Attach. 2

Prepared November 28, 2007

ALEXANDRIA FIRE DEPARTMENT
INCIDENT ANALYSIS

3 ALARM FIRE
WITH 4 CIVILIAN INJURIES
AND 6 FIREFIGHTER INJURIES

ALEXANDRIA KNOLLS WEST
6101 EDSALL ROAD
ALEXANDRIA, VA

AUGUST 25, 2007

ANALYSIS PREPARED BY
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INTRODUCTION

On the evening of August 25, 2007, the Alexandria Fire Department responded to a series of incidents that resulted from the passage of a strong thunderstorm through the Northern Virginia area. The storm was directly responsible for two multiple alarm fires, both caused by lightning strikes, and approximately 21 other incidents that occurred within a period of two hours.

The most serious incident was a 3-alarm fire in a high rise condominium building at 6101 Edsall Road, in the western part of Alexandria. Another 2-alarm fire occurred in a hotel on Bluestone Road, approximately 2.5 miles east of the first fire. The Edsall Road incident required the evacuation of approximately 300 residents and resulted in four civilian injuries and six firefighter injuries. Three of the firefighter injuries were serious enough to require the members to be admitted to hospital and one of the firefighters was treated in intensive care for four days.

The occurrence of a serious firefighter injury is one of the primary reasons that the incident analysis was conducted. The Alexandria Fire Department wants to ensure that this incident becomes a positive learning experience, particularly to enhance firefighter safety in the future. Virginia Occupational Safety and Health (VOSHA) is conducting a separate investigation of the firefighter injuries for regulatory enforcement purposes and will issue a separate report.

The incident analysis closely examines the Department's command, control, standard operating procedures, resources and overall performance in relation to the events that occurred on the evening of August 25. All of the observations and recommendations contained within this report are intended to be constructive - not to find fault or to criticize the actions of the firefighters who were involved in the incident. Their performance should be commended and their ability to deal with an unusual set of circumstances should be recognized. Several occupants of the building were rescued and the situation was effectively controlled as a result of their exceptional efforts. The incident could have caused much more severe injuries, or even fatalities, if the firefighters had not performed so effectively.

This report is intended to identify the lessons that should be taken from this experience and applied to the Alexandria Fire Department's overall preparedness for challenging situations that can be anticipated within its operational environment. The specific circumstances of August 25 may be viewed as exceptional; however the occurrence of a thunderstorm at the end of a hot, humid summer day, followed by a period of very high emergency activity, is not unusual. Thunderstorms typically generate numerous emergency incidents that stretch fire department resources for a period of time. The experience was a true test of the Department's capabilities and resiliency.

The Alexandria Fire Department contracted with J Gordon Routley, a consultant who specializes in fire department operations and firefighter health and safety, to conduct this analysis. The process was facilitated by Captain Byron Andrews III, Aide to the Fire Chief and included extensive interviews with emergency responders who were involved in the incident; reviews of radio and telephone recordings, incident reports, standard operating procedures and related documents; examination of the building plans and a visit to the incident scene.

BUILDING DESCRIPTION

The incident occurred at Alexandria Knolls West, an 18 story condominium building located at 6101 Edsall Road, in the west end of Alexandria.
The occupancy of the building is a significant factor. The building has approximately 300 occupants, many of whom are elderly and/or handicapped and would be unable to evacuate without assistance. Any incident that requires evacuation of the residents is likely to be very labor-intensive, demanding the assignment of several companies to assist the occupants and maintain control of the exit stairways. In many situations sheltering in place would be more desirable than attempting to evacuate all of the occupants down two stairways.

Construction and Fire Protection

The building has a reinforced concrete structure and meets the building code definition of fire resistive construction. It is equipped with a fire alarm system and two standpipes are provided for fire department use, one at either end of the building, supplied by a fixed fire pump and exterior fire department connections. Two fire hydrants are located along the private entrance roadway. An emergency generator provides power for emergency lighting in the corridors and stairways.

There are no automatic sprinklers in the apartments or service areas. If a similar building were constructed today, automatic sprinklers would be required. It should be noted that automatic sprinklers would have had little or no impact on the incident that occurred on August 25, 2007, because there was very little active fire in the building and most of that fire was in concealed spaces. The most critical problems were caused by the smoke that was released by smoldering insulation and arcing electrical equipment.

Site Arrangement

The building is constructed on a slope and set back from Edsall Road in a manner that makes it difficult to view from the street. Access to the building is provided by a loop driveway that connects with the public street in two locations. The roadway provides the legally required access for fire apparatus, although the width, slope and curvature present challenges for maneuvering and positioning large apparatus.

The private access roadways allow for aerial apparatus to be positioned along the two faces of the building. Only the lower floors can be reached with aerial apparatus and the setbacks and slope of the roadways further limit the areas that can be accessed from the exterior. An aerial apparatus that is positioned for use effectively blocks the roadway, preventing access by any other vehicles.

Aerial View – 6101 Edsall Road

Aerial View – South Side

Aerial View – North Side

Interior Configuration and Stairways

The building is constructed with a single corridor running north-south on each floor and three elevators at the center. The corridor is offset at the elevator lobby. (Refer to site plan on following page.)

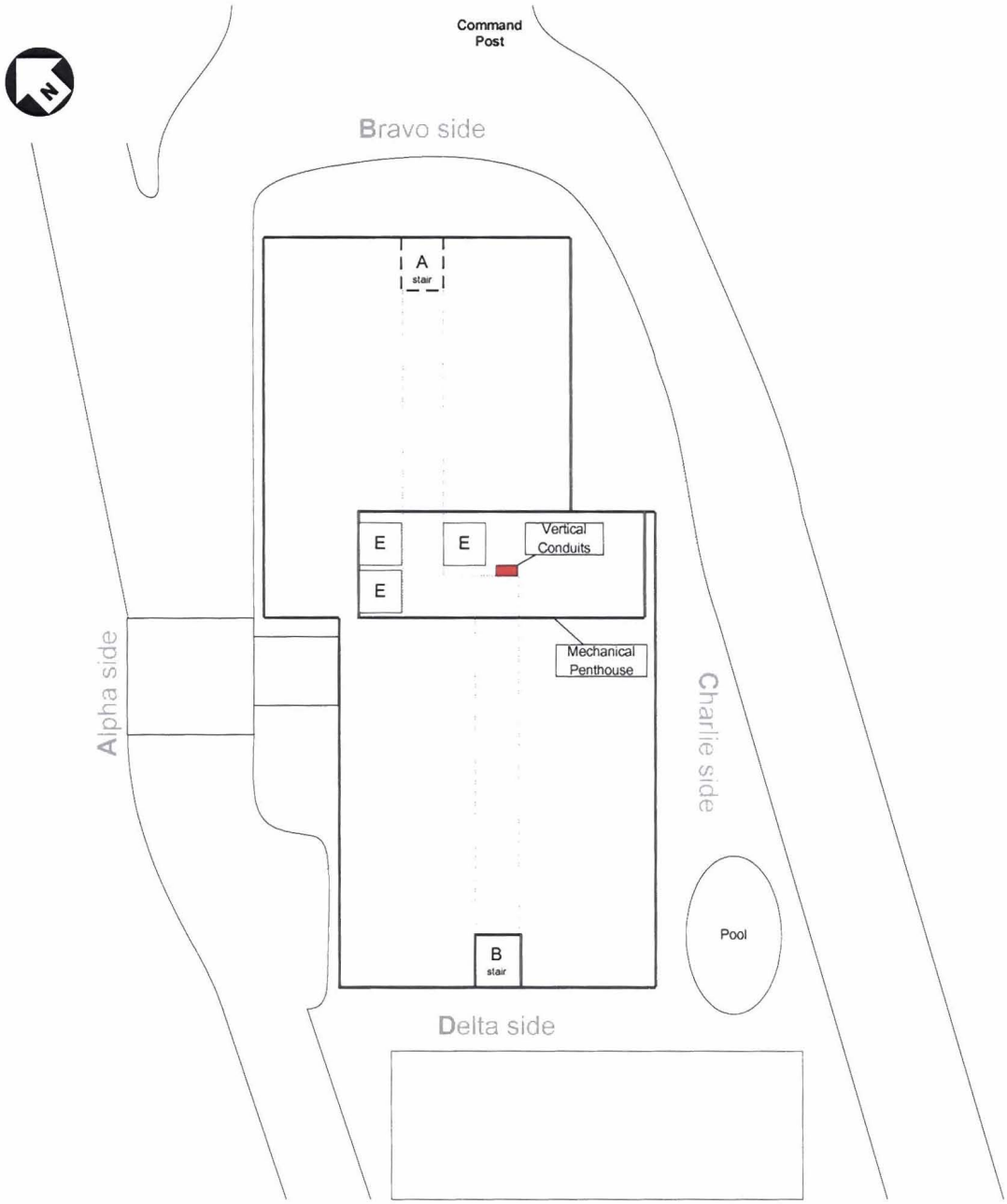
An enclosed stairway is located at each end of the building; the A-stairway at the north (Bravo) end and the B-stairway at the south (Delta) end. The A-stairway runs from the 2nd floor to the 18th floor with a hatch to provide roof access, while the B-stairway runs from the ground floor to the roof level. A standpipe riser is located in each stairway.

