Introduction

The World Trade Center tragedy on September 11, 2001 was unparalleled in nature and magnitude. Never before had anyone intentionally flown commercial jetliners carrying thousands of gallons of fuel into a skyscraper. Never before had such buildings been so severely damaged by explosion and fire that they collapsed to the ground. Never before had a single terrorist act caused such a massive loss of life – 2,823 people in all. It was the worst terrorist attack in the history of terrorism.

In the aftermath of this extraordinary event, the enormous heroism of the members of the Fire Department of the City of New York stands out as an inspiration in the face of calamity. Three hundred forty-three FDNY personnel sacrificed their lives while trying to save others. They facilitated the safe evacuation of more than 25,000 people, the largest rescue operation in United States history.

This tragedy has reshaped our expectations about future threats and created a new urgency to increase preparedness. Many people believe that more large terrorist attacks on the United States are a certainty. The president and Congress are seeking to increase the nation's preparedness through a massive reorganization of homeland security agencies. The state, the city, and the FDNY must also take steps to prepare for the future.

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. To do this, we studied the Department's response to the attack on September 11 in detail. Our goal was to learn from this incident and to define specific recommendations that the Department should implement. We did not attempt to reconstruct an exhaustive, minute-by-minute history of what the Department and its members did and did not do as they responded to the incident.

As our work progressed, we found many examples actions by FDNY personnel that saved lives, but we focused on identifying procedures, organization, and technology that should be improved to increase the Department's preparedness in the future.

Our team conducted more than 100 interviews with FDNY personnel who responded to the attack. We also examined the transcripts of hundreds more interviews that the Department conducted internally, and we reviewed a large number of dispatch records and about 60 hours of communications tapes. Throughout our effort, we had unfettered access to FDNY records and personnel, including the Fire Commissioner, his staff and all senior operations personnel. We spent more than 1,000 hours working closely with FDNY personnel who

responded to the World Trade Center attack, and with personnel who will be involved in implementing the recommendations of this report.

We also spoke with more than 100 experts in the United States and abroad, including those in other fire departments, emergency agencies and the military, as well as researchers and technology vendors. This helped us understand the diverse methods and best practices used around the world in responding to major disasters.

During the last three months of this effort, multiple FDNY task forces, involving about 50 Fire and EMS personnel (see Exhibit 1), joined us to develop detailed recommendations for change on a broad set of issues. Many of these recommendations were based directly on work and ideas that the FDNY developed. Even as this report was being prepared, several recommendations were already being implemented.

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

The Fire Department now faces two major challenges: implementing the recommendations successfully and helping the city improve its inter-agency planning and coordination. Implementing these recommendations will bring about substantial change in the Department, requiring a renewed commitment to leadership, accountability, and discipline. But internal change is not enough. The FDNY and other government agencies must improve inter-agency planning and coordination if they are to fulfill their mission to protect the citizens of New York City. The last section of our report discusses this challenge.

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The response to the World Trade Center attack was tremendously complex. We hope that this report will help the Fire Department, the city and the country be better prepared should we ever be forced to face such a crisis again.

Report Organization

This report has four parts.

Part I is a summary of the key events of the FDNY response on September 11, including events related to command and control, communications, and resource deployment. It has separate sections on the response by Fire and EMS personnel.

Part II contains recommendations for the FDNY across four areas:

Operations: Broader deployment of the Incident Command System, development of the Fire Department Operations Center, creation of Incident Management Teams, improvement of recall, mutual aid and staging processes, and expansion of hazardous materials capabilities.

Planning and Management: Improvement of planning and management processes.

Communications and Technology: A new process to identify the Fire Department communications and technology needs, and test, acquire and deploy solutions. Also, solutions to a number of urgent needs concerning communications, personnel tracking and information management.

Family and Member Support Services: Enhancing the system for notifying families of injured or deceased personnel and providing counseling services to personnel and their families.

Part III contains a discussion of additional issues to be addressed, including inter-agency coordination and joint planning.

Part IV contains exhibits that provide additional detail and graphic illustrations to support the material contained in Part I.

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.[1] 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[2] in the lobby of World Trade Center 1 (WTC 1) at approximately 8:50 a.m.

[1] 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.

[2] 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[3] and deployed units from WTC 1.

Chiefs designate staging areas

As the mobilization escalated, dispatchers instructed responding Fire units to report to staging areas[4] 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

[3] 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.

[4] 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[5] 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.

[5] 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 ordered 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, [6] 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.

[6] 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[7] 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,

[7] 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 [8] 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,[9] 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.

[8] The Planning and Management section of this report includes a series of additional recommendations for expansion of the Operational Planning Unit.

[9] 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.

* * *

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.

Emergency Medical Service response on September 11

This section describes the major aspects of the response of the FDNY's Emergency Medical Service (EMS) to the World Trade Center attack. It has three parts. The first describes how EMS officers at the scene exercised command and control and how EMS Dispatch personnel handled communications issues. The second deals specifically with how EMS officers deployed and managed resources and personnel. The third covers how they addressed planning and logistics issues.

COMMAND, CONTROL AND COMMUNICATIONS

On the morning of September 11, the EMS dispatcher for the Manhattan Central borough area was also handling all dispatch needs for the Manhattan South borough area, where the World Trade Center is located. Normally each borough dispatch area has its own channel and dispatcher, however, the channel usually dedicated to Manhattan South was not being used due to insufficient staffing levels at the Emergency Medical Services Dispatch Center at that time.

Upon confirmation that an airplane had flown into WTC 1, the Manhattan Central dispatcher immediately assigned ambulance units to the scene and transferred the incident to the EMS citywide dispatcher, in accordance with EMS protocols. These protocols require that multiple casualty incidents (i.e., those involving more than five patients) have a dedicated dispatcher. This also leaves the regular borough dispatchers free to concentrate on activities within the borough not related to the incident. EMS personnel assigned to a multiple casualty incident are directed to switch their radios to the citywide channel.

Command is established

Protocols for responding to multiple casualty incidents covering a large area such as the World Trade Center require that commanders establish geographic areas at the scene called divisions. Within each division, one or more EMS activities take place: staging of EMS units, patient triage, treatment, and transportation to a hospital. Each of these functions is known as a sector within each division.

At approximately 8:53 a.m., Conditions Car 042,[23] the first responding EMS officer, established EMS operations outside WTC 1 near West Street. EMS personnel established an initial staging and triage area at 8:55 a.m. on West Street across from WTC 1. Shortly thereafter, this staging area was relocated to the corner of West and Vesey Streets (see Exhibit 4).

The Assistant Chief of EMS Operations (Car 6A, the second highest-ranking EMS officer) arrived at the incident at approximately 9:01 a.m., and assumed the position of EMS Command, making him responsible for managing the overall EMS response to the incident. He assigned Conditions Car 042 to establish a division on Church Street and decided to move the EMS Command Post to the lobby of WTC 1, next to the Incident Command Post (ICP) that had been established by Fire Operations. (FDNY protocols require that EMS Command report to the Incident Commander. See Exhibit 12 for an EMS command and control events timeline.)

However, as EMS Command moved into the lobby of WTC 1, he was not immediately aware that the FDNY Incident Commander (the Chief of Department) was moving the ICP to the far side of West Street, in front of 2 World Financial Center.

Upon notification of the ICP move, EMS Command, at 9:20 a.m., assigned the EMS Division 3 Chief[24] (Car 63) to be the EMS Operations Chief for the incident and to report to the new ICP. (The job of Operations Chief entailed tracking EMS resources and assisting EMS Command.) EMS Command joined Car 63 at the ICP at approximately 9:30 a.m.

As more EMS officers and personnel arrived at the incident, additional divisions and sectors were established. Around 9:10 a.m., the Chief of EMS Operations (Car 6) began setting up a division south of the World Trade Center complex. It was fully functional by 9:45 a.m. and was referred to as the South End Division; however, Car 6 experienced radio communications difficulties and was unable to communicate the existence of this division.

By 9:11 a.m., the staging and triage sectors at West and Vesey Streets had expanded to become part of a geographic division known as the Vesey Division. The Liberty Division was established on Liberty Street at about 9:20 a.m. The Chief of Planning (Car 4P) established a WTC 7 Division at around 9:30 a.m. By

[23] Some FDNY personnel have radio designations that use the term "Car," followed by numbers and/or letters. A "conditions car" is a designation for an EMS officer who supervises field operations within a specific area of the city.

