

# Executive Summary

The terrorist attacks on the World Trade Center on September 11, 2001 reshaped expectations about future threats and created a new urgency to increase preparedness. At the Fire Department's request, McKinsey & Company spent five months working with Department personnel to develop recommendations for change to enhance the FDNY's preparedness.

These recommendations stem from the lessons that emerged from our detailed review of the Department's response on September 11, and from the many interviews we conducted with FDNY personnel and with other emergency service agencies, experts in fire operations, the military, and technology vendors. Many of the recommendations represent the joint efforts of several McKinsey-FDNY task forces involving approximately 50 FDNY members.

This Executive Summary contains recommendations to the Fire Department in these key areas: operations, planning and management, communications and technology, and family and member support services.<sup>1</sup> As background, the Executive Summary also contains a description of the key events related to these areas during the Department's response to the attack on September 11.

## **FIRE AND EMS RESPONSE: KEY EVENTS OF SEPTEMBER 11**

The FDNY's response to the attack began at 8:46 a.m., the moment the first plane hit Tower 1 of the World Trade Center. The FDNY's First Battalion Chief witnessed the first crash from a nearby street and was the first arriving chief officer on the scene. In accordance with FDNY protocols, he established an Incident Command Post<sup>2</sup> in the lobby of World Trade Center 1 (WTC 1) at approximately 8:50 a.m.

<sup>1</sup> Family and member support services are the infrastructure and processes used to notify families of death or injury to FDNY personnel, along with post-incident peer and family counseling and support.

<sup>2</sup> The Incident Command Post is the location from which all aspects of an incident response are managed.

## **Chief of Department establishes command**

At about 9:00 a.m., the Chief of Department took over as Incident Commander. At that time, he moved the Incident Command Post from the lobby of WTC 1 to a spot across West Street, an eight-lane highway, because of falling debris and other safety concerns. Chief officers considered a limited, localized collapse of the towers possible, but did not think that they would collapse entirely.

After the Incident Command Post was moved to West Street, several fire chiefs remained behind in the lobby of WTC 1, which became an Operations Post for fire units operating in that building. Their presence in the lobby was necessary so they would have access to important building systems, such as controls for alarms, elevators, and communications systems.

Within minutes, the chief officers in WTC 1 decided to focus efforts on rescue and evacuation. They sent firefighters up into the building to help the hundreds of people trapped in elevators, stairwells, and rooms, along with those who were unable to evacuate because they were injured. They also ordered firefighters to make sure that floors were fully evacuated.

At the same time, EMS commanders began to set up geographic areas around the scene where ambulances could be staged and patients triaged, treated and transported to hospitals. The EMS Assistant Chief of Operations assumed overall EMS Command at the Incident Command Post, reporting to the Incident Commander.

At 9:03 a.m., the second plane hit World Trade Center Tower 2 (WTC 2). Chiefs immediately called in additional Fire units<sup>3</sup> and deployed units from WTC 1.

## **Chiefs designate staging areas**

As the mobilization escalated, dispatchers instructed responding Fire units to report to staging areas<sup>4</sup> that senior chiefs had designated near the World Trade Center. However, as these units approached the area, many failed to report to the staging areas and instead proceeded directly to the tower lobbies or other parts of the incident area. As a result, senior chiefs could not accurately track the whereabouts of all units. In addition, the failure to stage prevented Fire units from getting necessary information and orientation before going into the towers. For instance, several units that were not familiar with the World Trade Center layout

<sup>3</sup> A Fire unit is a group of firefighters who have the same assignment, e.g. an engine or ladder company. Most units include four to five firefighters and one officer.

<sup>4</sup> A staging area is a resource management area in close proximity to the incident. Units directed to stage are expected to respond to the staging area and await further deployment instructions.

had problems differentiating WTC 1 from WTC 2. Also, because some units did not stage and chiefs were unsure of their location, additional units, that might not have been required at that time, were deployed to the incident.

Units arriving at the lobby of WTC 1 checked in with the chief officers at the Operations Post to obtain their assignments. Chief officers sent these units up into the building in an orderly, controlled way. We believe the same happened in WTC 2.

### **Communications limitations emerge**

A number of communications difficulties hindered FDNY chief officers as they coordinated the response.