A vertical row of windows indicates the presence of a stairway at each end of the building. From the exterior, it is very difficult to locate the stairway doors or to differentiate between the A- and B-stairways without a floor plan.

- The door that leads to the A-stairway can only be accessed by descending a set of exterior stairs from the parking lot on the Bravo side of the building.

- The door at the bottom of the B-Stairway discharges to a narrow walkway on the Delta side, between the building and the tennis courts. The walkway connects to a flight of exterior stairs on the Alpha side of the building and to the swimming pool area on the Charlie side.

- Only the B-stairway is accessible from the main lobby, via an interior corridor. The A-stairway ends one floor above the lobby and discharges directly to the exterior.



Site and building plan, indicating elevators, stairways and corridors, and exterior access. Location of vertical conduits indicated in red.

Observations:

There are numerous apartment and condominium buildings in Alexandria, particularly in the western part of the city and in the adjacent areas of Fairfax and Arlington Counties. Many of these buildings share most of the same characteristics. A very similar situation could have occurred in any one of these buildings and would have presented very similar challenges.

Fire Description

The fire was caused by a lightning strike on the top of the mechanical penthouse at the center of the building. The lightning bolt caused extensive damage to switchgear and power circuits in the penthouse, where the elevator motors and air conditioning equipment were located. The surge of electrical energy traveled down through the building along three vertical steel conduits that delivered 208 volt power from the electrical service entry on the ground level to the penthouse. The lightning bolt caused severe damage to the conduits and the conductors inside them and additional damage to equipment in the main electrical room on the ground floor.

The fires that were ignited by the lightning bolt involved the switchgear panels in the penthouse and the insulation on electrical conductors within the conduits at several locations. The fire also involved combustible insulation materials within void spaces on the 17th and 18th floors and on the 8th floor. The damaged electrical equipment continued to arc and release smoke until the power supply was interrupted.

The three conduits ran vertically within a void space in the wall of the public corridor, next to an elevator shaft. One side of this void space could be opened-up from the public corridor on each floor, while entry had to be made through the kitchens of the adjacent apartments to reach the back side of the void space. On the 8th floor, a metal panel in the public corridor provided access to a large junction box that connected the upper and lower sections of the conduits. The fire involved wiring inside the box and extended to the void space around it.

The fires themselves were relatively minor and easily extinguished once the power was turned off. The major problem was the smoke that was produced by the fires and by the electrical arcing. The fires did not extend to the building structure or contents, although significant quantities of smoke were produced at each location and spread throughout the building.

The volume of fire at each location was limited by the enclosure of the conduits in fire resistant materials. The firefighters had to locate and gain access to each point where there was active fire, before it could be fully extinguished and the

walls around the conduits had to be opened to check for fire extension. A team of 3 or 4 firefighters was able to manage each fire, once it was located.

Observations:

The fires were primarily in concealed spaced and produced more smoke than flame. If the fires that were ignited on the occupied floors had extended to the interiors of the apartments, the situation would have become much more critical. A working fire involving one apartment in a highrise building is a major operational challenge for firefighters. The possibility of two or three simultaneous apartment fires on different levels would be much more problematic.

INCIDENT CHRONOLOGY

The high temperature recorded at Reagan National Airport on Saturday, August 25, 2007 was 94 degrees with high humidity. During the later part of the afternoon, Alexandria Fire Department units were committed to an incident on King Street that required electrical power to be shut down to several businesses in the downtown area. The King Street incident occupied a full first alarm assignment for more than two hours, working outside in the heat and humidity. The last units were still on the scene of that incident when a severe thunderstorm passed through the Northern Virginia area in the early evening

The storm brought strong winds and numerous lightning strikes, although there was relatively little rainfall. As typically occurs during a thunderstorm, a flurry of emergency incidents was triggered, including power failures, stuck elevators, transformer fires, alarm system activations, traffic accidents and lightning strikes. Activity in the Alexandria Fire Communications Center increased dramatically and most of the department's units were dispatched to at least one incident during the first 20 minutes. The storm had a similar impact on the Fairfax and Arlington Fire Departments as it passed through the area.

The initial report of an incident at 6101 Edsall Road came from a call to Alexandria 9-1-1 at 19:42 hours. The first caller reported that the building had been struck by lightning and there was a fire in the elevator shaft. Several additional calls were received in rapid succession reporting smoke in the lobby and on different floors of the building.

Alexandria Fire Communications dispatched a high rise box alarm assignment to the report of a fire in the building. The first alarm assignment was not dispatched via the CAD system until 19:49 hours. The radio dispatch announcement was broadcast at 19:52 hours and the information indicating smoke in the lobby and a report of fire in the elevator shaft was transmitted to the units en route.

The crews at Station 208 were already en route when the alarm was dispatched. They had been monitoring activity on the tactical radio channels and heard the dispatcher call Battalion 212 to advise they were preparing to transmit a box for 6101 Edsall Road. Engine 208 and Truck 208 immediately responded and had been en route for at least two minutes before the alarm was transmitted to their vehicle MDTs. Both units were turning from South Van Dorn Street onto Edsall Road when the dispatch assignment was announced over the radio.

First Alarm dispatched at 19:49:02
E208 E426 E206 E405* T208 T405* R426 M208 B212 B111 A215
Notes: E405 and T405 were unavailable and did not respond
B212 responded, but was not listed on the CAD assignment
B404 was listed on the assignment, but was not dispatched initially
T408 and B404 were added to the assignment at 19:54:17

Initial Operations

The first arriving unit, Truck 208, arrived on the Alpha-side of the building at 19:52 hours, where they encountered residents exiting from the building. Truck 208 reported that occupants informed them of fire in Apartment 602 and possibly on the roof. Battalion Chief 212, still en route, immediately advised Communications to start lining-up a second alarm and that he would advise if it was needed.

Engine 208 arrived on the Alpha-side a few seconds after Truck 208, assumed command, and reported that there was smoke in the lobby and the trash room, indicating the possibility of a trash chute fire. Battalion Chief 212 arrived via the Charlie-side of the building a moment later and assumed command. The Command Post was established at the B212 vehicle in the parking area on the Bravo-side.

Engine 426 and Rescue 426 arrived at approximately the same time and also entered via the Charlie-side to the Bravo-side of the building. Both companies began to perform their pre-assigned functions; E426 establishing a water supply and R426 establishing a rapid intervention team. The crew of E426 then proceeded to the second floor to check the trash chute.

Rescue 426 reported to Command that a resident was reporting a fire in wiring in the corridor on the 8th floor. Command directed R426 and E426 to proceed to the 8th floor to deal with that situation, stating that the second due truck would be given the RIT assignment.

Engine 206 was the next unit to arrive and advised Command that they would be assuming their pre-assigned function of Lobby Control. The Incident Commander reassigned E206 to go to the roof level to check on a report of fire at that location.

The initial check by E208 and T208 determined that the fire was not in the trash compactor or the trash chute. Engine 208 reported that the situation appeared to be an electrical fire, with smoke spreading throughout the building. The Building Engineer was in the lobby and directed E208 to the electrical room on the ground floor to shut-down the main power supply to the building.

Observations:

> At this point the Incident Commander was not aware that the initial assignment was missing one engine company and that the second due truck and second due Battalion Chief would be delayed. The dispatch information had not been sent to the MDT in the B212 vehicle and the Incident Commander did not have a list of the units that were assigned to the incident. He assumed that the additional units would be arriving

momentarily. Battalion 212 asked Communications for the identity of the 4th due engine company, but did not receive a response.

Although E405 and T405 were listed on the first alarm assignment, both units were on the scene of another incident in Fairfax County when the alarm for Edsall Road was dispatched. Tower 408 was added to the assignment as a replacement for T405; however it did not arrive on the scene until 15 to 20 minutes after the first companies began operating. Battalion 111 from Arlington arrived at approximately the same time. The 4th due engine assignment was not covered.

Tower 405 completed their assignment in Fairfax County and anticipated that they would be called to Edsall Road, based on the radio traffic they were monitoring. They stood-by at a location about a mile from the incident until they were eventually dispatched on the Level-2 RIT assignment, 30 minutes after the first units arrived. Engine 405 was dispatched on the 3rd alarm.

Stairway Operations

Engine 206 began to climb the A-stairway, while E426 and R426 started up the B-stairway. The crews reported light smoke in both stairways and heavier smoke in the corridors on each floor that they checked on the way up. The Incident Commander directed T208 to select one of the stairways to set-up for smoke removal, while E208 returned to the lobby to check the elevators for occupants and for indications of fire in the elevator shafts.