[24] An EMS division chief has command responsibility for a larger geographic area of the city. This type of division is distinct from the divisions that EMS officers establish at multiple casualty incidents and from Fire Operations Divisions.

this time there were five divisions: Vesey, Church, South End, Liberty and WTC 7. (See Exhibit 13 for the incident organization timeline and Exhibit 14 for the initial EMS organization chart.)

Communications difficulties emerge

EMS chiefs responding to the incident had difficulty communicating over the radio due to the large volume of radio traffic. This impeded their ability to gain awareness of the overall situation at the scene. The radio problems may have been partly caused by the way EMS uses its radio frequencies.

EMS uses the same frequency for two communications channels: command and citywide. The command channel is used for point-to-point communication among EMS Chiefs and officers at an incident, while the citywide channel is used for communication among EMS personnel and Dispatch across the city. Transmissions on the command channel can only be heard on radios in the vicinity of the person transmitting. However, transmissions on the citywide channel can be heard throughout the city on both that channel *and* the command channel. This is done through the use of a citywide repeater system that receives transmissions from individual radios and repeats them over more powerful transmitters. Consequently, an EMS radio tuned to the command channel will receive all traffic on that channel in its immediate vicinity, in addition to all traffic on the citywide channel.

In order to relieve radio congestion, the Manhattan South Borough channel was opened at 9:45 a.m. for radio transmissions between EMS Dispatch and ambulances responding to the incident. The citywide channel was dedicated solely for communications among chief officers and supervisors coordinating the response. However, many units did not tune their radios to Manhattan South and continued to operate on the citywide channel. This contributed further to communications congestion and degraded the chiefs' ability to communicate, as dispatchers were continually repeating to units the order to switch to Manhattan South. The congestion problem was exacerbated by a number of ambulances that repeatedly asked to be dispatched to the incident.

EMS dispatchers were overwhelmed with tasks

In New York City, calls to 911 for medical help are answered initially by the 911 call center (which is managed by the NYPD), and then connected to EMS dispatchers. The 911 operators can communicate information to EMS via two methods: telephone or a data link called the Special Police Radio Inquiry Network (SPRINT). Usually, 911 operators, EMS and Fire dispatch operators try to communicate by phone to exchange urgent and/or complex information.

EMS dispatchers, in addition to handling incoming information from the 911 call center, are also responsible for assigning ambulances to incidents, communicating with chief officers and ambulances over the radio and the phone, monitoring incident information from multiple sources and handling other telephone calls.

On September 11, EMS dispatchers were dealing with a high volume of information, a very large number of responding units, a complex incident response, and a myriad of communications difficulties. As a result, they were overwhelmed, limiting their ability to synthesize information and disseminate it effectively.

Information flow to incident commanders was limited

In the section of this report on the response of FDNY Fire Operations, we cited several examples to show that the Incident Commander and senior chiefs had a limited amount of information available to them as they made important decisions. An additional example comes from a series of events that followed a phone call to 911 from a person in WTC 2 a few minutes before that tower collapsed. These events illustrate the urgent need for the city to increase the level and accuracy of information exchange and dissemination within and across emergency response agencies.

At 9:37 a.m., a male caller from the 105th floor of WTC 2 phoned 911 and reported that floors beneath him "in the 90-something floor" had collapsed. The 911 operator typed a record of the call into the SPRINT system at 9:41 a.m. That record mistakenly stated the gender of the caller as female and it was unspecific about the location of the collapsed floors.

The SPRINT system automatically forwarded the record to the computers at the EMS Dispatch and NYPD Dispatch centers. Our review of the SPRINT records showed that it was among thousands of SPRINT records that the EMS Dispatch computers received that morning.

The EMS Dispatch computer system received the record at 9:47 a.m. It read as follows:

"09:47:15 Supplement-PD (T70) ..sts 2 World Trade Cntr...Flr 105....sts floor underneath her...collapse..."

This record was not read by anyone at EMS Dispatch at the time because it was categorized as a "supplement message." Supplement messages are received by the EMS computer system and automatically added to a "job record," which is a record of events relating to a particular incident. EMS Dispatch operators are not expected to review supplement messages during incidents and never do so.

Therefore, under normal operating procedures, there is no reason this message would have been seen by anyone at EMS.

The SPRINT system also sent the record of this call to the NYPD Zone 1 dispatcher,[25] who interpreted the words "sts underneath her … collapse" as meaning that the floor that the caller was on was collapsing. At 9:42 a.m., this dispatcher broadcast a message on the NYPD Zone 1 radio channel stating, "106th floor of WTC2 has collapsed or is collapsing, on authority of female on 106th floor." Clearly, this broadcast was an inaccurate representation of the contents of the original call.

Upon hearing the 9:42 a.m. radio announcement, the NYPD Zone 1 dispatch supervisor created a new SPRINT record indicating that the 106th floor was collapsing. This record was forwarded to three places: the NYPD Special Operations Division (SOD) dispatcher, EMS Dispatch and the PD's traffic division. The SOD dispatcher received this new record just before 9:52 a.m. and broadcast a message over the NYPD's SOD frequency as, "106th floor of WTC2 is crumbling."

This record was also received at EMS Dispatch just before 9:52 a.m. It read:

"09:51:39 PDEMS (BO1A) Floor of 106 Floor of 2 World Trade Center in (sic) collapsing."

This message was categorized as a "PD-EMS" message, which means that, under normal circumstances, it would have been handled differently at EMS Dispatch than the earlier supplement message, and would have been reviewed by EMS Dispatch personnel.

On the morning of September 11, however, EMS dispatchers were asked to handle an enormous volume of calls and perform many extraordinary tasks under extreme pressure. This message arrived while EMS dispatchers were handling telephone and radio calls from dispatched units seeking further instructions, units that had not been dispatched, off-duty workers, hospitals, and personnel in the field having trouble with radio communication who called dispatchers on the phone.

We believe that EMS Dispatch operators did not have the time to review either the supplement message or the PD-EMS message before the collapse of WTC 2 at 9:59 a.m. We also believe that neither Fire Dispatch nor any senior Fire or EMS chiefs received the information in these messages.

[25] Zone 1 includes the area around the World Trade Center.

WTC 2 collapse impairs EMS command structure

WTC 2's collapse at 9:59 a.m. destroyed the EMS Command Post, which was next to the Incident Command Post on West Street. The EMS divisions and sectors that had been established prior to the collapse were dispersed as personnel evacuated the area and sought shelter in surrounding structures. Chief officers at the ICP also sought shelter in nearby structures. In the absence of ranking chief officers, the EMS Communications Officer, previously located at the ICP, recommended to EMS Dispatch that command be transferred until resources could regroup. However, EMS Dispatch was unable to immediately act on this for two reasons: 1) It is not a normal procedure to transfer command via Dispatch and; 2) It was unclear at that point in time who was available to assume command.

The overall command structure of EMS operations was unclear to EMS members and FDNY command for about one hour after WTC 2 collapsed. EMS Dispatch was unable to account for or contact EMS Command or any other senior personnel. EMS personnel had difficulty with multiple means of communication including portable radios (handie talkies), mobile radios, mobile phones and fixed line phones. Interviewees told us that no means of communication worked reliably immediately after the collapse.

Starting at approximately 10:09 a.m., a Division 2 Deputy Chief (Car 621) made repeated requests to Dispatch to conduct a roll call to determine the command structure and location of any chiefs. However, Dispatch was unable to conduct such a roll call because there was too much radio traffic following the collapse of WTC 2. At 10:29 a.m., WTC 1 collapsed, prolonging and exacerbating command, control and communications difficulties.

EMS chiefs and officers regroup

Approximately ten minutes after WTC 1 collapsed, several senior EMS chiefs and officers converged by chance in an area near the Embassy Suites Hotel, located at Vesey Street and North End Avenue. These chiefs held an impromptu meeting in the lobby of the hotel to discuss operations strategy, resource deployment and the safety of EMS personnel. Two primary decisions were made at this meeting:

- Car 6A and Car 6C (the Tour 1 EMS Chief Officer) would proceed to One Police Plaza, on the assumption that responding agencies would be coordinated from that location, given the destruction of the city's Office of Emergency Management (OEM) offices at WTC 7.
- EMS resources would be re-deployed to establish two divisions, one at Chelsea Piers and one at the Staten Island Ferry Terminal. The chief officers divided EMS personnel and ambulances located at West and Vesey Streets into two groups and assigned them to these new divisions, which were established by approximately 10:55 a.m.