For instance, problems with radio communications left the chief officers in the lobby of WTC 1, and probably those in WTC 2, with little reliable information on the progress or status of many of the units they had sent up into the buildings. The portable radios that were used by the FDNY on September 11 do not work reliably in high-rise buildings without having their signals amplified and rebroadcast by a repeater system. The World Trade Center had such a system, but chief officers deemed it inoperable early in the response after they tested it in the lobby of WTC 1. With the repeater malfunctioning, the chiefs in the lobby of WTC 1 would not have been able to communicate with any units whose radios were tuned to the repeater channel, even if such units were just a few feet away from them. On the other hand, the command and tactical channels<sup>5</sup> on these radios do support some, albeit unreliable, communications in high rises. Therefore, the chiefs decided to use their command and tactical channels for operations in WTC 1.

Radio communications between chief officers in the lobby of WTC 1 and the units they sent in the building were sporadic. The chiefs were able to get through to some units sometimes, but not others. Some units acknowledged receiving radio communications some times, but not others. This left the chiefs not knowing whether their messages failed to get through, whether the units failed to acknowledge because they were busy with rescue operations, or whether the units did acknowledge, but the acknowledgement did not get through. Because information about civilians in distress continued to reach the Operations Post in the lobby, the chief officers decided to continue their attempts to evacuate and rescue civilians, despite the communications difficulties. We believe that the chiefs and units in WTC 2 faced similar communications problems.

<sup>5</sup> Tactical radio channels are used for on-scene communications among chiefs and the units they command. Chiefs provide directions to units on this channel while units provide status reports to the chiefs and each other and request assistance. Command channels are used by chiefs at an incident to communicate with each other.

Chief officers in the lobbies of WTC 1 and WTC 2 also had very little reliable information on what was happening outside the towers. They had no reliable sources of intelligence, and had no external information about the overall status of the incident area, the condition of the towers, or the progression of the fires. For example, they had no access to television reports or reports from an NYPD helicopter that was hovering above the towers. This lack of information hindered their ability to evaluate the overall situation.

EMS chiefs and ambulances also faced communications problems due largely to radio traffic congestion. This occurred partly because two EMS channels are on the same frequency: the command channel, normally reserved for chief officers, and the citywide channel, normally used by ambulances and EMS Dispatch. This congestion problem was exacerbated by a number of ambulances that repeatedly asked to be dispatched to the World Trade Center.

Radio communications difficulties were one of several factors that led EMS Dispatch operators to be overwhelmed with work on September 11. In addition to communicating with ambulances and chief officers by radio, EMS operators must also act on requests for help sent by the 911 call center and the NYPD via phone calls or computer messages. They must assign ambulances, record actions in the computer system, monitor information from multiple sources and handle other phone calls. The complexity and amount of information related to the World Trade Center attack made it extremely difficult for EMS operators to review everything they received from multiple sources and take appropriate action quickly.

## **WTC 2 collapses**

WTC 2 collapsed at 9:59 a.m., killing many civilians and first responders. However, firefighters and chief officers inside WTC 1 were initially unaware of precisely what was happening. Many believed that a partial collapse had occurred in WTC 1. As the lobby of WTC 1 filled with blinding dust and debris, the First Battalion Chief, who was at the Operations Post in WTC 1, immediately issued an evacuation order for WTC 1 over his portable radio. However, a number of firefighters did not hear that order. Several left the building only because they were told by other firefighters that an evacuation order had been issued.

The collapse of WTC 2 destroyed the Incident Command Post across West Street and weakened the command and control structure, as fire and EMS chiefs at the post sought shelter in surrounding structures. The collapse of WTC 1 at 10:29 a.m. killed the Chief of Department and other officers, temporarily leaving the incident without a commander. In addition, following the collapses, many EMS personnel were unaware of who was acting as EMS Command.

At 11:00 a.m., the Chief of Planning, a high-ranking EMS officer, assumed EMS Command, but overall incident command remained unclear for nearly another half hour. During this time, several senior fire chiefs took the initiative to restore overall command, sometimes leading to multiple incident commanders. Overall command was restored at 11:28 a.m. by Citywide Tour Commander 4C,<sup>6</sup> who replaced the Chief of Department as Incident Commander.