Rescue 426 then reported that they had encountered building occupants in the B-stairway who advised them of an elderly person in Apartment 1805. The occupants reported that there was smoke on the 18th floor and the person was unable to exit without assistance. The Incident Commander redirected R426 to go to the 18th floor to check on that situation and to open the top of the stair shaft.

With all of the units on the scene committed and reports of smoke and possible fire on multiple floor levels, the Incident Commander requested a second alarm and a Level-2 RIT assignment. Both requests were made at the same time.

Fire Attack

When they arrived on the 8th floor, E426 discovered fire in and around the large junction box in the corridor. They reported that they were connecting a hose line to the standpipe in the B-stairway to attack the fire. The Incident Commander assigned Engine 426 as the 8th Floor Division and advised that he was also assigning E208 and T405 to the 8th floor to assist. (At that time he believed that

T405 had been dispatched on the initial assignment and was not aware that T408 was en route as a replacement.)

Rescue 426 discovered fire in the wall on the 18th floor, outside apartment 1803. They also encountered two elderly occupants in their apartments and determined that sheltering in place was a better option than having them walk down 18 flights of stairs. They opened windows in the apartments to provide ventilation for the occupants, then obtained a standpipe pack from E206 and connected a second hose line to the standpipe in the B-stairway to attack the fire.

When E206 made access to the roof, after opening the hatch at the top of the A-stair shaft, they discovered heavy smoke in the elevator penthouse. They requested an additional company to bring a line up to the roof via the A-stairway.

The driver of T208 was already on the roof, having walked up the B-stairway to open the door at the top – he joined-up with E206 on the roof. The Incident Commander attempted to assign the other members of T208 to assist E206 on the roof; however they did not hear the assignment.

The reports from floors 8, 18 and the roof were all received with a space of approximately two minutes. At almost the same time, Alexandria Communications advised the Incident Commander of a medical emergency in Apartment 507. Engine 208 heard this report and advised the Incident Commander that they were in the stairway near the 5th floor and could check on the situation at 507.

Situation Status

> At this point there were reports of smoke in both stairways and on all 18 floors, with active fire on three different levels, plus a medical emergency and an unknown number of occupants still inside the building. The elevators were out of service; all five companies on the scene were committed; there was no RIT in place and Lobby Control had not been established. The second alarm companies were still en route, as well as the second due truck from the first alarm.

Fire Suppression

The incident involved fires in three separate locations at essentially the same time. Each fire was relatively minor and was controlled by the actions of a single company:

- Engine 426 attacked the fire in the junction box on the 8th floor and opened the wall to reach the fire in the void space. They also opened the wall in the kitchen of the adjacent apartment to attack the fire in the void space

from the back side. When T408 arrived, they were assigned to assist E426 with overhaul in this area and B111 was assigned as 8th Floor Division

- Rescue 426 opened the wall in the 18th floor corridor to expose the conduits and attack the fire in the void space. They also opened the wall inside the adjacent apartment to expose the back side of the void space.

- Engine 206 used their thermal image camera to look for the fire in the penthouse. They determined that the smoke was coming from the switchgear and other damaged electrical equipment. The smoke production stopped when the equipment was de-energized and no extinguishment actions were required at the roof level.

While the fire suppression actions were occurring, E208 assessed the patient on the 5th floor who was in respiratory distress and requested an ALS unit at their location. They also reported that the best way to remove the patient would be to position a tower ladder on the Charlie side of the building and use the bucket to lower the patient from the apartment balcony to the ground. The exterior option would involve fewer potential problems than attempting to carry a patient in respiratory distress down from the 5th floor and risk additional exposure to the smoke.

A paramedic from M208 was assigned to don an SCBA and went to the 5th floor to provide ALS treatment. Tower 405, which had been assigned on the Level-2 RIT dispatch, was reassigned to remove the patient.

Observation:

Alexandria EMS personnel are civilian employees who are not expected to fight fires or to operate in IDLH atmospheres. Fairfax M426 was on the scene standing- by at this time. The Fairfax medic units are staffed by fully qualified firefighters, who could have been assigned to operate inside the building.

Second Alarm

The second alarm was dispatched at 20:05 hours.

Second Alarm dispatched at 20:05:41 **E107 E408 E109 R206* M426 B404 L/A207 EMS232** Note: R206 was unable to respond; dual-staffed by E206 (already on scene) L/A207 was delivered to the scene by M207 - no qualified operator available

The Level-2 RIT assignment, which was requested at the same time as the 2nd alarm, was not dispatched until 20:22 hours.

Level 2 - RIT dispatched at 20:22:52
E422 T405 R109 B211
EMS231 M202 added at 20:25:53

The first alarm companies had been operating for approximately 30 minutes before the second alarm companies arrived. The second alarm assignment provided only three fire suppression companies, instead of four as required by the standard operating procedure. The assigned special service company, Rescue 206, failed to respond because it is cross-staffed by Engine 206, which had been dispatched on the first alarm.

Engine 107 was initially assigned to establish Staging and then reassigned to establish Lobby Control. The driver of E107 remained on Edsall Road as the Staging Officer. After arriving in the lobby, the company officer determined that there was very little that could be accomplished by Lobby Control and that Rehab for the crews that were coming downstairs was a higher priority. Engine 107 took on the added responsibility of managing Rehab, which was located outside the main entrance on the Alpha side of the building.

Battalion Chief 404 was assigned to establish Division 18. Arriving on the 18th floor, he found the corridor filled with smoke; although the crew of R426 already had the fire under control. Rescue 426 was opening the walls and ceilings to check for fire extension in the void spaces.

Two crew members from R426 were sent down to the 17th floor to check for fire around the conduits. They opened the wall and discovered charring in the void space, but no active fire.

One of the crew members from R426 was experiencing chest pains and severe weakness. Battalion Chief 404 directed the crew of R426 to assist this member downstairs to Rehab for medical evaluation, leaving the Battalion Chief alone on the 18th floor.

After determining that the situation in the penthouse was under control, E206 redeployed to the 18th floor and reported to Division 18. Engines 109 and 408 had both been assigned to report to Division 18 to relieve companies from the initial response and arrived a few minutes later.

Engine 109 worked with E206 to overhaul the void spaces around the conduits on the 18th floor. When they had ensured that there was no residual fire on this level, both companies began to work their way down from floor to floor, checking for fire in the concealed spaces around the conduits on each level. Alternating floors down to the 9th were checked by E206 and E109, while E408 remained on the 18th floor.

After checking the 9th floor, E206 requested reassignment to Rehab. As they started downstairs, they encountered a building resident who was in distress in the A-stairway and unable to walk. They carried the patient downstairs and turned him over to EMS personnel at ground level. Upon reaching the exit, all three crew members from E206 were exhausted and unable to walk. They were evaluated by EMS personnel and transported to Alexandria Hospital, where two of them were admitted in serious condition.

At that point the Incident Commander recognized that all of the crews that had responded on the first alarm had been operating for more than an hour under extremely physically demanding conditions. All of the personnel were exhausted and several were in need of urgent medical assistance. Extensive efforts would be needed to complete the required operations in the building and manage the displaced occupants. A third alarm was requested at that time to provide fresh personnel.

Observation:

> The fire problem was under control by the time the third alarm was requested. All of the firefighters from the first alarm were exhausted and/or incapacitated and there were no fresh crews available to complete the remaining tasks.

Third Alarm

Third Alarm dispatched at 20:59:28
E405 E203 E207 T422 M206
Note: There was no Battalion Chief available to respond on the 3rd alarm.

When the third alarm companies arrived, they were assigned to relieve the remaining first alarm companies and to complete overhaul, ventilation, salvage and occupant support functions. The first alarm companies were evaluated in Rehab and then released from the scene.

The determination was made that power could not be restored until the damaged electrical equipment was isolated. The remaining occupants were assisted in leaving the building and assistance was provided to find temporary accommodations for all of the residents.

The scene was turned-over to the Fire Marshals for investigation.

ANALYSIS

Firefighter Injuries

The occurrence of six firefighter injuries, including two that are considered serious, is the most compelling reason to conduct a detailed analysis of this incident. Six firefighters were transported to Alexandria Hospital, where three were admitted and three were released after assessment in the Emergency Department. One of the firefighters spent several days in intensive care and had not returned to regular duty when this report was prepared.

Five of the injured firefighters were assigned to Alexandria companies and one was assigned to a Fairfax company. All of them were on the initial response and participated in the stair climb; five of them climbed to the roof or to the 18th floor. The injuries were all related to extreme exertion combined with exposure to smoke and included chest pains, difficulty breathing and heat exhaustion. The most serious injury was directly related to inhalation of the products of combustion.

