fire Bureau does not have a Fire Safety Education Officer available for fire safety programs and demonstrations.

**RECOMMENDATION No. 10:**

The Bureau should fill the Fire Safety Education Officer position. If no firefighters are interested, serious consideration should be given to making this a civilian position.

**Risk Watch Participation**

Risk Watch is a comprehensive injury prevention program for use in schools. The program was developed by NFPA and safety experts to give children and families skills and knowledge needed to create safer homes and communities. Topics covered include motor vehicle safety, fire and burn prevention, choking, suffocation and strangulation prevention, poisoning prevention, firearms injury prevention, falls prevention, bike and pedestrian safety and water safety.

**Finding:** In 2010, the Fire bureau used a grant to purchase and distribute Risk Watch program materials to 55 City schools and 55 parochial schools.

**Premium Pay**

Premium pay is paid to employees who work excess hours during a regular work shift hours. A major reason for premium pay is 'callback' to maintain the Bureau minimum staffing requirement of 163 employees a work shift. The 'callback' process begins when engine company officers report their staffing for the next shift to the Battalion chief. If the 163 employee minimum will not be met, firefighters are called for premium pay to meet this threshold.

To be eligible for callback, firefighters need to sign up to get put on the district call back roster. Callback is a 12 hour shift for which firefighters are paid at the Master Firefighter rate. This is a flat rate that is paid regardless of rank.. Firefighters usually work within the district they are stationed but when necessary they work in one of the other 3 districts. The Bureau also uses a rotating system so everyone gets a chance to get some callback premium pay.



## Overtime Pay

Firefighters also are eligible for overtime pay. Reasons for overtime include ‘callouts’ to work fireworks, movie production and other special events details, holiday pay and training. Overtime is paid at the firefighters time and a half rate.

### Budgeted versus Actual Premium Pay

For budget purposes, Premium Pay includes payments for callouts and callbacks.

**Finding:** In 2010 and 2011 actual premium pay expenditures were 5% and 14% over budgeted amounts.

#### PREMIUM PAY

YEAR	BUDGETED	ACTUAL	OVER BUDGET
2010	\$10,265,170	10,813,505	548,335 (5%)
2011	\$10,338,186	11,806,903	1,468,717 (14%)
2012	11,530,920	NA	NA

#### Premium Pay as Percent of Total Bureau Operating Expenditures

YEAR	Actual Total Expenditures	Actual Premium Pay	Premium Pay as Percent of Total Expenditures
2010	\$51,300,751	\$10,813,505	21%
2011	\$51,538,601	\$11,806,903	23%

#### Premium Pay as Percent of Total Bureau Wages/Earnings

YEAR	Total Wages/Earnings	Premium Pay	Premium Pay as Percent of Total Wages
2010	\$50,187,614	\$10,813,505	21%
2011	\$50,275,011	\$11,806,903	23%

**Finding:** Premium pay actuals represent 21% of the Bureau’s total 2010 expenditures and 21% of total wage expenditures.

**Finding:** Premium pay actuals represent 23% of the Bureau 2011 total expenditures and 23% of total wage expenditures.

The above data is from City Controller CAFR (Comprehensive Annual Financial Report) data.

**Public Safety Divisions Premium Pay Comparison**

The Bureau has been criticized for excessive amount of premium pay given to employees. To evaluate this, the auditors compared the Fire Bureau budgeted premium pay to that of the Police and EMS public safety divisions. The number of positions per department and the total department budgets were also compared. Comparative data is from the 2011 budget.

**PUBLIC SAFETY DIVISIONS 2011 PREMIUM PAY BUDGETS**

DEPARTMENT	BUDGETED PREMIUM PAY PER DEPARTMENT	# OF BUDGETED POSITIONS
Fire	\$10,338,186	676
Police	\$7,296,441	1090
EMS	\$2,607,836	180

**Finding:** The Fire Bureau was budgeted for \$3,041,745 more premium pay than the police, even though the police had 414 more budgeted positions.