While the chiefs and officers in the Embassy Suites hotel lobby set about the tasks decided on at their meeting, they were unable to communicate their actions to Dispatch.

Unknown to those chiefs and officers, other EMS chiefs had already established additional EMS divisions elsewhere. Car 6 and Division Chief 5 (Car 65) established a division at Robert F. Wagner Jr. Park at 10:27 a.m.[26] In addition, Car 621 designated the Brooklyn side of the Brooklyn Bridge as a new division at 10:36 a.m. During this time, many EMS personnel remained unaware of who was serving as overall EMS Command.

Command restored, but communications problems continue

Shortly before 11:00 a.m., Car 621 informed Dispatch that he was prepared to assume EMS Command from the Brooklyn Bridge, which was the closest point to his location that was clear of dust and debris. However, at that exact time, the Chief of Planning (Car 4P), a higher-ranking officer than Car 621, assumed EMS Command at West and Chambers Streets, alongside fire chiefs who were relocating the ICP there.

Car 4P, also unaware of the establishment of divisions at Chelsea Piers and Staten Island Ferry Terminal, immediately established a division at West and Chambers Street. (See Exhibit 15 for the post-collapse EMS organization chart.)

At 11:09 a.m., EMS Dispatch conducted a roll call of chiefs at the scene. At this time, Car 661 responded and provided an update on the steps that were being taken to set up the divisions at the Ferry terminal and at Chelsea Piers. At 11:48 a.m., telephone communications between EMS Dispatch and One Police Plaza were re-established. However, communications between Dispatch and the Chelsea Piers and Staten Island Ferry Terminal divisions were not established for several more minutes, continuing to hinder the coordination of operations.

Shortly before noon, Car 4P, in his capacity as EMS Command, conducted another EMS chief roll call to determine the locations of chiefs, divisions and sectors. At that time, he was informed of the locations of all operating divisions and the location of senior personnel at One Police Plaza.

Subsequently, Car 4P asked Car 63 (the Division 3 Chief) to assume EMS Command. Car 63 did so at approximately 2 p.m., upon his arrival at the relocated ICP at West and Chambers Streets.

[26] This division merged later with the division established at the Staten Island Ferry Terminal.

At approximately 6:00 p.m., Fire Operations moved the ICP to the corner of West and Vesey Streets, several blocks closer to the WTC site. The EMS Command Post remained at West and Chambers due to safety concerns (e.g., EMS personnel did not possess full protective clothing). However, an EMS liaison officer operated at the relocated ICP and reported to EMS Command.

At approximately 5:00 p.m., at Car 6's request, EMS chiefs held a second face-to-face meeting at the EMS Command Post. They discussed the status of the response, the strategy for ongoing operations, and safety issues. They also discussed strategies to provide staffing for the incident and the 911 system, to ensure that citywide EMS coverage was maintained.

RESOURCE DEPLOYMENT AND MANAGEMENT

FDNY's EMS resource commitment to the World Trade Center incident was, of course, extensive. About 30 percent of the 354 ambulances available that morning in the city's 911 emergency ambulance system were deployed. Deployments peaked at around 1:00 p.m., as units began to return to regular service. The resources committed to the incident included:

- 14 municipal and 23 voluntary[27] Advanced Life Support (ALS) units, or 33 percent of all ALS units on duty in the 911 emergency ambulance system.
- 51 municipal and 18 voluntary Basic Life Support (BLS) units, or 29 percent of all BLS units on duty in the system.
- 24 out of 31 EMS lieutenants and captains on duty.
- 15 out of 17 EMS chiefs on duty (See Exhibit 16).
- An unknown number of mutual aid units.
- An unknown number of volunteer/freelance units.
- An unknown number of volunteer medical professionals.

Incident's scope hindered resource management

During the initial phase of the response, senior EMS chiefs used a magnetic command board to track deployment of EMS resources. Car 6C set up the board

[27] Ambulances that do not belong to FDNY but participate in NYC's 911 emergency ambulance system. Many are operated by hospitals.

at 9:23 a.m. at the EMS Command Post on West Street, but the board was lost at 9:59 a.m. when WTC 2 collapsed.

A large number of other events complicated EMS efforts to manage personnel and other resources responding to the incident.

- Normally, EMS personnel who are arriving for duty log into the EMS Computer-assisted Dispatch (CAD) system with their radio number and ambulance unit number. The system then keeps a record of all assignments, recording their name, shield number, assigned ambulance, and tour number. In this incident, some personnel responded without radios, and therefore personnel tracking information was incomplete. This hindered efforts to determine who was operating at the incident after the collapses.

- A large number of ambulances that are not part of the 911 emergency system, volunteered and/or self-deployed to the incident (i.e., without coordination and direction of EMS Command or EMS Dispatch), which degraded the FDNY's ability to maintain control.

- Several EMS units requested to be dispatched to the incident repeatedly or self-dispatched without permission from a dispatcher, and several EMS units responded with additional personnel who had responded to the recall.

- A recall of EMS personnel was announced through several radio and TV stations early in the incident. Who, if anybody, made the decision to recall all EMS personnel remains unclear. In all likelihood there was confusion or misinterpretation whether EMS personnel were also being recalled when the Chief of Department recalled all Fire personnel. EMS had never conducted or trained for a total recall and did not have a recall procedure.

- Civilians requiring medical assistance flagged down ambulances en route from their staging areas to their assignments. Several of these ambulances could not or did not communicate with their staging areas to request that another unit be given their original assignment. Instead, they informed EMS Dispatch of the fact that they were not proceeding to their original assignment. This required EMS Dispatch to assign additional units from the citywide resource pool to the incident so that the diverted ambulance's assignment could be filled.

- ¶ Numerous medical personnel phoned EMS Dispatch offering to volunteer their help. Some volunteering medical personnel, whose credentials had not been verified, went directly to EMS staging areas. This taxed onsite operations as the responsibility of verifying credentials was shifted to EMS officers operating at the scene.

From 9:59 a.m. until at least mid-afternoon on September 11, EMS chiefs and officers did not have an accurate view of the number and location of resources deployed to the incident, including on-duty EMS personnel and equipment, volunteer ambulances, off-duty members and volunteer professionals responding to the incident.

Ad hoc efforts were made to re-establish EMS resource and personnel tracking, such as the radio roll calls requested by the Car 621 and Car 4P in order to ascertain the status and locations of EMS chiefs. Also, officers who were supervising various divisions created handwritten reports on the number of units at their respective locations. In addition, the EMS Resource Coordination Center collected personnel data from battalions, and battalions called homes of unaccounted-for members to determine their whereabouts.

The chiefs' ability to manage resources was also hindered by the fact that their span of control was significantly stretched.[28] During the response to the incident, interviewees reported that, in some cases, the span of control increased to as much as one chief/officer to 20 EMTs/paramedics, well above the ratio of one-to-seven that senior EMS chiefs believe is the maximum that will ensure that command, control and quality of care are maintained.[29]

Efforts made to ensure Citywide coverage

A number of EMS officials made efforts to ensure adequate emergency medical coverage throughout the city and at the World Trade Center incident. At 9:07 a.m., EMS Dispatch contacted the city Office of Emergency Management (OEM) and requested activation of the regional mutual aid plan. OEM activated the plan, and mutual aid ambulances from the New York region did respond to the WTC. However, administration of the plan was hindered when OEM personnel had to evacuate their headquarters at WTC 7.

At 9:08 a.m., an EMS officer directed Dispatch to contact the EMS Academy at Fort Totten and ask all qualified EMS personnel there to stand by for deployment.

[28] Span of control refers to the number of personnel that each officer is managing simultaneously.

29 The New York State Emergency Management Office recommends that the Incident Command System deployed by emergency responders maintain the span of control between three and seven.

Those personnel did later deploy and were transported to the World Trade Center in buses.