The companies that were assigned to the upper levels of the building had to walk up the stairs, wearing their protective clothing and SCBA and carrying all of their tools and equipment. Each individual was carrying at least 100 pounds of extra weight and some had between 150 and 200 pounds of protective clothing and equipment. Walking up to the 8th floor with that extra weight is a significant test of strength and physical fitness, particularly while wearing protective clothing on a hot, humid evening.

Walking up 18 floors, as quickly as possible, with the extra weight is an extreme challenge. Most of the firefighters who made the climb to the 18th floor and the roof were close to exhaustion when they reached their destinations. They had to rest for a few minutes before they could begin to operate

The firefighters were also exposed to smoke while climbing the stairs. All of the crews that climbed the stairs reported making a very similar assessment of the situation when they began their climb. Although there was hazy smoke in the stairways, they decided not to use the air from their SCBAs on the way up, unless it became essential, because they wanted to save the air for conditions they might encounter when they reached the fire floors and in case they needed the air to exit. They did not believe that the smoke in the stairways was particularly dangerous or incapacitating.

Each company made the determination to not use air on the way upstairs independently and presumably by consensus. The applicable standard operating procedures and guidelines do not provide explicit criteria for determining when air must be used in this type of situation. Firefighters and company officers are expected to make discretionary decisions based on their assessment of the risk

factors in each situation. As a general guideline, they are expected to place safety ahead of expediency, although the balance point is very difficult to define.

If the crews had used their SCBAs while climbing the stairs, they would have consumed most of their air by the time they reached their destinations. They were all concerned about saving their air to be able to operate when they reached the fire floors and having an adequate reserve in case they might need it to exit. All of the crews also decided not to take additional SCBA cylinders with them, because they were already carrying as much weight as they could manage.

All of the crews also reported that they only used their air supplies sporadically when they reached the areas where they could not operate safely without it. They would use their air for a few minutes before retreating to a location where there was fresh air. They used their masks on and off to allow them to work as long as possible with a limited amount of air. The combined effects of heavy exertion, heat, humidity and prolonged exposure to light smoke made the firefighters highly susceptible to respiratory distress and exhaustion.

The decision making processes that allowed the firefighters to be exposed to the combination of respiratory hazards, heat stress and physical exhaustion were discussed with each crew. The firefighters and the company officers were all aware of the inherent risks that were involved in their actions. They were able to discuss IDLH conditions, their potential exposure to carbon monoxide, cyanide and other toxic gases, and the combined effects of heavy exertion and heat stress. The common rationale was that "they did what they had to do because it was necessary under the circumstances," not because they were ordered to take inappropriate risks. The crews also noted that, in retrospect, they could have worked more cautiously and deliberately, taking more time to plan their actions and pace the climb – particularly if they had had known that their back-up companies would be delayed.

Delayed Reinforcements and Support Systems

The initial attack companies expected that additional resources would be arriving within minutes and that "the system" would be getting organized behind them, according to standard operating procedures. They were not aware that the initial response was lacking companies and that the second alarm companies would be delayed. Their common reaction was to keep on working until they were so exhausted that they could not continue.

Under normal circumstances, the first wave of firefighters would be expected to reach the fire floor as quickly as possible to initiate operations. A second wave of companies should be close behind, bringing fresh personnel, additional SCBA cylinders and other equipment. In a "model operation" the second wave of

companies should reach the fire floor in time to relieve the initial attack companies, before their air supplies are expended. By that time a logistical supply chain should be established to provide replacement air cylinders, two floors below the fire.

The model system did not perform as expected at this incident for several reasons:

1. There were no back-up companies on the scene and the reinforcements did not arrive fast enough to meet the replacement cycle objective.

    - The initial assignment was missing one company and a second company was delayed.

    - The response of additional companies was delayed and the second alarm assignment was missing one company.

2. The lack of elevators required the firefighters to climb an unusual height and expend an unusual amount of energy before they reached the floors where they would operate.

3. The firefighters were exposed to smoke in the stairways while climbing.

4. The elevators were not available to transport additional firefighters, equipment and air cylinders and there were no companies available to establish a stairway supply chain.

5. The incident management structure was not sufficiently robust to recognize the problems that were occurring and make appropriate adjustments.

The situation was further complicated by the reports of fire on the 8th floor and at the top of the building. The standard operating procedures for highrise fire fighting are written with the presumption that the fire will occur on one floor. Multiple fires require adaptation and adjustments from the basic highrise plan, which would require even more resources.

The analysis of factors that contributed to the firefighter injuries also underlines the need to quickly establish an adequate command structure and to ensure that command officers are in position to coordinate operations and to monitor the condition of the crews. The practice of assigning company officers to positions within the command structure is ineffective when companies are operating with minimum staffing and the company officers are performing manual labor.

Emergency Medical Operations

While fire suppression and rescue operations were being conducted inside the building, a simultaneous operation was occurring to provide assistance and medical care for the occupants who were exiting from the building. Medic 208, assigned on the first alarm, initially took a position on the Alpha side of the building near the main entrance. The medic unit was assigned to stand-by with the rapid intervention team; however the assigned rapid intervention company was diverted to a different function. Medic 208 encountered several building occupants who had been exposed to smoke while evacuating and began to assist them. This occurred out of sight of the Command Post and the Incident Commander was not aware of the number of building occupants who were being assisted.

When EMS232 arrived, she found the crew of M208 treating the building occupants. EMS232 established "EMS Command" and requested an additional radio talk group for this function. Two DASH buses were requested to provide shelter for the occupants who were gathered outside the main entrance.

The level of EMS activity escalated rapidly when the firefighters from the first arriving companies returned to ground level seeking rehab. At this point one of the two paramedics from M208 had been assigned to go inside the building to assist E208 with the patient who was in respiratory distress, leaving only one paramedic to establish Rehab.

Rescue 426 had advised Medic 426 that they were coming down from the 18th floor with the firefighter who was experiencing chest pains. Medic 426 was waiting for the firefighter when they reached the ground and he was transported to Alexandria Hospital.

As additional firefighters arrived at ground level in need of medical attention and rehab, along with several additional civilian patients, EMS232 requested five additional medic units. EMS232 attempted to coordinate triage, treatment and transportation, which required several trips on foot from the command post, to the rehab area on side-Alpha, to the lobby, to the staging area and back to the command post.

The Rehab area was established in the same area where the building residents had gathered outside the main entrance. The location was not consciously selected and resources were not specifically assigned to establish Rehab. The function evolved spontaneously as exhausted firefighters arrived and encountered the EMS personnel, who were already taking care of building occupants. The Captain of E107, who had been assigned to Lobby Control, recognized the need for Rehab and took on the additional responsibility, coordinating efforts with EMS 232.

Observations:

- Rehab should not be assigned to a Medic unit that is already standing by a part of an assigned RIT capability. Additional resources should be provided for Rehab.

- The NOVA Rehab Manual is under review prior to adoption. This document should be adopted and training should be provided as quickly as possible.

- Ideally, Rehab should be established in a designated location that provides sufficient space and provides easy access for transport units. The selected location should not be exposed to residual smoke or other hazards. Sufficient resources should be assigned to Rehab to manage the number of firefighters that are expected,

- Separate EMS resources should be assigned to assist the building occupants. The occupants should be in a different location from Rehab.

- An EMS supervisor should be assigned on box alarm assignments, or at least on every working incident, to coordinate medic unit operations and establish a more robust incident management structure.

- The medical components of this incident could have been managed more effectively and much more efficiently by establishing an EMS Branch. The individual assigned to coordinate EMS operations should have remained at the Command Post and assigned designated officers to supervise various functions at different locations. This also would have been an appropriate incident to activate a multi-patient EMS plan, making use of an EMS strike team or task force the Multi-Patient Support Vehicle to provide the necessary resources.

- The Alexandria EMS supervisors are not sufficiently trained and experienced to operate comfortably within the incident command system. The EMS supervisors should be fully trained and incorporated into the incident command structure.

- EMS supervisors and other EMS personnel should be familiar with and trained in performing all functions that may be assigned to them at an incident. One of the EMS supervisors, who was dispatched as part of the Level 2-RIT at this incident, was not familiar with the SOP for Rapid Intervention Teams.

- Alexandria EMS personnel are not expected to fight fires or to operate in IDLH atmospheres. Their initial training includes SCBA qualification and

the medic units carry SCBA and protective clothing; however the EMS employees are not required to maintain SCBA proficiency or to meet annual fit test and operational evaluation requirements. The assignment of a solo medic from M208 to enter the building using SCBA exposed the individual to an inappropriate level of risk. (Fairfax M426 could have been assigned to perform this mission.)

Resource Availability

The shortage of resources was a critical factor at this incident. The Incident Commander did not have the quantity of resources on scene to conduct operations on the scale that was required for this incident. The shortfall in resources resulted primarily from system overload – an exceptional number of simultaneous incidents created an extreme demand for resources, which resulted in extended response times as well as incomplete assignments.