### **Inter-agency coordination was minimal**

Throughout the response on September 11, the FDNY and NYPD rarely coordinated command and control functions and rarely exchanged information related to command and control. For example, there were no senior NYPD chiefs at the Incident Command Post established by the Fire Department. We believe there were very limited communications, either directly or through a liaison, between senior FDNY chief officers and the senior officers in charge of the NYPD response. In addition, some potentially important information on the structural integrity of the buildings never reached the Incident Commander.

### **Resource management was complex**

The response of firefighters and EMS personnel to the World Trade Center on September 11 was unprecedented in scale and scope. More than 200 Fire units responded, approximately half of all units in the city. More than 100 ambulances in the emergency services system responded, about 30 percent of the total available. This massive response taxed the FDNY's efforts to manage its personnel and equipment in several ways.

For example, as the mobilization increased, a number of Fire units that had not been assigned to the incident – but wanted to help – contacted the Fire Dispatch Center repeatedly by radio, asking that they be authorized to respond. In some of these cases, Dispatch relented and assigned them. Many EMS, private, and community-based ambulance units did the same with the EMS Dispatch Center. This complicated efforts by the dispatchers to manage the response and, in some cases, led to the deployment of units that probably would not have been deployed had they not insisted.

Only four Fire units proceeded to the World Trade Center without being deployed by Fire Dispatch; however, a number of ambulances, both EMS and privately operated, responded without authorization from EMS Dispatch.

<sup>6</sup> A Citywide Tour Commander is a staff chief responsible for FDNY operations throughout the city. One citywide tour commander is on duty at all times. On September 11, seven citywide tour commanders were designated CWTC-4A through H, except for the designation CWTC-4F, which was unused.

Another factor that increased the size and complexity of the response was the timing of the attack. Because the attack came near a regular tour change, many firefighters and EMS personnel who had just finished their tours of duty responded with their units, complicating the Department's ability to keep track of who was on the scene.

When the Chief of Department issued a full recall, thousands of off-duty firefighters and EMS personnel left their families to help the city and the Department respond to the attacks. While the Fire Department had a recall procedure for Fire Operations personnel, it had not been activated for more than 30 years and personnel received no training in its activation. The Department had no recall procedure for EMS personnel. As a result, the recall was disorganized and ineffective. For instance, recalled firefighters and EMS personnel did not have clear guidance on where to go and the Department had substantial logistics problems transporting and equipping recalled personnel.

The FDNY requested and received mutual aid from Nassau and Westchester counties on September 11. However the Department had no process for evaluating the need for mutual aid, nor any formal methods of requesting that aid or managing it. Therefore, the Department had limited ability to evaluate how the mutual aid could be integrated into its operations. On September 11, this aid consisted mostly of engine and ladder companies, some of which deployed to the incident and some of which were used to help maintain citywide coverage. As the mobilization of personnel and resources grew, all senior fire and EMS operations officers responded to the scene. The experience and leadership of these senior chiefs proved crucial to re-establishing command and control after the towers collapsed. However, had some officers remained at a separate, protected location with the appropriate communications infrastructure, they may have been better able to support maintenance or re-establishment of incident command and control. Or they could have improved management of the Department's resource pool to ensure that all appropriate resources were sent to the scene, while at the same time fully protecting the rest of the city in case of another major incident.

In addition, most senior civilian FDNY staff members went to the scene, including several deputy and assistant commissioners. Many of them had no role or responsibility in the response.

The Fire Department Dispatch Center relocated dozens of firefighting units around the city during the incident and successfully maintained citywide coverage for regular fire operations. But the Department committed nearly all its special operations units such as Hazardous Materials and Rescue teams to the World Trade Center, leaving the rest of the city with extremely limited special operations coverage. For example, the Department would have been unable to respond quickly and effectively to another incident in the city requiring advanced hazardous materials capabilities.

## **Record keeping systems were insufficient**

FDNY systems to track its own personnel proved insufficient on September 11, as did its ability to track patients treated by EMS and taken to hospitals.