At 11:42 a.m., EMS, in conjunction with other agencies at One Police Plaza, requested state and federal assistance to include the Disaster Medical Assistance Team and the Disaster Mortuary Operational Response Team.

At 12:35 p.m., EMS dispatch started to release EMS units committed to the incident back into the 911 resource pool.

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. Instead, EMS personnel focused on transporting victims to the hospital as fast as possible.

PLANNING AND LOGISTICS

On September 11, EMS officers made no formal, explicit assignments of planning and logistics functions. At the division level, informal planning occurred throughout the response. For example, resource assignments later in the day were calculated with the consideration of the city's overall need for emergency medical services. Formal planning at the command level occurred only twice: once at the face-to-face meeting of chiefs at the Embassy Suites Hotel in the morning and once at the chiefs' meeting at the ICP around 5 p.m.

The Division 4 Chief (Car 64) initiated informal pre-staging of logistical units (e.g., Major Emergency Response Vehicles (MERVs) and borough supply) before the collapse**,** but the overall difficulties that commanders had in tracking resources throughout the emergency limited the effectiveness of the pre-staged logistical units. (See Exhibit 18 for a planning and logistics timeline.)

In addition, managing corporate and public donations proved challenging in the days following September 11. Large amounts of resources were donated to EMS by multiple sources, but the supplies often did not match the supply needs of the units.

FDNY Fire Operations response on September 11

This section of our report describes the major aspects of the response of FDNY Fire Operations to the World Trade Center attack. It has four parts. The first describes how FDNY commanders exercised overall command and control of fire operations at the scene. The second deals more specifically with how those commanders deployed and managed personnel and resources. The third describes how the Fire Department handled planning of its resource requirements on September 11 and afterwards, and how the Fire Department managed logistics (i.e., deployment of supplies and equipment). The fourth discusses the challenges faced by the Department as it sought to support and counsel its members and their families in the aftermath of September 11.

COMMAND, CONTROL AND COMMUNICATIONS

The FDNY's response to the attacks of September 11 began at 8:46 a.m., the moment that American Airlines Flight 11 crashed into Tower 1 of the World Trade Center (WTC 1).

Command is established

The Battalion Chief assigned to Battalion 1 (B1)[10] witnessed the impact of the plane from the corner of Church and Lispenard Streets. He immediately signaled a second alarm[11] and proceeded to the World Trade Center. En route, B1 requested additional resources by transmitting a third alarm at 8:48 a.m.

B1 informed the FDNY Communications Office (Dispatch) that the corner of West and Vesey Streets, one block north of WTC 1, would be the designated staging area for third alarm units.[12] B1 arrived at WTC 1 at approximately 8:50 a.m. As the first responding chief, he established the Incident Command Post

[10] A battalion is a collection of FDNY resources or "units" (e.g., engine and ladder companies) responsible for a geographical area of the city. Four to five firefighters and one officer generally comprise a unit. Five to eight units comprise a battalion. Four to seven battalions comprise a division. The World Trade Center was located in Battalion 1's response area within Division 1. "B1" and similar codes used in this document are radio designations.

[11] Alarms correspond to the number and type of units deployed to an incident. A second alarm in a high-rise building typically deploys 19 pieces of apparatus and 11 chiefs. Third, fourth and fifth alarms deploy additional resources.

[12] A staging area is a resource management area in close proximity to an incident. It is standard FDNY procedure to stage units assigned to third alarms and above. Units that are directed to stage are expected to respond to the staging area and await further deployment instructions.

(ICP) in the lobby, per FDNY's high-rise firefighting procedures.[13] In approximately 10 minutes, from 8:50 a.m. to about 9:00 a.m., Incident Command was established and passed (according to protocol) from B1 to the First Division Chief (D1) to the Citywide Tour Commander 4D (CWTC-4D)[14] and finally to the Chief of Department (COD) (see Exhibit 2 for a command and control timeline).

At approximately 9:00 a.m., the Incident Commander moved the Incident Command Post from the lobby of WTC 1 to the far side of West Street (an eight-lane highway) opposite WTC 1, because of the increasing risk from falling debris within and around the lobby and other safety concerns. Chief officers considered a limited, localized collapse of the towers possible, but did not think that they would collapse entirely. The command post in the lobby of WTC 1 became the Operations Post[15] (OP-1) for WTC 1, reporting to the ICP. This Operations Post was managed by senior chiefs and was responsible for all operations in WTC 1, including the assignment of units to search and rescue operations in that building. It was necessary for the chiefs to remain in the lobby so they would have direct access to important building systems, such as controls for alarms, elevators, and communications systems.

The Field Communications Unit (Field Com) set up operations at the West Street ICP at approximately 9:15 a.m., in accordance with protocols. This unit was responsible for tracking the location and job assignment of all resources at the incident (e.g., which units responded to which alarms and which units were assigned to each tower). Field Com was also responsible for coordinating the assignment of additional units to the incident with Dispatch, upon request by the Incident Commander.

Our interviews with the chief officers in charge of the Operations Post in WTC 1 indicated that, early in the response, they decided that operations in WTC 1 should focus on search and rescue of injured and trapped civilians. The chiefs dispatched units from the lobby of WTC 1 to higher floors in two situations:

- In response to specific distress calls (e.g., people stranded in elevators, trapped in rooms, or hurt who would either call 911 or contact OP-1 directly through WTC 1's internal telephone system).
- To ensure that floors below the fire had been totally evacuated.

[13] An Incident Command Post is the location from which all aspects of an incident, including operations, logistics, and planning are managed.

[14] The 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.

[15] An Operations Post is where operations are led for one component of the incident.

Units arriving at the lobby of WTC 1 checked in with the chief officers at the Operations Post for their assignments. Chief officers sent these units up into the building in a controlled, orderly way.

Before 9:00 a.m., D1 and B1 directed Port Authority personnel to evacuate surrounding buildings as a precautionary measure.

Plane hits WTC 2

At 9:03 a.m., United Airlines Flight 175 hit World Trade Center Tower 2 (WTC 2). Resources were immediately deployed to WTC 2 from the West and Vesey staging area and WTC 1. CWTC-4B, in coordination with the Incident Commander and chiefs in command of OP-1, established an additional Operations Post in the lobby of WTC 2 (OP-2), reporting to the Incident Commander. As at WTC 1, we believe that chiefs sent units arriving at WTC 2 up into the building in a controlled, orderly way.

Chiefs designate staging areas

As the mobilization escalated, senior chiefs established staging areas near the World Trade Center. However, as units approached, many failed to report to these areas and instead proceeded directly to the tower lobbies or to other parts of the incident area (see Exhibit 3 for a staging timeline).

For instance, early in the response B1 designated the corner of West and Vesey Streets as the staging area for third alarm units. Starting at 8:53 a.m., Dispatch sent radio instructions to these units to stage at West and Vesey. At 8:57 a.m., the Chief of Department, while still en route to the incident, requested the assignment of a staging chief to coordinate activities at West and Vesey. He then issued a fifth alarm for WTC 1 and responding units were instructed to report to this staging area.

At 9:12 a.m., the Chief of Department issued a fifth alarm for WTC 2 and at approximately 9:16 a.m., the corner of West and Albany Streets (two blocks south of the World Trade Center) was designated as the staging area for WTC 2. All units responding to that fifth alarm were directed by Dispatch to stage there. Citywide Tour Commander CWTC 4E assumed command of that area as the staging chief.

However, it is unclear whether all units received Dispatch's radio transmissions instructing them to stage because the units were not explicitly asked to confirm receipt of the transmission and they did not acknowledge the messages. Some

units responding to WTC 2 from Brooklyn may have been in the Brooklyn-Battery Tunnel, out of the reach of the Dispatch's radio communication and Mobile Data Terminal[16] (MDT) systems, when the staging directions were transmitted.

As units converged on the scene and civilians were evacuated, there was traffic congestion and gridlock in the area. Several units traveling from the north had difficulty getting to their staging area south of the towers. Our interviews and reviews of dispatch tapes suggest that several responding units were unable to reach their staging areas with their apparatus and therefore proceeded on foot directly to the tower lobbies.