The nature of the situation compounded the resource problem. All of the first alarm companies were committed to operations that involved exceptional physical efforts, while reinforcements were delayed responding. The circumstances caused the Incident Commander to divert units from their normal assignments, including the RIT and Lobby Control, and there was a long delay before additional companies became available to replace them.

The NOVA Standard Operating Procedures for fires in highrise buildings are based on the immediate response of seven fire suppression companies (4 engines, 2 trucks, one rescue squad). At this incident the second due truck was delayed by at least 10 to 15 rniinutes and the 4trh due engine was never dispatched. Operations were initiated with only five fire suppression companies on the scene.

There is a presumption that any significant working incident in a highrise building would call for an immediate second alarm, bringing at least four additional suppression companies and additional command and support resources to the scene. There was a delay of several minutes before the second alarm was dispatched and the response times for the additional units were longer than normal. Only three fire suppression companies responded on the second alarm.

The additional companies took too long to respond and there were never sufficient resources on the scene to conduct operations on the scale that was appropriate for the situation – the supply of resources never caught-up with the demand. The shortage of resources could have been disastrous if the situation had been slightly different, particularly if the fires on the 8th and 18th floors had extended beyond the void spaces.

The situation was effectively mitigated as a result of exceptional initiative and physical effort by the companies that were on the scene. The firefighters performed beyond expectations and worked under conditions that exceeded normal risk levels in order to "get the job done" in spite of the circumstantial factors. Their performance ensured that all of the building occupants were safely evacuated, with only minor injuries, but resulted in six firefighter injuries that should have been avoidable under "normal circumstances."

Incident Management

The shortage of resources was particularly critical in relation to the command organization. A highrise incident requires a larger and more complex management structure than most other types of incidents, due to the number of tasks that must be supervised and coordinated. An incident that involves fire on multiple floors of an occupied highrise building with the elevators out of service compounds the incident management problems.

The fundamental principles of highrise operations require the command organization to be established ahead of or at least in parallel with the assignment of companies. This incident escalated very rapidly, from a smoke investigation to reports of fire on three floors, and required the commitment of all of the companies that were available. There were no command officers available at that time to build the management structure that would have been appropriate for this incident.

Only a single command officer was on the scene during the initial phase of the incident. Battalion Chief 212 arrived without an aide and without the limited amount of information that is normally available via MDT. Battalion Aide 215 arrived a few minutes after the Incident Commander and set-up the basic command post structure at the rear of the B212 vehicle. This type of command post is appropriate for a one-alarm structure fire, but it is far from adequate for a three-alarm highrise incident.

The Command Post for this incident would have been much more effective if it had been moved into a properly equipped Command Vehicle. An environment that provides multiple radios, telephones, work stations with computer terminals, proper lighting and other enhancements is much more functional than standing at the rear of an SUV in a crowded parking lot. The Alexandria Police Command Unit is available for this type of situation and both Fairfax and Arlington have fire department command vehicles available to respond on mutual aid.

A fire in an occupied highrise residential building involves particular command challenges relating to the building occupants. The occupants who self-evacuate must be managed, sheltered and provided with timely information. In many cases EMS resources must be assigned to provide triage, treatment and transportation

for at least some of the residents. The command structure must also keep track of areas or floors that have been searched or still need to be searched.

In addition, the Communications Center typically receives a flow of telephone calls from occupants who are still inside the building, seeking information, instructions or assistance --- this information must be processed through the Command Post. At this incident the Fire Chief arrived with A215 and assumed the responsibility for managing occupant information at the Command Post. His arrival was at this point in the operation was circumstantial and provided an additional resource that would not generally be anticipated.

There were not enough command officers available at the Edsall Road incident to establish an appropriate command structure in a timely manner. The support systems that would normally be established for this type of incident could not be provided:

- The command officers assigned to supervise tactical positions on the 8th and 18th floors, B111 and B404, did not arrive on the scene until 15 to 20 minutes after the first companies. The fires were under control before they arrived at their assigned locations and established the divisions. Both of these officers were operating without aides, which compromised their effectiveness as well as their personal safety.

- The Incident Safety Officer position was never filled. No PAR reports were called-for or provided during the first hour of operations. (The staff Safety Officer was coming from home with a response time of more than one hour.)

- The standard logistics functions for a highrise incident were never established. There were no command officers available to manage a forward staging area, to set-up a stairway support operation or to ensure that a system was established to replenish SCBA supplies inside the building. There was no structured accountability for companies entering and leaving the fire area or reporting to Rehab.

- There was no command officer assigned to coordinate ventilation.

- The supervisor who was managing EMS operations was not operating in a command officer mode and was overwhelmed by the number of tasks that required attention.

- The planning function was never addressed. This position should be especially critical for an incident that does not fit within the anticipated parameters for a highrise fire (i.e. no elevators, fire on multiple floors, delayed response of additional resources).

- The company that was pre-assigned to establish the initial RIT was reassigned and the company that was expected to takes its place was delayed. There was an additional delay of 17 minutes before the Level-2 RIT was dispatched. There was no RIT in place during the first 40 minutes of tactical operations.

- The public information officer position was not assigned until the staff PIO arrived, approximately 90 minutes into the incident. There was a delay in notifying the PIO to respond.

- No one was assigned to provide liaison with building management or the evacuees.

The sequence of circumstances had a compounding effect on the availability of command personnel. The Battalion Chief and the EMS Supervisor who were assigned on the Level 2-RIT (B211 and EMS231) were only on the scene for a few minutes before they were reassigned to respond to another working fire in Alexandria. The Fairfax County Operations Deputy Chief, who was not assigned to the incident, assumed the RIT assignment at Edsall Road, in place of B211.

The additional incident, on Bluestone Road, required a second alarm, which further compounded the resource and communications problems. The on-call duty chief, who was responding from his home to the Edsall Road incident, was diverted to the Bluestone Road incident, due to an erroneous report of a firefighter injury at that location. This left the functions normally assigned to the Alexandria duty chief uncovered.

Lobby Control

The NOVA standard operating procedures for a highrise fire identify Lobby Control as a standard function that is pre-assigned to the 3rd due engine company on the first alarm. At this incident the pre-assigned company was diverted to a more urgent requirement and Lobby Control was not established until the first engine on the second alarm arrived.

One of the primary responsibilities of Lobby Control is to control access to the upper floors and maintain accountability for crews entering and leaving the building. Establishing Lobby Control in this building did not provide access control or accountability, because the elevators were out of service and all of the crews that went upstairs entered the stairways via the exterior doors. Some of firefighters who came down the B-stairway found their way to the lobby, while others went directly to the exterior.

The delay in establishing Lobby Control did not have a negative impact on the outcome of this incident; however the analysis points out the need to control

access to the stairways – particularly if the elevators are out of service. In most situations Lobby Control could assign personnel to control the stairway entrances. In some cases it may be necessary to assign an additional company to Lobby Control in order to cover remote stairways.

Staging

When E107 was reassigned from Staging to Lobby Control, the engineer of E107 was left alone to manage the Staging Area on Edsall Road. The limited access to the building made staging particularly important at this incident, because the private roadways could easily become congested or blocked. Problems were encountered maneuvering vehicles into the scene, particularly when T405 was needed to remove the patient from the 5th floor. The medic units that were used to transport patients also had difficulty reaching the Treatment and Rehab area and then leaving the scene.

The best strategy in this situation would have been to stage or park all vehicles that were not required to be near the fire building on Edsall Road, in order to keep the access roads clear. This was not accomplished, because only a single individual was assigned to manage staging. There was no one available to direct vehicles to appropriate locations and ensure that the access paths remained open. If a full company had been assigned to Staging, the crew members could have been assigned to direct traffic within the incident scene.

Ventilation

There was no overall ventilation strategy for the building. The only crew that appeared to have a specific plan in mind was T208 and their plan was not effectively communicated to the Incident Commander or to other companies.

The standard operating procedures for highrise fires recommend designating an attack stairway and an evacuation stairway. The objective is to pressurize the evacuation stairway to keep it clear of smoke for residents to evacuate, while anticipating that the attack stairway will become contaminated as companies make access into the fire floor (or floors). In some circumstances the attack stairway can be used to exhaust smoke.

The designation of evacuation and attack stairways should be made by the Incident Commander. When the companies headed upstairs reported smoke in the stairways and on the floors, the Incident Commander assigned T208 to set-up one of the stairways to be used for smoke removal. The evacuation and attack stairway terminology was not used and the selection of which stairway to use was left to T208.

At that time companies were using both stairways to access the upper floors and, presumably, residents were using both stairways to exit. Confusion was noted in determining which companies were in which stairway, which stairways would be used for ventilation and which stairway to pressurize.

- Truck 208 reported that the A-stairway had a roof opening and would be used for smoke removal. Command then directed R426 to open the scuttle at the top of the stairway. Rescue 426 responded that they were in the B-stairway.