**Finding:** The Fire Bureau had a very large overtime budget compared to EMS. There was a difference of \$7,730,350 but the Fire Department had 496 more budgeted positions.

**PREMIUM PAY PERCENTAGE OF PUBLIC SAFETY DIVISIONS 2011 BUDGETS**

BUREAU	BUDGETED PREMIUM PAY	TOTAL BUDGET	PERCENTAGE
Fire	\$10,338,186	\$52,136,382	19.82%
Police	\$7,296,441	\$67,843,678	10.75%
EMS	\$2,607,836	\$13,028,605	20.00%

**Finding:** The Fire Bureau had a 9.07% higher premium pay budget compared to the Police Bureau. This is high considering the Police Bureau total budget is \$15,707,296 higher than Fire budget.

**Finding:** Fire and EMS premium pay was almost identical as a percentage of total budgets. EMS was 20.00% and fire was 19.82%. The difference was only .18%

**Premium Pay Breakdown**

**Finding:** Understaffing of the Fire Bureau is the biggest reason for premium pay. The minimum staffing requirement of 163 employees at all times cannot be met unless premium pay is given out. In 2011 the Fire Bureau was understaffed by 54 people. The Bureau was budgeted for a staff of 676 and only had 622 positions filled. Fire Bureau personnel that man the fire houses were budgeted for 657 positions but only 604 positions were filled.

**Finding:** Callbacks to maintain required staffing levels accounted for 54.8% of premium pay in 2010 and 62.4% in 2011.

Ceridian payroll system data provided by the Fire Bureau organizes Premium Pay into the following categories:

Premium Pay Category	2010	2011
Holiday Pay	26.5%	26.5%
Overtime*	13.7%	6.0%
Callbacks	54.8%	62.4%
FLSA	4.3%	4.0%
Callouts	>1%	>1%

\*Includes overtime for training, fire prevention and arson.

**Finding:** Firefighters are receiving overtime for training even though the contract permits the Bureau “to schedule an employee for specialized training or an employee as an instructor on a workweek consisting of 40 hours”.

**RECOMMENDATION No. 11:**

All employees receiving specialized training and all instructors providing such training should be scheduled during regular work hours. This would help reduce City overtime costs.

**Premium Pay Pension Implications**

**Finding:** Premium pay has ominous consequences for Fire Bureau pension calculations. State statute permits premium pay to be included in City firefighter pension earnings calculations.

The Firemen's Relief and Pension Fund, enacted May 25, 1933, et seq., applies to 'every city of the second class in this Commonwealth'. Because Pittsburgh is the only city of the second class in the state, the statute applies only to Pittsburgh. The statute specifies that "50% of the average monthly wages earned by the contributor" during any 3 calendar years of service or the last 36 months preceding retirement shall be paid as pension. "Wages" includes all payments, regardless of source.

**Finding:** Premium pay is not included in Police or Paramedic pension calculations.

**Finding:** Premium pay represented 23% of total Fire Bureau wages in 2011. Premium pay can increase pension payments substantially.

#### **RECOMMENDATION No. 12:**

Minimum staffing, the number of employees on duty at one time, is a mandatory subject of collective bargaining. Fire Administration and the Fire Union should work toward a collective bargaining agreement that offers more flexibility than the current minimum staffing requirement of 163 personnel. Granting the Fire Administration more flexibility on minimum staffing could reduce the number of call backs, premium pay costs and pension costs.

#### **Contracted Fire Protection Services**

The City has an intergovernmental cooperation agreement ("Agreement") with the Borough of Wilksburg to provide fire protection and related services. These services include fire suppression, emergency management coordination, hazardous materials response, vehicle and other rescue services and fire prevention and education activities.

This is the City's second intergovernmental cooperation agreement with the Borough. Since 2007, the City has been collecting the Borough's non-recyclable municipal waste. The Borough has its own recycling program.

The effective date of the Fire Protection Services agreement was April 1, 2011. Unless terminated earlier, the agreement is in effect through December 31, 2015 and automatically renews for 5 year terms thereafter.