Chief officers at the World Trade Center scene kept track of the location and assignment of units, but they had no way of backing-up their records. For example, the FDNY Field Communications Unit was responsible for tracking the assignment of Fire units to different alarms, towers, and staging areas. This unit worked next to the Incident Command Post and kept records on a magnetic command board, using small magnets placed on a diagram to indicate unit locations. Chief officers at the Operations Posts in the two towers also used magnetic command boards to track the units assigned to their buildings. These boards and the records they kept were destroyed when the towers collapsed. As a result, the Department could not quickly create a reliable list of missing and dead personnel.

In addition, the Department did not have a complete and accurate family notification database with records of whom to contact in case of death or injury of a member. Because of this, and because of the large number of firefighters missing and dead, there were substantial delays notifying families of the loss of loved ones, and the procedures to notify families varied substantially over time.

Throughout the incident, EMS patient-tracking capabilities, which are performed manually by EMS personnel, did not hold up well. Because of the large number of victims and patients requiring immediate treatment and transport, EMS personnel decided they could not accurately complete the paperwork required to enable accurate tracking of patients as those patients were transported to different hospitals.

## **Planning and logistics capabilities evolved**

During the FDNY response on September 11, officers were not selected to coordinate planning or logistics functions<sup>7</sup> on a dedicated basis. However, the planning and logistics requirements of this incident, particularly post-collapse, were well beyond anything FDNY had experienced before. In the days immediately following, planning and logistics improved significantly as the Department assigned chief officers to coordinate these tasks and received support from the Federal Emergency Management Agency, the U.S. Department of Forestry Incident Management Teams (IMTs), the U.S. Army Corps of Engineers,

<sup>7</sup> Incident planning includes determining resource requirements and managing information flow. Logistics includes managing the deployment and tracking of supplies and equipment.

the city's Office of Emergency Management, construction companies and private donors.

## **RECOMMENDATIONS**

Our detailed examination of the FDNY's response to the World Trade Center attack on September 11 indicates that the Fire Department should focus its efforts to improve preparedness in the following key areas: operations, planning and management, communications and technology, and family and member support services.

In operations, the FDNY needs to expand its use of the Incident Command System (ICS), a blueprint for emergency response widely used around the country. This will lead to the creation of a well-defined, flexible, and complete command and control structure for major incidents, with clear and consistent responsibilities and roles. In addition, the FDNY should improve the support it provides incident commanders so that crucial functions can be effectively performed, including command and control, planning, logistics and inter-agency coordination. And, the Department must improve its ability to assess the needs of the rest of the city during major incidents and deploy necessary resources to meet those needs. The Department would also benefit from having specialized teams that are highly trained in managing the response to large and complex incidents. Among other operational needs, the Department should have a formal, flexible procedure for recalling off-duty firefighters and for activating mutual aid from agencies in surrounding areas. It needs to improve its process for ensuring that firefighting units stage as required. And, it must expand its hazardous materials capabilities.

Planning is another important component of enhancing preparedness. The FDNY must do more to anticipate its future needs, plan ahead for them, and better manage the initiatives that will meet these needs. This includes developing, expanding and updating procedures and exchanging operational information with other agencies. It also involves improving the Department's ability to assess risks and threats across the city so it can create specific response plans for key locations and prioritize training and investments in new resources, including special operations.

Multiple difficulties involving communications and technology hindered firefighters and EMS personnel on September 11. These difficulties pointed out the FDNY's need for an improved process to evaluate, acquire and deploy technology and communications equipment and infrastructure. September 11 also highlighted a number of critical communications and technology needs that must be addressed immediately. These include improving radio communications, improving the Department's ability to receive and disseminate critical information

about incidents, and improving the tracking of Department personnel and patients treated by EMS.

September 11 also showed that the Department needs a broader and more flexible system for providing support services to members and their families, i.e., notifying family members when a member of the Fire Department is injured, missing or killed, and providing counseling and other services to families and affected Department members.

This report has a series of broad and detailed recommendations to address all of these needs. However, in order for the recommendations to have any major impact, the FDNY must make a renewed commitment to leadership, accountability and discipline at all levels, in the field and at headquarters.