- Engine 206 heard the radio traffic and reported that they were in the A-stairway. When they reached the top floor, Engine 206 opened the scuttle to ventilate the stair shaft and to gain access to the roof.

- The driver of T208 then reported that he had climbed to the top of the B-stairway and opened the door to the roof.

The other members of T208 placed a positive pressure fan at the bottom of the B-stairway and then used additional fans to clear smoke from the corridors on the lower floors into the A-stairway. These actions should have caused the B-stairway to be designated for evacuation and the A-stairway for attack; however these designations were not announced. The companies that attacked the fires on the 8th and 18th floors both connected their lines to the standpipe in the B-stairway and both stairways were used by firefighters and residents attempting to leave the building.

This confusion may have contributed to both firefighter and civilian injuries. The crew of E206 was in the A-stairway when they encountered the civilian who was in distress and had to be carried down to the ground level. When they reached the exit, the crew members were exhausted and had to be transported to the hospital, along with the individual they had rescued. The exposure to smoke in the stairway probably contributed to their injuries.

Observations

- Ventilation should be assigned to a group leader who is responsible for determining the strategy to be employed and coordinating the operation.

- Attack and evacuation stairways should be designated, using the proper terminology, and communicated to all companies.

- The Incident Commander needs an accurate plan of the building to manage highrise operations. The pre-fire plan information was not available at the Command Post.

COMMUNICATIONS

The unusual sequence of events that occurred on the evening of August 25, 2007 placed extreme demands on the Alexandria Fire Communications Center. The analysis of the Edsall Road incident identified several concerns that are directly related to the operations and staffing of the Communications Center, as well as the policies and procedures that are in place to coordinate automatic aid operations among the Alexandria, Arlington and Fairfax fire communications centers.

Communications Center Staffing

The Alexandria Fire Communications Center is normally staffed by one supervisor and two dispatchers on each shift. Four personnel were on duty in the Communications Center when the Edsall Road incident occurred; however none of them was a regular dispatcher or supervisor. The dispatch staff performed commendably when faced with an extreme workload and an unusual combination of incidents; however several errors can be attributed to their lack of experience.

All of the full-time supervisors and dispatchers are civilian employees, who are specifically trained to work in the Communications Center. The civilian dispatchers are supplemented by a number of field personnel, from both EMS and fire suppression, who have been trained to work as fill-in dispatchers. Some of the field personnel have worked part time in the Communications Center for many years, while others have limited experience.

The Fire Department also assigns light duty firefighters and EMS personnel to work in the Communications Center, particularly when there are vacant civilian dispatcher positions or long-term absences that have to be covered. The light-duty personnel receive on-the-job training and are gradually assigned to perform additional functions, progressing from answering non-emergency telephone lines, to answering 9-1-1 calls, to covering a radio dispatcher position.

The Communications Center had been making extensive use of field personnel and light duty personnel for several months to fill-in for absences and to cover vacant positions resulting from retirements and resignations. The process of hiring and training new dispatchers had not been completed when the incident occurred. The established policy was to ensure that there would always be at least one regular dispatcher or supervisor on duty on each shift.

One civilian supervisor was scheduled to work on the night of August 25, along with two light duty members who were temporarily assigned to Communications. Neither of the light duty members had been trained to work as a radio operator, so an additional firefighter, who was qualified as a radio dispatcher, was called-in on overtime. This would have provided four personnel on duty instead of the usual three; however two of them were trainees – one could only answer non-

emergency telephone calls and the other could answer non-emergency and 9-1-1 calls.

When the supervisor called-in sick, there was no other regular supervisor or dispatcher available to cover the absence. A second individual, a field paramedic who had worked as a fill-in dispatcher for several years, was called on overtime to cover the absence. The second overtime person had the most experience in the Communications Center and became the de-facto supervisor for the shift.

Initial Call Processing

The Communications Center was already working an extremely heavy workload of calls when the fire at 6101 Edsall Road was reported. The exceptionally high activity continued for more than an hour, overwhelming the capacity of the Communications Center to efficiently process calls and manage incident communications.

The activity level was unusual, even for the period immediately following a thunderstorm. During the preceding 23 minutes, 15 other incidents had been dispatched, including one full box alarm for a possible apartment fire. All of these incidents were still in progress when the fire on Edsall Road was reported.

The initial call reporting a fire at 6101 Edsall Road was logged into the CAD system at 19:43:50 hours. The assignment was not dispatched until 19:49:02 hours, more than 5 minutes later. The box alarm was not announced over the radio system until 19:53:00.

The dispatch delay was caused by the combination of an extreme workload, inexperienced dispatchers, and the number of units that were unavailable due to the incidents that were already in progress. The delay is also attributable to the procedures that are required to process automatic aid incidents involving Alexandria, Fairfax and Arlington.

Under the NOVA automatic-aid system, Alexandria, Arlington and Fairfax units respond to calls in each other's jurisdictions several times each day. The policy is intended to ensure that the closest available unit(s) will respond to emergency incidents, regardless of boundary lines, and to make the most efficient use of the total resources that are available in the region. Each agency is dispatched by a different communications center and the exchange of information routinely adds a delay of approximately two minutes to the dispatch process for automatic aid units.

The three computer aided dispatch (CAD) systems are not linked to allow unit status information to be exchanged or to permit the dispatch of each others' units. Each CAD system keeps track of the status of its own units, but has no current status information for units that are managed by the other centers.

The Alexandria CAD system will recommend units from Fairfax and Arlington for incidents in Alexandria, based on the assumption that they are available and in quarters. When the CAD system recommends a unit from an adjacent jurisdiction, an Alexandria dispatcher must call that agency's communications center by telephone to verify that the desired unit is available. If the unit is available, a dispatcher in that center must manually enter the incident into their CAD system before the unit can be dispatched. The Alexandria dispatcher must then keep track of the unit's status manually on the Alexandria CAD system.

If the requested unit is not available, the Alexandria dispatcher must refer back to the CAD system to determine the next due unit, which could come from any one of the three departments. If the next due unit comes from Fairfax or Arlington, the dispatcher must repeat the process to determine if that unit is available before it can be dispatched. The delay increases with each additional step.

The process becomes much more complicated for incidents that call for multiple units and involve all three communications centers. In many cases the process involves a sequence of calls between communications centers before the full assignment is dispatched. During high activity periods the process becomes even more cumbersome, particularly when all three communications centers are simultaneously experiencing heavy workloads and reduced unit availability. A thunderstorm that traverses the NOVA area causes an extremely high level of activity in all three jurisdictions, which greatly exacerbates the inherent weaknesses of the system.

The initial assignment for a highrise box alarm requires 4 engine companies, 2 ladder companies, one rescue squad, two battalion chiefs, one battalion aide and one medic unit. The Alexandria CAD system shows that five Alexandria units (E208, T208, M208, E206 and A215), five Fairfax County units (E426, R426, E405, T405 and B404) and one Arlington unit (B111) were initially dispatched on the high-rise box alarm assignment for 6101 Edsall Road. The radio dispatch included Alexandria B212 and omitted Fairfax B404.

The telephone recording indicates that Alexandria did not request E405 or B404 from Fairfax for the initial assignment. Fairfax confirmed that E426 and R426 were available to respond, but reported that T405 was unavailable. Nevertheless the Alexandria CAD record and radio recordings both indicate that E405 and T405 were included in the initial assignment.

Both Alexandria Battalion Chiefs (B211 and B212) were assigned to other incidents at the time the call was entered into the CAD system. The CAD system recommended one Fairfax Battalion Chief (B404) and one Arlington Battalion Chief (B111) on the initial assignment.

Before the call was dispatched, one of the dispatchers called Battalion Chief 212 and advised him of the pending highrise box assignment for Edsall Road. He released himself from the first incident and responded to the new incident. Battalion Chief 212 was included in the radio dispatch announcement, but was not added to the assignment on the CAD system – as a result, he did not receive any of the dispatch information over his mobile data terminal for more than 15 minutes.

The personnel at Station 208 heard the call to Battalion 212 over the radio and immediately responded in the direction of Edsall Road. They were half way to the scene when the call was transmitted to their mobile data terminals and they were turning onto Edsall Road when they heard the dispatch message over the radio.

The personnel at Fairfax Station 426 were monitoring Alexandria 2-Adam on a portable radio and responded when they heard the dispatch announcement. They were en route before Fairfax dispatched them to the incident.

Most of the first alarm units arrived at 6101 Edsall Road between 19:52 and 19:54, which was 10 to 12 minutes after the initial call was received. The units arriving within that time period included E208, T208, M208, E426, R426 and B212.

After these units had arrived on the scene, Alexandria called back to Fairfax to request T408 as the second due truck in place of T405. Battalion 212 was not advised of the change or that the second due ladder would be delayed. Tower 408 arrived approximately 15 minutes after the first units.