Among those units that failed to report to the West and Albany staging area were those responding to the fifth alarm for WTC 2. Interviews indicated that several units (probably including those responding to this fifth alarm) traveled past this staging area on their apparatus. After waiting approximately 23 minutes for adequate resources to arrive at the West and Albany staging area, CWTC-4E issued an additional second alarm for WTC 2. Units responding to this additional second alarm did report to the staging area.

At 9:47 a.m., the Incident Commander requested additional resources and issued a third fifth alarm for the incident. Units were directed to respond to the West and Vesey staging area.

The lack of staging had several effects.

- ¶ Chief officers on the scene, the Field Communications Unit, and Dispatch could not accurately track the whereabouts of all units.
- ¶ Units that failed to stage may have not received necessary information and orientation before going into the towers. As a result, several companies that were not from surrounding battalions had problems differentiating WTC 1 from WTC 2. Interviews with chief officers in command of the WTC 1 Operations Post indicated that several units that arrived there asked for confirmation of whether they were in the lobby of WTC 1 or WTC 2.
- ¶ If units had staged according to protocol, other units that were dispatched to the WTC might have been kept instead in the citywide pool. For example, the additional second alarm issued by CWTC-4E led to the dispatch of eight additional units to the incident.

[16] A Mobile Data Terminal is a computer screen and printer in an apparatus (e.g., engine or ladder truck) that can receive and send data such as deployment instructions and confirmations.

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 on these radios do support some, albeit unreliable, communications in high rises. Therefore, the chiefs decided to use their command and tactical channels[17] 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.

In attempts to improve their communications, chief officers tried to deploy the Department's mobile repeater and give units "standpipe phones" that could be connected to boxes along the building's standpipe system. These were all ineffective. Chief officers in WTC 1 had some success in getting information to units in high floors by instructing units in lower floors to relay messages to them.

When WTC 2 was hit, several chiefs who were in WTC 1 proceeded to that building, but first they coordinated with other chiefs the selection of command and tactical channels for the different towers.

[17] 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 both towers also had very little reliable information about what was happening outside the towers, beyond their communications with the ICP. 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.

Threat of third plane is announced

At approximately 9:30 a.m., personnel in the lobby of WTC 1 heard an unconfirmed report of a threat from a third plane. Due to this announcement and communications problems that were constraining command and control capabilities, CWTC-4D broadcast over the FDNY tactical radio channel assigned to WTC 1 an order to all FDNY members to come down to the lobby of WTC 1. There was no acknowledgement by officers or firefighters of the order.

Shortly after the order was given, chief officers in the lobby learned that the threat of a third plane was false. At this point, the chiefs continued the search and rescue operations.

Most of FDNY's senior leadership responds to scene

As the mobilization of personnel and resources grew, most of the senior uniformed and civilian leadership of the FDNY responded to the scene, including all senior Fire and EMS operations officers. Out of 32 staff chiefs and members of the executive staff,[18] 26 responded to the incident area, 22 of which arrived prior to the first collapse. Members of the executive staff who responded prior to the first collapse included the Fire Commissioner, Chief of Department, Chiefs of Fire and EMS Operations, and seven out of nine staff chiefs. The remaining two staff chiefs responded after the collapse of the towers.

The experience and leadership of these senior chiefs proved crucial to re-establishing command and control after the towers collapsed. However, had some senior 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

[18] The 32-member executive staff includes the civilian fire commissioners who are responsible for bureaus within the Department, along with the Chief of Department, Chief of Operations, the Chief Fire Marshall and the nine staff chiefs. Staff chiefs include the seven citywide tour commanders, the Chief of Safety, and the Chief of Fire Prevention.

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.

Many of the senior civilian FDNY staff members who responded to the scene had no role or responsibility in the response.

WTC 2 collapse destroys Command Post

The collapse of WTC 2 at 9:59 a.m. killed many civilians and first responders and destroyed the Incident Command Post on West Street and the Field Communications Unit. The collapse weakened the command and control structure as Fire and EMS chiefs at the ICP, including the Incident Commander, sought shelter in nearby structures.

However at OP-1, in the lobby of WTC 1, the collapse of WTC 2 was not immediately apparent. Our interviews indicate that many believed that a partial collapse within the lobby of WTC 1 had occurred or that the elevators or other debris had fallen into the lobby of WTC 1. The lobby of WTC 1 filled with blinding dust and debris and became untenable. In almost complete darkness, firefighters, officers, chiefs and civilians were forced to leave the lobby of WTC 1. Prior to searching for an exit for himself, B1 issued an order at approximately 10:00 a.m. over the portable (handie talkie) radio for all FDNY members to evacuate WTC 1.

Many firefighters and officers operating in WTC 1 informed us that they were unaware that WTC 2 had collapsed when they heard the order to evacuate. Also, firefighters and officers on upper floors never heard the evacuation order. In some cases, these firefighters were told by other firefighters that the evacuation order had been issued.

WTC 1 collapse impairs incident command

After the collapse of WTC 2, the Incident Commander and personnel operating at the Incident Command Post moved north on West Street toward Chambers Street. However, the Incident Commander along with other members of the command and executive staff returned to the incident area to assess the situation and were killed at 10:29 a.m. when WTC 1 collapsed.

Between 10:29 a.m. and 11:28 a.m., incident command and control was seriously impaired. Several factors complicated efforts to re-establish it. Dispatch and the staff chiefs were unable to determine which chiefs had survived the collapses, where they were, what resources were available in different sectors of the incident area, if there was an ICP, and who the Incident Commander was. In addition, radio communications were difficult due to the large numbers of transmissions, which included attempts to locate personnel, mayday calls and company units seeking orders. Several chief officers, including Division Chief 6 (D6), the Chief

of Fire Prevention, CWTC-4A and CWTC-4C, took the initiative to re-establish the incident command and control structure. This process led to the emergence of multiple, sometimes co-existing ICPs (see Exhibit 4).

Incident command reestablished

At the request of Dispatch at approximately 11:28 a.m., a single ICP was designated at West and Chambers when CWTC-4C assumed Incident Command (see Exhibit 5 for sample exchanges between Dispatch and responding chiefs and for sample, illustrative quotes from interviews regarding the re-establishment of command).

The ICP remained at West and Chambers until approximately 6:00 p.m. and was then moved to West and Vesey, closer to the incident area, where it remained until the morning of September 15. At that time, the ICP was relocated to Engine 10 and Ladder 10's quarters at 124 Liberty Street. On Monday, September 17, the ICP was moved to larger premises at Battalion 1, Engine 7 and Ladder 1's quarters at 100 Duane Street.

RESOURCE DEPLOYMENT AND MANAGEMENT

The response of FDNY Fire Operations 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. In the first three hours alone, 121 engine companies, 62 ladder companies, and 27 fire chief officers were assigned to the incident.[19] This corresponds to 61 percent of engine companies, 43 percent of ladder companies, and 47 percent of chief officers (see Exhibit 6 for the resource deployment timeline and Exhibits 7 and 8 for apparatus and chief deployment).

Much of this massive response was ordered by chief officers as they dealt with an increasingly dangerous and challenging situation. However, some of the response occurred outside regular command procedures. The size of the response taxed the FDNY's efforts to effectively deploy and manage its personnel and resources.

Units ask to be dispatched to the WTC

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

[19] In addition to 183 ladder and engine units, nearly all special operations units of the Department were assigned to the incident.

Center repeatedly by radio, asking that they be authorized to respond. In some of these cases, Dispatch relented and assigned them. Many EMS and private 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.

Self-dispatch of Fire units is minimal

Out of the more than 200 Fire units responding, only four proceeded to the incident without being deployed by Fire Dispatch. Of these units, two informed Dispatch that they were responding and demanded an MDT ticket assigning them to the incident. Two others proceeded directly to the incident without Dispatch's knowledge: one of these responded at approximately 9:20 a.m. after responding to an unrelated incident. Another unit sent a radio transmission regarding injured civilians on the 35th floor of WTC 1 despite the fact that Dispatch records at that time indicated that this unit was available at the firehouse.

Incident timing leads to response of off-duty firefighters

Another factor that increased the size and complexity of the response was the timing of the attack. Because the attack coincided with the change of tours in the firehouses at 9:00 a.m., numerous units responded with both night-tour and day-tour members. (Exhibit 9 contains examples of units responding with additional off-duty personnel who were ending their shift.).