We point this out because the FDNY had contemplated several of the recommendations in this report before, but never fully brought them to fruition. For instance, the Department purchased new UHF radios in 1999, but was unsuccessful in an attempt to deploy them in 2001. A few years ago, chief officers discussed and planned the creation of a robust Fire Department Operations Center that would provide the infrastructure and communications capabilities necessary for effective citywide command and control and planning. These plans were never implemented. When units failed to stage properly in the past, the Department did not follow up systematically so that it could retrain those units, and, if necessary, sanction them, their officers, and their commanders. On September 11, as they took part in a response of unprecedented scale and complexity, many Fire units did not stage properly. They went directly to the lobbies and immediate surroundings of WTC 1 and WTC 2.

In an effort to help the Department improve accountability and discipline, we have included in this report a number of recommendations for enhanced planning and management processes. Ultimately, however, recommendations and processes will only go so far. Success will be predicated on managers, civilian and uniformed, who are committed to bringing about profound change, are capable of leading all personnel by example and are eager to embrace full accountability for their own performance. As this report was being completed, the FDNY increased the number of staff chief officers in management positions. This additional management capacity will help the Department implement these recommendations.

We have computed the cost of our recommendations to the greatest extent possible. The largest cost could go to ensuring reliable communications in high-rise buildings. It would cost \$150 million to \$250 million to install repeater systems in all high-rises in the city. (This figure could be substantially reduced if the FDNY finds it can use an existing citywide infrastructure, such as the NYPD's, to help address the in-building communications problem.) The remainder of our recommendations would cost \$15 million to \$25 million, a figure

that could rise because several recommendations require that Department bureaus and groups change their composition and broaden their skill sets. Many of these changes will, no doubt, be accomplished with existing personnel. However, the Department may also need to add personnel, expertise and additional equipment to fully achieve what is required. Such steps could result in substantial additional costs that are difficult to quantify at this time. In addition, the cost estimate does not include the expansion of hazardous materials capabilities that we are recommending. Since the Department has yet to decide the specifics of the expansion, it is impossible to estimate its cost.

Below is a summary of our recommendations for increasing operational preparedness, improving planning and management, improving communications and technology capabilities and enhancing family and member support services.

### **Increase operational preparedness**

We have seven recommendations regarding operational preparedness, centered on establishing procedures and command and control structures that are flexible and can be quickly expanded in the event of major emergencies.

**1) Expand use of the Incident Command System.** This system is used by many local, state and federal emergency response agencies around the country. It provides a basis for establishing a flexible command and control structure with defined roles, clear communications protocols and adaptable procedures. We recommend that the Department:

- ¶ Review all its procedures to ensure consistency with ICS principles.
- ¶ Train all FDNY personnel likely to be involved in incident response in ICS principles, and continue this training on a regular basis.
- ¶ Create dedicated, ongoing training programs for FDNY chiefs so that they are proficient in using ICS principles during large and complex incidents involving terrorism, chemical, biological and radiological materials, and attacks to critical infrastructure.

**2) Further develop the Fire Department Operations Center.** This center, which now monitors and reports on daily Department activities, should be expanded into a fully functional emergency operations center. It should have infrastructure and communications capabilities to provide citywide command, control, and operational planning, and support for inter-agency coordination during routine operations and major incidents. During resource-taxing events, senior operations personnel should report to the center to set operational priorities; manage resources and citywide coverage, including the initiations of recall and mutual aid requests; and ensure that command and control is maintained for incidents across the city.

**3) Create Incident Management Teams.** These teams should be comprised of specialized, highly trained personnel who would be activated in response to major incidents. Each team member should have expertise in a particular aspect of incident management, such as operations or planning. We recommend establishment of two teams of 21 individuals to ensure around-the-clock coverage over a period of weeks.

**4) Deploy a flexible recall procedure.** The FDNY should develop, deploy and train its personnel in a flexible recall procedure that allows the Department to efficiently mobilize all or part of its off-duty personnel in case of emergencies or other needs. The Department should strictly enforce adherence to the recall procedure during training and actual recalls. Off-duty firefighters who are not activated by a recall or do not report to specified mobilization areas should not be allowed to participate in the response, if the circumstances allow. Those who fail to adhere to the recall procedure should be referred for additional training and/or disciplinary action.