Battalion Chief 111 from Arlington did not report en route until after the Alexandria units were on the scene of the incident and arrived approximately 20 minutes after the first group of companies. Fairfax Battalion Chief 404 responded when T408 was dispatched and arrived on the scene at approximately the same time.

The 4th due engine company was never dispatched and the error was not recognized.

Additional Calls and Information

While the units were en route and after they were on the scene, Alexandria Fire Communications received several additional calls from residents of the building reporting smoke in different areas. Some of this information was transmitted to the Incident Commander, but most of it was not passed on. The calls continued after the units were on the scene and included several elderly residents who were concerned because they were unable to walk down the stairs without assistance.

The telephone recordings indicate that the dispatchers were unskilled at communicating with distressed building occupants. Several of the calls were handled abruptly and rudely, probably because the dispatchers were extremely stressed by the number of calls for this incident and the numerous other incidents that were occurring simultaneously. The dispatchers attempted to pass on information they recognized as significant, including a report of an occupant who was in respiratory distress; however the analysis indicates this is a weak area and specific training should be provided to all dispatchers.

System Overload

The errors and delays in managing communications for the Edsall Road incident continued for the duration of the incident. There was a brief delay in processing the request for a second alarm, which called for two engine companies from Arlington and one from Fairfax. Alexandria Rescue 206 was dispatched on the second alarm, although this unit is cross-staffed by the crew of Engine 206 and they were already committed at the scene of the fire. This error was not recognized and no substitute unit was dispatched. (This problem should be addressed by making a change in the unit status and selection functions within the CAD system. The system should not recommend units that are unavailable.)

The Incident Commander called for a Level 2-RIT task force assignment at the same time as the second alarm. This request was missed in the Communications Center and the extra units were not dispatched until 17 minutes after the second alarm had been dispatched.

The Bluestone Road incident, which involved another working fire caused by a lightning strike, was dispatched while the Communications Center was still extremely busy with traffic relating to Edsall Road. This incident, which escalated to two alarms, created an additional demand for companies during a period when the three major NOVA jurisdictions were all heavily committed. It took several minutes to obtain all of the units that were required for the Bluestone incident, including B211 and EMS231, which were both reassigned from the Edsall Road incident.

With two multiple alarm incidents in progress simultaneously, all available Alexandria Fire Department units were committed and both Arlington and Fairfax had dispatched several units to assist Alexandria, in addition to being very busy with their own incidents. An additional company for the Bluestone incident was obtained from Reagan National Airport.

No additional units were requested from surrounding jurisdictions (beyond Arlington, Fairfax and the Airport) to provide coverage for the empty Alexandria fire stations. This left the city extremely vulnerable if any additional incidents had

occurred during a period of 60 to 90 minutes, before companies were released from the Edsall Road and Bluestone Road incidents.

The acting supervisor was too overwhelmed to think about requesting additional coverage from jurisdictions beyond the normal automatic aid partners. The metropolitan Washington area has a tremendous quantity of resources that are available; however there are no established procedures for requesting them. This type of strategic resource deployment only becomes necessary during periods of extreme demand, when the Communications Center is under maximum stress. (

The staff duty officer is expected to ensure that adequate coverage is provided during major incidents. In this case there was a delay in notifying the duty officer and he was diverted to the Bluestone Road incident while en route.

In addition to all of the demands directly related to dispatching incidents, the Communications Center was occupied with making notifications, contacting the power company for electrical problems resulting from the storms, communicating with Alexandria Hospital regarding the injured civilians and firefighters and finding replacement personnel to complete the shifts of the injured firefighters. It is not surprising that errors and omissions occurred, considering the extreme activity level, in addition to the fact that none of the personnel on duty in the Communications Center was normally assigned there.

An additional off-duty dispatcher was called-in on overtime to help with the workload; however the extra person did not arrive until the peak activity was winding down. The individuals who were on duty described the activity level as so busy that they didn't have time to call for help for themselves. The crews assigned to Fire Station 204 will assist in the Communications Center if they are needed and they are in quarters - on this occasion they were out of quarters responding to calls.

Observations

- The applicable national standard, NFPA 1221, calls for 95% of incidents to be processed and dispatched within 60 seconds and 99% to be processed and dispatched within 90 seconds. (The 1% factor is intended to allow for exceptional circumstances.) A call processing time of 5 minutes and 12 seconds for the initial assignment is beyond the range of acceptable performance.

- The inherent weaknesses of the NOVA automatic aid system are very evident in the analysis of this incident. The same systemic weaknesses are experienced several times every day, on a smaller scale, as units from Alexandria, Fairfax and Arlington respond to incidents in each other's jurisdictional areas. Every delayed response and every error in assigning units involves potential negative consequences.

- The automatic aid network could be improved by providing a fully functional interface among the three CAD systems. Linking the CAD systems would allow unit status information to be exchanged automatically and permit each communications center to dispatch units from the neighboring departments. This would eliminate most of the delays and errors that occur when information has to be transferred from dispatcher to dispatcher by telephone and then entered manually into each system.

- A consolidated fire-rescue communications center, serving all three jurisdictions, would be more efficient than the three independent fire communications centers.

❖ A more structured plan should be developed to coordinate mutual aid within the metropolitan Washington area and ensure that adequate coverage is maintained in all jurisdictions. This should not depend on a communications center that is already overloaded and at a crisis level to manage redeployment of resources on an even larger scale. A regional coordination center concept should be considered.

❖ Automated procedures should be developed to activate additional resources, such as off-duty command and staff personnel who have fire department take-home vehicles. The Communications Center is too busy during critical situations to determine who to call and then make individual notifications. Automated pager notifications should be programmed into the CAD system and each individual should recognize situations that call for their immediate response.

❖ The Fire Communications Center is staffed to manage the normal workload of emergency incidents. When unusual events occur, the Fire Department Operations Center should be quickly activated to manage functions that exceed the capacity of the Communications Center.

FIRE PROTECTION SYSTEMS UNIT

The Fire Protection Systems Unit, which is a component of the Code Enforcement Section of the Alexandria Fire Department, regulates fixed fire protection systems in highrise buildings. Two problems were reported relating to the standpipe system at 6101 Edsall Road:

1. The engine company that attempted to connect to the standpipe system connection, E426, reported that an underground leak was evident as soon as the system was charged. The operator of E426 quickly stretched a supply line to a standpipe outlet in the A-stairway to bypass the problem

2. When the companies attempted to connect attack lines to the standpipe at the 8th floor and at the 18th floor, they found that the valves were too tight to open without using tools.

Both of these problems were noted at the incident scene and discussed at the incident critique. The Fire Protection Systems Unit was not aware of these problems until an enquiry was made to obtain information for this report, more than two months after the incident. This indicated an internal communications issue that should be investigated and corrected.

OCCUPANT ASSISTANCE AND SHELTERING

Managing the displaced occupants of the building presented an additional set of challenges. Most of the occupants were able to self-evacuate and were milling around the lobby and the main entrance by the time firefighters arrived. Many of them had been exposed to mild smoke as they exited, however none of them appeared to be in major distress.

Several of the building occupants provided reports of smoke and/or fire at different locations in the building and concerns about residents who might need assistance to evacuate. Evacuation of the remaining occupants was not a critical concern at this time, because the smoke was relatively light and did not appear to present an imminent hazard. A higher priority was given to identifying the source of the smoke. Companies were assigned to check on the reports of fire on the 8th floor and in the elevator penthouse.

The concern for occupants increased as firefighters en route to the 8th floor encountered residents in the stairways who were descending from higher floors. The residents reported that elderly residents on the 18th floor could not exit because of smoke in the corridors and stairways. This report prompted the rapid deployment of companies to the 18th floor.

The firefighters determined that the 18th floor residents could safely shelter in place, although the electricity was shut off. The apartments were generally clear of smoke and fresh air was available through open windows or on balconies. There was no need to expose them to the smoke in the corridors and stairways and to have them walk down 18 floors.

The Communications Center was continuing to receive 9-1-1 calls from occupants of the building, including some elderly and infirmed residents who were concerned about the need to evacuate and their ability to leave the building without assistance. The dispatchers who answered those calls had very little information to provide and, in some cases, were very abrupt with the callers. There was an implicit expectation that the firefighters who were on the scene would deal with whatever was going on and the dispatchers were too busy with other activity to talk to the callers.

As the pace of activity in Communications slowed down, more information was passed on to the Command Post relating to occupants in the building. The report of a resident who was having difficulty breathing was transmitted to the Incident Commander as a priority message. (This was the occupant who was removed from the 5th floor by Tower 405.)

As the incident continued, the Command Post developed a list of apartments to be checked, based on calls to 9-1-1 or individuals on the scene who were

concerned about occupants. The listed apartments were checked as resources became available, generally after the 3rd alarm companies arrived.