In addition, other off-duty firefighters and officers reported to firehouses and directly to the incident scene in response to the recall issued by the Department. Some recalled firefighters responded to the scene by riding with on-duty units.

Normally, the officer in charge of each company knows the names of all firefighters and officers responding to an incident. At the start of every tour, the officer fills out a "riding list," a form recording the names of personnel assigned to each apparatus. One copy of the riding list is stored on the apparatus and the officer keeps another copy himself. Multiple riding lists were destroyed on September 11. This was one of several factors that prevented the Department from having accurate records of those who responded to the incident.

Recall mobilizes additional off-duty firefighters

The Chief of Department directed issuance of a recall of all off-duty firefighters and officers at 9:29 a.m. The recall order was broadcast by public media outlets and dispatched across FDNY radio channels. 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. As a result, the recall was disorganized and ineffective. The initial recall order did not include specific directions on where firefighters were to report. Recalled firefighters responded to multiple locations, including directly to the incident area, the firehouse closest to their location at the time of the recall, their own firehouse, or to recall staging areas which were established and communicated later in the morning.

Our interviews revealed that the Department faced substantial logistical problems transporting and equipping members responding to the recall, even after they had assembled in recall staging areas or had deployed to the incident area. All reserve apparatus and vehicles were put in service with recalled personnel. They were used at the WTC incident as well as to augment citywide coverage.

Mutual aid request brings Nassau and Westchester units

Before September 11, the FDNY had rarely requested mutual aid from departments outside the city to support fire operations. 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 mutual aid could be integrated into its operations. However, due to the magnitude of the WTC incident, FDNY personnel sought mutual aid from Westchester County at approximately 10:07 a.m., and from Nassau County at 10:23 a.m.

These initial mutual aid requests did not specify the level and type of resources needed. In addition, the FDNY did not have adequate information on the resources and capabilities of departments in surrounding cities and counties (e.g., the size, capabilities and expertise of different units). And, the FDNY had minimal operational training with surrounding fire departments, and hence had limited ability to evaluate whether and how resources from other departments could be integrated with the FDNY's operations. For instance, it could not tell whether procedures could be integrated, equipment could interoperate, and whether the capabilities of units with the same names (e.g., rescue or hazmat) were comparable.

Our interviews and review of dispatch tapes indicate that mutual aid received from neighboring fire departments on September 11 consisted primarily of engine and ladder units. Some mutual aid units deployed to staging areas. Some deployed directly to the incident and others were paired with FDNY units to help maintain citywide coverage.

Personnel tracking systems were insufficient

FDNY systems to track personnel at incidents proved insufficient on September 11, as they lacked accuracy and were lost when the towers collapsed.

The FDNY Field Communications Unit was responsible for tracking the assignment of Fire units to different alarms, the release of units from the staging area to the incident area and unit locations at the incident. 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. This record was most likely inaccurate because many units went directly to the tower lobbies instead of their assigned staging areas. Field Com was destroyed at 9:59 a.m. when WTC 2 collapsed, and all unit assignment records were lost since the FDNY Field Communications units cannot create a remote back up of deployment records.

FDNY protocols also provide that operations posts at major incidents keep detailed records of deployments within their area of responsibility. A communications coordinator (Comcord) is designated at each operations post, responsible for tracking unit assignments and managing communications between tactical and command channels. Like Field Com, the Comcord uses a magnetic command board for record keeping. The Comcord sketches the building with a marker on the command board and places magnets designating individual units in the appropriate locations on the sketch to represent each unit's location within the building. In this case, the operations posts were located in the lobbies of the two towers. B2 was designated the Comcord in the lobby of WTC 1. It is likely that this procedure was also carried out in the lobby of WTC 2.

Radio difficulties on September 11 contributed to the complexity of keeping accurate records of individual units and tracking their progress. After units were given their assignments, the only way for the Comcords and other chief officers to track their whereabouts was through radio communications. Comcords could not ascertain, without a radio query and a response, whether units assigned to search a specific floor had reached that floor or the location of an individual firefighter in danger.

The command boards utilized by Comcords at the operation posts were destroyed when the towers collapsed. Just as with Field Com, all the information captured on them was lost, as there were no methods in place to back up the records of unit assignments.

The limitations of this tracking system were not unique to the response to the World Trade Center incident. However, the magnitude of the response, difficulties with in-building communications and the response from off-duty firefighters on September 11 significantly increased the uncertainty of firefighter

and unit locations. As a result, following the collapses, the Department could not quickly create a reliable list of missing and dead personnel.

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 or the senior FDNY chiefs in the lobbies.

The evacuation and subsequent destruction of the headquarters of the city's Office of Emergency Management (OEM) in WTC 7 further impaired the coordination process among the FDNY, NYPD and other responding agencies on September 11.

Citywide coverage was maintained

As FDNY committed large numbers of units to the WTC incident, it followed existing procedures and protocols to maintain citywide coverage for fire operations. During the initial three hours of the incident, Dispatch relocated 68 units throughout the city to ensure coverage. In addition, at 9:00 a.m., FDNY reverted to a response status known as "Fallback 3"at the discretion of the Bureau of Fire Communications. Fallback refers to a situation in which the normal response to an alarm is lowered during a period of inordinately heavy fires or during an emergency that affects an entire borough or boroughs. This lowered response means that fewer units will respond initially to a first alarm and that additional units will be committed only after further evaluation. Fallback 3 corresponds to the minimum apparatus response to an alarm.

Dispatch also created several dispatch staging areas and directed resources in the citywide pool to these areas to facilitate resource management and expedite the response time to the WTC incident.

Even with the commitment of a massive amount of resources by FDNY to the WTC incident and the significant loss of resources resulting from the collapse of the towers, citywide coverage for regular fire operations was maintained. Average fire incident response times on September 11 did increase, but only by about one minute, to an average of 5.5 minutes. The total number of calls for fire related assistance received on September 11 was comparable to the same 24-hour period the previous year, 2,322 versus 2,225 respectively. Response times within the city

returned to normal on September 15 and thereafter. The Bureau of Fleet and Technical Services immediately began repairing apparatus and replacing equipment so that firehouses could be returned to service.

Citywide coverage for special operations was minimal

While the Department maintained citywide coverage for regular fire operations, it committed nearly all of its special operations units to the incident, leaving the remainder of the city with extremely limited special operations coverage.

Among the special operations units committed were the Hazardous Materials unit (Hazmat), High Rise units, a Field Communications[20] unit, the Mobile Command Center unit, all the Rescue units and six out of seven Squads.[21] Citywide Tour Commander 4D ordered Fire Dispatch to keep one Rescue Unit available for the rest of the city. However, that rescue unit contacted Dispatch multiple times asking that it be deployed until Dispatch relented and assigned it to the incident. As a result, prior to the collapses, all rescue units had deployed to the World Trade Center (see Exhibit 10).

The FDNY has just one Hazmat Unit, which was committed to the World Trade Center. Had there been another hazardous material incident in the city, terrorist-related or not, the Department's ability to respond would have been minimal. The one Squad that was left in reserve would have been able to carry out some hazmat tasks but not a prolonged, large or complex operation in the absence of the equipment, capabilities and specialized supervision of the Hazmat unit.

In addition, post-collapse, the FDNY's Marine Division was the primary source of water for all fire fighting activities on the west side of lower Manhattan. The pumping capabilities of the boats on September 11th and on succeeding days were below design capacity due to mechanical problems. A privately owned boat provided much additional pumping capacity.

[20] The Field Communications unit that was deployed and later destroyed was the Department's spare; the primary vehicle was out of service for maintenance reasons. Normally only one unit is on duty at any one time.

[21] A Squad is a specially trained and equipped engine company with expertise in hazardous materials, rescue and other special operations capabilities.

PLANNING AND LOGISTICS

During the FDNY response on September 11, officers were not selected to coordinate planning or logistics functions[22] on a dedicated basis (see Exhibit 11 for the planning and logistics timeline).

In accordance with usual FDNY practices, we believe that, before the collapse of WTC 2, the Incident Commander carried out needs assessment and resource tracking functions, with the assistance of Field Com. Personnel at the Incident Command Post were assigned tasks as needed to support the response in these areas.