**5) Seek formal mutual aid agreements for fire operations.** The FDNY should develop and formalize mutual aid policies and establish agreements with other departments and agencies to provide for efficient pooling of resources when necessary. The Department should first assess the capabilities and compatibilities of neighboring public safety agencies to maximize effectiveness of any joint operations. The agreements should ensure that participants follow common operational and communications protocols to maintain command and control of mutual aid personnel. The agreements should also ensure that equipment and procedures are interoperable, and that participants conduct regular joint training.

**6) Modify and enforce fire staging protocols.** The Department should modify its staging procedure according to the following guidelines:

- ¶ Use staging in all incidents requiring a third alarm or greater.
- ¶ Train Fire Dispatch and firefighting personnel to follow strict communications protocols for communicating the designation and location of staging areas to responding units and enforce adherence to these rules on a day-to-day basis.
- ¶ Assign chief officers to command and coordinate staging areas. While the designated staging chief is en route to the area, the first officer responding to that area should perform these functions.
- ¶ Strictly enforce adherence to staging protocols in training and in day-to-day operations, including the application of sanctions to units, officers and chiefs if units fail to follow procedure.

**7) Expand hazmat capabilities and re-evaluate other special operations capabilities.** The FDNY has just one Hazmat Unit, which it committed to the

World Trade Center on September 11. That day, the Department would have been unable to respond quickly and effectively to another incident that required advanced hazardous materials capabilities.

Special operations units such as hazmat are likely to play crucial roles in the city's response to large and complex incidents, particularly those that result from terrorist acts. Such attacks could involve radiological, chemical, and biological agents, and/or multiple, simultaneous incidents, either on land or over water. Preparing for and responding to such attacks could require special operations capabilities well beyond those currently possessed by the FDNY.

We recommend that FDNY expand its hazmat capabilities and re-evaluate its heavy rescue and marine operations capabilities. To do this, the FDNY's Operational Planning Unit<sup>8</sup> should analyze the costs and benefits of different hazmat expansion alternatives and develop a specific expansion proposal, including new funding requirements. Possible expansion alternatives include: increasing training and equipment of FDNY Squads,<sup>9</sup> deploying a second hazmat unit similar to the current one, replacing the current unit with several smaller ones that could be stationed in different boroughs, or a combination of the above.

In addition, we believe that the city or state should create an inter-agency planning initiative that ensures all local, state and federal agencies likely to be involved in hazmat incidents understand each other's responsibilities, have the resources necessary to meet those responsibilities and respond to incidents cohesively and effectively.

If and when this initiative is put in place, it would help determine the FDNY's special operations capabilities. For example, it would define the type and scale of events the Department should be able to respond to. It would also define how long the Department would need to respond to such events alone before the deployment of additional special operations resources from other agencies such as FEMA, the U.S. Department of Defense, the U.S. Department of Energy, the U.S. Environmental Protection Agency, or the Coast Guard.

### **Improve planning and management**

Better planning will enhance the FDNY's preparedness by identifying and implementing the most effective methods of responding to any kind of an event.

<sup>8</sup> The Planning and Management section of this report includes a series of additional recommendations for expansion of the Operational Planning Unit.

<sup>9</sup> A Squad is a specially trained and equipped engine company with expertise in hazardous materials, rescue and other special operations capabilities.

We recommend the Department: 1) enhance its planning and management processes and, 2) expand and reorganize its Operational Planning Unit.

**1) Enhance the Department’s planning and management processes.**

We recommend that the FDNY form a Planning Oversight Committee comprised of senior chiefs and commissioners that would lead the creation of a formal Annual Plan and closely track and manage the performance of the Department and its bureaus throughout the year.

The Annual Plan should consist of clearly laid-out objectives, and initiatives designed to meet those objectives. The committee should ensure that the Department sets specific performance targets for itself and its bureaus and creates clear responsibility and accountability.

The Planning Oversight Committee should be supported by an expanded Management Analysis and Planning (MAP) group, which would be responsible for coordinating all cross-bureau initiatives in the Department and supporting the creation of the Annual Plan. The MAP group should also monitor the overall performance of the Department and its bureaus, along with the progress of initiatives, using explicit metrics and milestones.