The City furnishes staff, supervision, equipment and supplies and staffs one engine house in Wilksburg. Wilksburg firefighters that met the minimum City qualifications became employees of the City Fire Bureau. Each former Wilksburg firefighter that joined the Bureau will received prior service credit equal to 54% of his or her service time for calculating his or her City pension benefit. Pension funds were transferred from Wilksburg to pay for credited service time.

The Agreement obligates Wilkinsburg to cover the City expenses through fixed quarterly payments from June 1, 2011 to December 1, 2015 totaling \$7,560,558. The payments are based on estimated costs for salaries and benefits, supplies and equipment, personnel pre-employment expenses and indirect costs. Salary and benefit costs are predicated on the wages and benefits currently provided under the current labor agreement between the City and Union. If future labor agreements between the City and Union provide for an increase in wages or benefits during the payment period, Wilkinsburg's cost of services will be increased accordingly

**Finding:** The fire protections services Agreement is of mutual benefit to the City and the Borough of Wilkinsburg. The Borough anticipates more than a \$600,000 savings on its annual 2.2 million budget for fire service. The City has added 24 additional skilled and experienced firefighters and increased its public safety response capacity. Calls to Wilkinsburg and Pittsburgh are dispatched from Wilkinsburg Engine Company No. 16.

**RECOMMENDATION No. 13:**

The City should pursue the cost/benefit of additional Intergovernmental Cooperation Agreements for fire protection and other public safety services.

**Pittsburgh Bureau of Fire  
Response to Controller's Audit  
December 5, 2012**

**Vehicle Inventory**

The controller's audit inventory of Fire Bureau vehicles is inflated. The Fire Bureau has the following number and types of vehicles:

30 Engines – This includes 25 frontline and 5 reserves

3 Quints – This include 3 frontline and 0 reserves

14 Trucks – This includes 11 frontline and 3 reserves

3 Sedans

3 Vans

10 SUVs – This includes 8 frontline and 2 reserves

3 Pick-up trucks

2 Mobile Air Compressor Unit – This include 1 frontline and 1 reserve

The total number of vehicles in the Fire Bureau inventory is 68.

**Recommendation No. 1**

At the time of this audit, the Fire Bureau did purchase the Firehouse Equipment, Inventory, Maintenance, and Usage module. The Fire Bureau is in the process of bringing it online.

**Recommendation No. 5**

The Fire Bureau received a Department of Homeland Security Grant that will enable the MDTs to be updated. The new MDTs combined with an upgrade in software should permit better tracking of PBF apparatus and more accurate times.

**Recommendation No. 6**

Stations 10, 17, and 24 are testing a station alerting system. A decision to incorporate this system in all stations will be made after a thorough evaluation.

## **Recommendation No. 7**

Firehouse Software is a commercial software that the Fire Bureau is licensed to use. The Fire Bureau does not have the authority or resources to alter the software. Any upgrades to the software must come from the manufacturer.

### **Premium Pay**

Looking at budgeted premium pay dollar amounts, the number of budgeted positions, and their percentage of the Fire Bureau's operating budget can be misleading. The contractual requirements for the expenditures from these accounts are not the same. Rules for premium pay within the Fire Bureau are unique when compared to the Police Bureau and the EMS Bureau.

1. The PBF has a minimum staffing requirement of 163 people per shift. This requirement is in accordance with the collective bargaining agreement. To staff apparatus each shift requires 163 people. Staffing levels per shift are a management prerogative in the Police and EMS Bureaus.
2. Unlike the Police Bureau and the EMS Bureau, members of the PBF do not have the option of receiving compensation time instead of premium pay. If a firefighter works an extra shift, they must receive premium pay according to the collective bargaining agreement.
3. Fire Bureau personnel also receive holiday premium pay and do not have the option of selecting a "deferred" holiday like Police Bureau and EMS Bureau personnel.

Despite the limitations placed by the collective bargaining agreement, the leadership within the Fire Bureau proved prudent and efficient in its management of premium pay.