Two DASH buses were requested to provide temporary shelter for the evacuees who were gathered outside the building waiting for an indication if they would be able to reoccupy the building. When the buses arrived, some of the occupants took advantage of the air conditioned space while others continued to mill around the main entrance.

When the firefighters who had been involved in the initial attack began to exit, a Rehab operation was established spontaneously in the same area where the residents had gathered. This area became confusing as EMS personnel were assigned to treat firefighters who were in need of medial assistance as well as building occupants who were reacting to smoke exposure, exertion and anxiety.

The Rehab and Treatment functions were not formally established – they evolved through necessity.

At approximately 21:00 hours the Fire Chief called the Emergency Management Coordinator to initiate planning for potential sheltering of the building occupants. The Emergency Management director began to activate Red Cross and other resources to prepare for the possibility that a large number of residents would require shelter.

There was a considerable delay before the determination was made that power could not be restored. During this period many residents continued to wait for information. As the situation evolved, there was no need to establish a shelter, because all of the displaced residents were able to find accommodations with friends or relatives or to obtain hotel rooms.

The incident analysis suggests that Emergency Management could have been summoned more quickly and could have taken a more active role in managing the evacuees, including providing temporary shelter and accountability and keeping them better informed of the situation. Assigning this function to Emergency Management would relieve the fire suppression and EMS forces of this burden, particularly in situations where resources are in short supply.

RECOMMENDATIONS

The detailed analysis of the incident points out several weaknesses that should be corrected through internal adjustments, including:

- ensuring that qualified and experienced personnel are always on duty in the Communications Center
- providing additional dispatcher training, particularly in dealing with building occupants who call 9-1-1 for assistance or instructions
- providing additional incident management system training for EMS supervisors
- dispatching EMS supervisors to box alarm incidents
- ensuring that EMS personnel are properly trained and prepared to operate in IDLH environments
- placing additional emphasis on incident management training and simulations for complex and challenging incidents. *(The organization must be prepared for situations that are more demanding than routine incidents and circumstances.)*
- improving procedures for activating and assigning staff personnel during major incidents and high demand situations. *(The senior staff officers are on a rotating schedule to provide an on call duty officer for major incidents at night and on weekends. Several additional staff officers could be called-upon, if needed; however there are no established procedures for calling or assigning them.)*
- dispatching Emergency Management to assist evacuees
- dispatching a command vehicle to major incidents
- revising the SOP for highrise incidents to address situations that do not fit the model of a fire on one floor

Second Level Recommendations

A second level of improvements, that would involve more complex and costly changes, should be carefully considered. All of these changes are directly related to the Fire Communications Center:

- increasing staffing in the Communications Center to one supervisor and three dispatchers. *(This would allow the supervisor to perform supervisory functions and oversee the operations of the Communications Center instead of being occupied with basic tasks.)*

- upgrading the Alexandria CAD system to correct operational limitations

- providing a CAD interface among the Alexandria, Fairfax and Arlington Communications Centers

- consolidating the Alexandria, Fairfax and Arlington Communications Centers *(as an alternative to the three preceding recommendations)*

- establishing a regional mutual aid coordination center to manage large scale redeployments and ensure that coverage is maintained for all areas

- providing direct MDT access to pre-fire plans, diagrams and aerial photos of target hazards

Third Level Recommendations

A third level of changes would involve adding resources to the Alexandria Fire Department to increase operational capabilities and capacity.

The Alexandria Fire Department operates as a component of the NOVA regional automatic response system, which is intended to make the most efficient use of fire department resources among the participating jurisdictions. The system is intended to function seamlessly, dispatching the closest available units to every emergency incident, without regard to boundary lines. The functionality of the system requires the fire departments to adopt and apply a common system of standard operating procedures. In many respects the NOVA system is highly advanced and a model for other metropolitan areas; however there is still room for improvement in several areas.

Alexandria continues to staff engine and ladder companies with three crew members, while the neighboring jurisdictions have increased or are in the process of increasing their company staffing to four crew members. In this regard an Alexandria fire suppression company has significantly less operational capability than a Fairfax County or Arlington company. The impact of three-person staffing is most evident in labor intensive situations and contributed directly to the injuries that were related to overexertion and exhaustion at the Edsall Road incident.

Alexandria's increasing population density, commercial activity, traffic and related factors are placing increasing demands on the Fire Department. As the city has

become more urban and the demand for fire and rescue services has increased, the Fire Department has innovated, reorganized and adapted to make the most efficient use of its resources. The resulting organization is very lean and its resources are stressed to meet normal day-to-day demands. The type of situation that occurred on Edsall Road and the critical shortage of resources that was experienced on the evening of August 25 are both likely to occur more often as these trends continue.

- The first consideration should be to increase the staffing of all engine and ladder companies to a minimum of four personnel on duty at all times. This change would significantly increase the operational capabilities of each Alexandria company and provide compatibility with the Fairfax County and Arlington Fire Departments.

Additional resource enhancements that should be considered include:

- operating a fully staffed rescue company instead of cross staffing the heavy rescue unit with an engine company crew
- assigning an aide for each Battalion Chief
- assigning a full-time driver/operator to the lighting and air unit
- assigning an on-duty Safety Officer

Situational Context

The analysis of the Edsall Road incident requires consideration of several factors in the appropriate context. The detailed incident analysis reveals numerous areas where changes or improvements should be considered, in order to be better prepared for similar situations in the future. It is very appropriate to consider whether the recommendations are realistic or if they are based on a truly exceptional and extreme set of circumstances. It is unrealistic to expect that the Fire Department would have the resources to manage every potential set of circumstances, no matter how unlikely.

The incident occurred during a thunderstorm at the end of a hot and humid day, which is not an unusual occurrence in the Alexandria area. This type of storm typically generates a period of high activity for the Fire Department and this particular storm had a strong impact on Alexandria and the immediately adjacent areas. The thunderstorm was the cause of the incident on Edsall Road and also the reason that fire department resources were scarce, because of the numerous simultaneous incidents. Similar combinations of circumstances occur several times each year.

The fire itself was not particularly severe and most of the damage was limited to building's electrical system and the enclosing walls and ceilings. The residents were displaced until temporary power could be restored and they were inconvenienced for a few weeks, while the damage was repaired.

Four civilian injuries and six firefighter injuries, of which three were considered relatively serious, resulted from the incident. On that basis alone the incident is worthy of analysis to determine if the injuries were avoidable and identify actions should be taken to prevent their repetition. The incident could have resulted in more serious injuries or fatalities if the circumstances had been slightly different or if the firefighters on the scene had not performed at an exceptional level.

The firefighter injuries were a direct result of firefighters stretching their own limits of strength and endurance to perform their assigned tasks under unusually demanding circumstances. The firefighters had to operate outside the boundaries of standard operating procedures and challenge their own strength and endurance, because the circumstances undermined their ability to operate within a systematic structure. In simple terms, the system broke down because there were not enough resources available to operate according to the established plan for highrise operations and the firefighters compensated by improvising, working longer and harder, and accomplishing tasks with fewer people.

If the firefighters had not performed at that level, there is a significant possibility that the outcome could have involved additional civilian injuries or fatalities. Similarly, if the circumstances had been slightly different, the outcome could have involved more serious firefighter injuries or fatalities.

thinking was proven to be flawed during this incident. There were numerous incidents occurring simultaneously inside and outside the city, which limited the amount of available resources that were needed in a timely manner. As you review this incident and the citation from VOSH, we ask that you recognize the difficult challenges facing the responders at the Edsall Road fire. In the last thirty years there has been no increase in suppression staffing, despite the direct evidence of the benefit to our safety and the safety of the citizens of our great city. The time for "getting by" by doing the best with what we have has come to an end. It is time for our department to adhere to both nationally and regionally recognized staffing standards.

As part of this safety initiative, we ask that you approve Chief Thiel's alternative budget request for three shift safety officers and improvements to our fire training facilities. Our suppression staffing and training academy staffing need a significant and long overdue commitment if our future operations are to be as safe and effective as possible. Our current fire training facilities are woefully inadequate to support our current and future mission. A plan for upgrade and expansion of current facilities, or relocation to a different facility is desperately needed. We also ask that you meet with our organization as soon as possible to discuss further improvements to the safety and health of our members. Alexandria is a modern, vibrant city. As the growth of the city continues, we must ensure that our fire department is properly prepared to serve the challenges that this development represents. We truly look forward to working with you to guarantee the safety and success of our entire organization.

I will leave you with a quote that I feel is quite appropriate as you consider this issue. In the wake of Chicago's tragic Our Lady of Angels School fire of 1958, the then president of the National Fire Protection Association, Percey Bugbee, said in an interview: *"There are no new lessons to be learned from this fire; only old lessons that tragically went unheeded."*

Respectfully,

John R. Vollmer

John R. Vollmer, President
Alexandria Firefighters Local 2141