**2) Expand and reorganize the Operational Planning Unit.** This unit currently creates and maintains the Department’s standard operating procedures. We recommend that it be reorganized and its role expanded. The new unit’s first priorities should be to conduct a comprehensive risk assessment of potential hazards to city locations. This assessment should include creation of an FDNY risk database, which would compile information on unique hazards at specific locations such as chemicals or radioactive materials. The risk assessment should lead to the development of pre-plans for managing emergencies at particularly high-risk locations.

In addition, the unit should develop and maintain an FDNY All-Hazards Emergency Response Plan that would provide guidance for managing large incidents, including chemical, biological, and radiological attacks and other forms of terrorism.

**Improve communications and technology capabilities**

Firefighters and EMS personnel were hindered in their response on September 11 by failures and limitations of communications systems and processes, and technology. To address these challenges, we recommend FDNY proceed simultaneously on two tracks: 1) revamp the management process it uses to evaluate, acquire and deploy technology and communications equipment and protocols; and 2) immediately address several urgent communications and technology needs.

**1) Revamp the communications and technology management process.** We recommend the Department create a Technology Steering Committee that decides on communications and technology initiatives and manages their implementation. The committee should lead the development of a 5-year Technology Plan by assessing Department needs, and deciding on solutions. The committee should also manage the implementation of all technology and communications initiatives of the Department.

**2) Immediately address urgent needs.** The FDNY's urgent communications and technology needs fall into four broad areas: 1) improving communications capabilities; 2) improving the Department's ability to receive and disseminate critical incident information; 3) giving chief officers at incident scenes better ways to manage information and track personnel; and 4) improving EMS's ability to track patients during incidents.

2.1) Improve communications capabilities. Among several communications initiatives, the Department should accelerate the thorough testing of the UHF portable radios it bought in 1999. If the testing is successful, the Department should deploy the radios after personnel receive appropriate training to use them. While questions still exist about the performance of the radios, they could have significant advantages over current radios, such as support for a larger number of channels.

The Department also faces major problems with radio communications in high-rise buildings, subways and tunnels and should address these quickly.

In high-rises, it should pursue several initiatives. One is testing and deploying portable, mobile or air-based repeaters, which mitigate communications difficulties in high-rises. Additionally, the Department should pursue the deployment of permanent solutions that can resolve in-building communications issues in high-rises. FDNY should develop and seek adoption of a change in the city building code requiring large buildings and structures – existing and new – to support reliable in-building communications by first responders. While the new code should not require specific technologies, one possible solution could be installation of fixed, building-specific repeater systems. The city should consider establishing a subsidy system to give the owners of existing buildings incentives to expedite compliance with the new building code.

Additionally, the Department should assess, as an alternative, whether the city should build and operate a citywide radio infrastructure capable of meeting all or most of its in-building communication needs.

Moreover, the FDNY should seek to work with the NYPD to understand whether and how the NYPD's extensive citywide communications network infrastructure can be leveraged to support the FDNY's communications needs.

In subways, the FDNY could use portable repeaters as a limited, interim solution. It should also investigate using the new Police Radio System for the subways that is being deployed by the Metropolitan Transportation Authority. (This system is not due for completion until December 2004.)

When FDNY units are in tunnels, they cannot communicate with the Dispatch center, so they risk missing assignments or important information while traveling to emergencies. Communication between firefighters in tunnels is also unreliable. For the four major auto tunnels, we recommend the Department seek agreement with the MTA and Port Authority of New York and New Jersey to coordinate the evaluation and deployment of technology that would provide ubiquitous and reliable coverage in tunnels.

Finally, the FDNY should review the EMS communications practice of using one radio frequency for both its command and citywide channels. This dual use contributed to severe radio traffic congestion on September 11. The Technology Steering Committee should:

- ¶ Conduct a detailed evaluation with EMS Operations to determine if separate or additional channels are needed and how they might be deployed.
- ¶ Put in place training and procedures to ensure that EMS personnel adhere strictly to radio communications protocols.