However, the Incident Commander and the chief officers responsible for the operations posts were required to make decisions on these matters lacking some important information, including: reliable intelligence, media reports, aerial video coverage, or verbal reports from helicopters on the condition of the towers and traffic. After the buildings collapsed, planning and logistics requirements grew well beyond anything FDNY had experienced before.

For instance, the logistics required to support the search, rescue, and recovery operations after the collapses were massive and unprecedented for the FDNY. Our interviews suggest that the distribution of equipment (e.g., radios, self-contained breathing apparatus) may not have been adequately managed and tracked on the afternoon and evening of September 11, and as a consequence, equipment was not utilized or was lost.

In the days immediately following September 11, planning and logistics improved significantly. On September 15, a dedicated Battalion Chief was assigned as the planning chief for the incident. In addition, the U.S. Department of Forestry Incident Management Teams (IMTs), who arrived on September 13th, and the U.S. Army Corps of Engineers provided assistance with traditional planning functions and documentation. These included creation of sector logs, which are a recording of all events and actions that took place in a given sector each day. IMTs also helped create incident action plans, which outline the response plan and the resource requirements for the next 24 hours. The presence of the IMTs supplemented the FDNY's resource allocation and site mapping capabilities and enabled it to substantially improve coordination among various agencies and other parties operating at and around the incident site.

In addition, after September 11, IMTs, along with the city's Office of Emergency Management, construction companies and private donors, aided with logistics

[22] Incident planning includes determining resource requirements and managing information flow. Logistics includes managing the deployment and tracking of supplies and equipment.

coordination. An FDNY Deputy Chief was assigned as the logistics chief on September 18. Thereafter, he was responsible for leading a team to manage the logistics requirements of the incident and for addressing any safety issues. Early in October, an additional dedicated deputy chief assumed overall safety responsibilities for the site, including managing the safety officers who were already operating there. This enabled the separation of logistics and safety responsibilities.

FAMILY AND MEMBER SUPPORT SERVICES

The Fire Department has a proud tradition of supporting its members and their families when members are injured, killed, or missing. The procedures used by the FDNY to notify families that loved ones had been injured or killed, and the type and level of post-incident counseling and support given to members and families have changed over the years. However, the Department has always provided honorable, personal, and deeply felt support to its members and their families in the most difficult moments.

Faced with an unprecedented number of casualties on September 11, the Department had difficulties providing the appropriate level of support and care to its members and their families in a consistent way.

In the aftermath of the collapse of the towers, several factors made it extremely difficult for the Department to create an accurate list of personnel missing or deceased. For one thing, there was a lack of accurate records on who responded and where they were. In addition, many firefighters remained on site to help the search and rescue operation. And, the Department did not have a complete, accurate personnel notification database with records of whom to contact in case of death or injury to a member.

As a result, the Department could not provide reliable information to families immediately after the incident. There were substantial delays in notifying family members of the loss of loved ones, and the procedures to notify families varied over time, ranging from visits by retired chiefs to phone calls from the site.

The Department set up on-site counseling services for firefighters and, within a week, established remote counseling locations in Manhattan, Queens and Staten Island. However, the magnitude of the incident and the ensuing counseling needs overwhelmed the infrastructure of the Department's Counseling Services Unit. The unit's challenges at the time included evaluating, pre-screening and securing funding to pay for counselors.

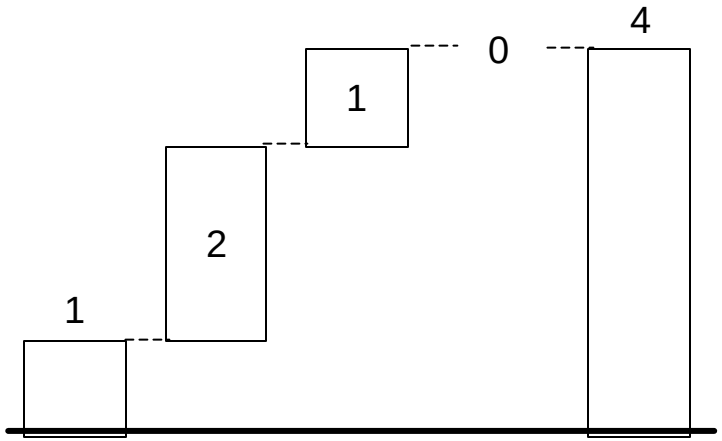
Over the past several months, the Department has started to formalize several processes it developed in response to the counseling and support needs of members and their families. For example, in January, the Commissioner

appointed an assistant commissioner for family assistance to coordinate activities that meet the needs of members and their families.

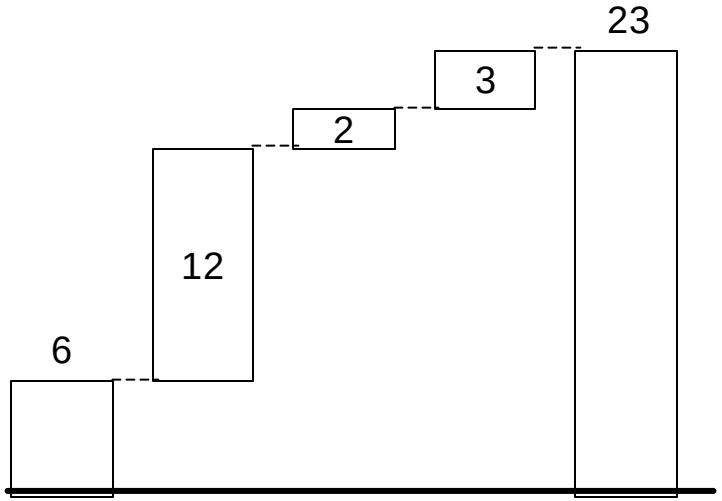
Exhibit 8

FIRE CHIEF DEPLOYMENT ON SEPTEMBER 11

Number of Division Chiefs deployed



Number of Battalion Chiefs deployed



Time	8-9 am	9-10	10-11	11-12	Total
Chiefs available for city wide coverage	8	6	5	5	
	43	31	29	26	

* The total number of Division and Battalion Chiefs on duty at any one time is 9 and 49 respectively

Source: Dispatch transcripts

INCIDENT/PROJECT ORDER NUMBER: I D - 0 3 - E 6 - 1 2 3 4

RESOURCE ORDER

Personnel

INITIAL DATE/TIME: 04-05-03

2. INCIDENT/PROJECT NAME: Mormon Cricket #1

3. INCIDENT /PROJECT ORDER NUMBER: 10-03-E6-1234

4. OFFICE REFERENCE NUMBER: USDA-APHIS-I4

5. DESCRIPTIVE LOCATION/RESPONSE AREA: Southern Elmore County

6. SEC. | TWN | RNG | Base MDM

7. MAP REFERENCE

8. INCIDENT BASE/PHONE NUMBER: 208-123-4567

9. JURISDICTION/AGENCY: ID - Dept. of Ag.

10. ORDERING OFFICE: ID - Dept. of Ag.

11. AIRCRAFT INFORMATION | LAT. | LONG.

BEARING	DISTANCE	BASE OR OMNI	AIR CONTACT	FREQUENCY	Ground Contact	FREQUENCY	RELOAD BASE	OTHER AIRCRAFT/HAZARDS

12. Request Number	Ordered Date/Time	From / To	QTY	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA
0-1	04/05 1000	10 M. Smith/ T. Able	1	Entomologist	04-07 1200	see action taken	T. Pole/ C. Davis	1030	PPQ 05	Bill Paxton	0800/ 1030			
0-2	04/05 1000	10 M. Smith/ T. Able	1	Entomologist	04-07 1200	see action taken	T. Pole/ C. Davis	1030	PPQ 06	Martha Hill	0800/ 1030			
0-3	04/06 1300	10 T. Fray/ T. Able	1	Operations S.C.	04-08 0800	ICP	T. Pole/ C. Davis	1310	PPQ 25	Brent Woods	4-7 1500/ 4-7 1900			

13. ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN	ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN
0-1/2	04/05	1030	T. Pole/C. Davis	Request filled. ETA 04-07					Will be met in BOI by Kelly
				1030 UA 235 departs LAX					Phone#: 208-344-7825.
				0800 arrives BOI 1100. Plane.		04/05	1030	M. Smith/T.Pole	Relayed. Confirmed phone #.