2.2) Improve the Department's ability to receive and disseminate critical information about incidents. The Department must provide chief officers on the scene of any major incident with critical information about the overall situation. The FDNY has already taken an important step by working with the NYPD on protocols to put an FDNY chief officer in a police helicopter when the FDNY feels it would be helpful to manage incidents. FDNY should also pursue agreements with the NYPD and local media to obtain live video feeds from their helicopters, in addition to two-way voice communications with those helicopters.

FDNY should also continue to re-evaluate the organization of the EMS Dispatch Center, where operators became overwhelmed with tasks during September 11. The Department should consider whether operators should continue to perform multiple tasks or focus on specialized, functionally defined tasks.

In addition, FDNY should ensure that personnel at the Fire Department Operations Center (FDOC) have the capability to receive, synthesize and communicate information from multiple sources, in particular other agencies such as the NYPD. For example the FDOC should monitor transmissions on key NYPD radio channels and it should receive copies of the data messages that the 911 call center and the NYPD send by computer to EMS Dispatch.

2.3) Give chief officers at incident scenes better ways to manage information and track personnel. The Department should evaluate electronic command boards to

replace the current magnetic boards. Electronic boards would give chief officers better ways of managing incident information because these boards can store and display on a screen maps, building plans, procedures, and location characteristics. In addition, they could improve the chiefs' ability to record the location of deployed personnel and perhaps provide for wireless transmission of that data to create a remote backup.

2.4) Improve EMS's ability to track patients during incidents. The Technology Steering Committee and EMS Operations should evaluate the deployment of technology and associated procedures to ensure that a flexible patient tracking process capable of supporting large multiple casualty incidents is in place.

### **Enhance the system to provide family and member support services**

Family and member support services include notifying specified emergency contacts or families if a Department member is injured, killed or missing on duty, and providing counseling and other services to affected families and Department members. The events of September 11 created a need for support services vastly greater than the Department's capabilities. We recommend that the Department establish a flexible infrastructure and process that would provide these services efficiently and reliably should such a large-scale need ever arise again.

This new system would be created and managed by a Support Services Committee. The committee would keep up-to-date emergency contact names for all FDNY personnel, lists of trained peer counselors and information on specialized service providers. It would also provide plans for quickly deploying the necessary support infrastructure in case of a large emergency, and it would mobilize to deploy and manage that infrastructure. An internal FDNY task force has started to develop guidelines for such plans and infrastructure. We recommend the Support Services Committee complete these guidelines and deploy the new infrastructure and process, after receiving input from the Family Advisory Board and unions.

### **ADDITIONAL ISSUES TO BE ADDRESSED**

The recommendations in this report focus on changing internal FDNY procedures, technology, management processes and organization to better prepare for major incidents. However, we believe the Department cannot do the critical job of enhancing preparedness alone.

To truly improve New York City's preparedness, emergency services and other public safety agencies must plan and execute their response to major incidents together.

The FDNY and NYPD have taken a few important first steps towards improving coordination, such as working on a protocol to post a fire chief in an NYPD helicopter, exchanging liaison officers, and conducting regular meetings of senior NYPD and FDNY personnel. But for the FDNY and the city to be fully prepared to face the threats posed by terrorism and other major incidents, the city or state governments must establish a much broader, detailed and more formalized inter-agency planning and coordination process. This process would have the FDNY and NYPD as major participants, along with a number of other city, regional, state and federal agencies. The process would include:

- ¶ Establishment of common command and control structures and terminology, and agreement on the roles and responsibilities of each agency for managing the response to any incident.
- ¶ Deployment of interoperable communications infrastructures and protocols to improve response coordination and exchange of information.
- ¶ Implementation of joint training exercises to ensure that agencies can and will cooperate effectively during incidents, e.g., by operating under a unified command and control structure.

In addition, an inter-agency planning process would help agencies develop and deploy detailed, consistent and complete citywide emergency response plans for different types of threats and hazards.

Finally, the process would help ensure that the FDNY and all agencies likely to be involved in hazmat incidents understand each other's responsibilities, have the resources necessary to meet those responsibilities and respond to these incidents cohesively and effectively.

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The attack on the World Trade Center has created a new urgency for the Fire Department to improve its preparedness. We believe that, if the recommendations in this report are implemented, they will protect civilians and firefighters from injury and loss of life, and will minimize property damage, if the city ever again has to face a crisis like it did on September 11.