INCIDENT/PROJECT ORDER NUMBER

RESOURCE ORDER

INITIAL DATE/TIME

2. INCIDENT/PROJECT NAME

3. INCIDENT /PROJECT ORDER NUMBER

4. OFFICE REFERENCE NUMBER

5. DESCRIPTIVE LOCATION/RESPONSE AREA

6. SEC. | TWN | RNG | Base MDM

7. MAP REFERENCE

8. INCIDENT BASE/PHONE NUMBER

9. JURISDICTION/AGENCY

10. ORDERING OFFICE

11. AIRCRAFT INFORMATION

LAT.

LONG.

BEARING	DISTANCE	BASE OR OMNI	AIR CONTACT	FREQUENCY	Ground Contact	FREQUENCY	RELOAD BASE	OTHER AIRCRAFT/HAZARDS

12. Request Number	Ordered Date/Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA

13. ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN	ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN

CONTINUATION SHEET NO._____ OF _____

Order No.	**RESOURCE ORDER**	2. INCIDENT/PROJECT NAME	3. INCIDENT /PROJECT ORDER NUMBER	4. OFFICE REFERENCE NUMBER

12. Request Number	Ordered Date/Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA

NFES 2203 (7/87)

Increase operational preparedness

To effectively prepare for fire and EMS incidents of all sizes, emergency services organizations need well-defined systems and procedures that are flexible and can be quickly expanded. We have seven major recommendations to increase operational preparedness at the FDNY:

1) Expand the use of the Incident Command System (ICS) to provide a foundation for responding to and managing any type of emergency.
2) Further develop the existing Fire Department Operations Center to support the response to specific incidents and ensure that the Department's mission is accomplished citywide during major incidents.
3) Create Incident Management Teams, which are specialized highly trained teams that use ICS principles to manage large or complex incidents.
4) Fully deploy a flexible recall procedure to allow FDNY to recall specific off-duty personnel required to respond to an incident or maintain citywide coverage.
5) Develop agreements with neighboring departments for fire operations mutual aid, to augment FDNY's resources when necessary.
6) Modify and enforce staging protocols to increase command and control, and the capability to track personnel.
7) Expand capabilities to deal with hazardous materials incidents and re-evaluate heavy rescue and marine capabilities.

1) EXPAND USE OF THE INCIDENT COMMAND SYSTEM

The founding principles of the Incident Command System were designed 30 years ago to aid in the management of resources at emergency incidents. Today, ICS provides a basis for establishing a flexible command and control structure, along with defined roles, procedures and organizational principles that can be adapted to any specific situation or incident. In addition, ICS addresses specific operational, planning, logistics and finance issues relating to emergency incidents. Federal and state agencies mandate that all emergency response agencies operate in accordance with ICS.

The FDNY uses many ICS principles on a daily basis, but rarely uses other important aspects of the approach because of the nature and scale of most incidents in the city.

In order to examine ways to further deploy ICS, an FDNY task force of senior chiefs from Fire and EMS Operations worked with McKinsey for the last three months of our effort. This task force studied how ICS is used in other fire departments and agencies around the country and reviewed existing ICS models such as FIRESCOPE and the National Interagency Incident Management System (NIIMS). The task force chose the NIIMS model for FDNY. It then compared current FDNY command and control, procedures, tactics and operations with NIIMS and identified gaps between the two systems. The result of this effort was a clear, well-documented blueprint for expanding ICS at all levels in the FDNY.

We now recommend that the FDNY take the next steps toward increasing and further formalizing the day-to-day use of the Incident Command System. This will provide the basis for the Department to increase its ability to respond to large, complex incidents by:

- Ensuring that the command and control structure used by the Department is flexible, modular, and consistent across incidents and over time.
- Improving the Department's incident planning and logistics capabilities by creating specific planning and logistics functions consistent with ICS.
- Creating the foundation to achieve effective response coordination with other municipal, state, and federal agencies responding to major incidents.
- Defining clear roles and responsibilities for senior personnel responding to major incidents.

To achieve this, the Department must take three key steps over the next few months: review all FDNY procedures to ensure consistency with ICS principles; train FDNY personnel on the ICS; and establish ongoing ICS training programs for senior personnel.

1.1) Review all FDNY procedures to ensure consistency with ICS principles

In the course of its work, the FDNY task force examined how ICS principles might apply to procedures that the Department uses to fight a fire in a high-rise building. The task force developed recommendations for a number of changes. For instance, regarding the command and control structure, it recommended adopting ICS terminology to increase interagency understanding of FDNY operations. It also recommended new communications protocols that would

identify individual incidents and create consistent radio identification names for roles in the command structure.

We now recommend that FDNY review *all* its procedures to update them and make them comply fully with the ICS. The result of this review should be a comprehensive set of ICS-compliant FDNY procedures for emergency incident situations (e.g., multiple casualty, hazardous materials, transportation, residential and commercial building fires).

In addition, we recommend that, during this review of procedures, the Department explicitly re-evaluate the location and roles of operations and command posts. The Department needs to re-evaluate when to use a remote command post, when Fire and EMS command posts should be co-located, when Fire and EMS command posts should be in a mobile command vehicle, and how the incident command post should be made accessible to other agencies.

1.2) Train all FDNY personnel in ICS principles and procedures

It is crucial for the FDNY to increase its awareness, understanding, and use of the ICS to effectively lead the response to large incidents, or support other agencies when they lead such responses. Effective formalization and expansion of the use of the ICS will require training officers, firefighters and EMS personnel.

As a result, we recommend that, while the review and approval of new ICS-compatible procedures is taking place, the FDNY develop a training program to support the full rollout of those procedures. This program should be designed to ensure that FDNY personnel at all levels:

- Are knowledgeable about the ICS and its implementation at the FDNY and understand its importance and usefulness.
- Understand how the FDNY deploys the ICS for specific types of procedures.
- Are aware of the roles and responsibilities of the different ICS functions such as planning, logistics, and finance.
- Understand ICS communications protocols.

The training program must have two components: 1) a short-term component that will ensure that personnel have the training required to deploy revised, ICS-consistent procedures in the field; and 2) a long-term component that will ensure continuous training in ICS principles and their implementation at the FDNY.

We estimate that the total incremental cost to the Department of creating and implementing this training program over the next 12 months is $5 million to $7 million, depending upon the training program design and delivery method (e.g., classroom training supplemented with computer-simulated exercises).

Implementing a training program of this magnitude and importance would require a substantial commitment from all bureaus in the Department, particularly Fire and EMS Operations, which would have to commit resources to support the design and lead the delivery of the training program. We estimate that the Department would have to commit approximately 1,000 chief-hours over the next six months. In addition, the Bureau of Training would need to dedicate substantial resources to develop the curriculum and materials with the assigned chief officers.

Once the training program is developed and the first, short-term component is implemented, incremental training costs are expected to be minimal.

1.3) Establish ongoing ICS training programs for senior personnel

FDNY must ensure that all senior personnel such as Fire and EMS chief officers can perform all leadership roles associated with the FDNY ICS in a wide variety of situations. This requires that these chiefs be trained in the following functions:

- Incident command, including: coordinating the overall response strategy, managing (at a high level) all FDNY resources and those from other agencies, and ensuring a manageable span of control for other supervisors as incidents escalate.
- Operations, including the selection and execution of FDNY procedures.
- Planning, including the creation, updating, and use of incident action plans, management of interagency meetings, collection and synthesis of information from multiple sources (e.g., intelligence, media, other responding agencies) and estimation of future resource requirements for the incident response.
- Logistics, including the procurement, receipt, transportation, and management of equipment, materials and services to support FDNY operations, and tracking all additional or special FDNY equipment used at an incident.

In addition, the Department should put in place the financial and administrative capabilities to support incident response, including the ability to track and assign costs to a particular incident and carry out emergency procurements as needed.

The training programs described above will help chiefs better understand their roles, functions, and responsibilities under the ICS. However, in order for these chiefs to be more effective managers of the response to large, complex incidents, the Department must do more. It must train them regularly to perform these roles in a variety of specific scenarios.

Currently senior FDNY chiefs receive their last formal training when they are promoted to the rank of battalion chief or EMS captain. Some senior chiefs have not received routine, periodic training for more than 15 years. We recommend that the Department create a periodic (e.g., twice a year) training program for its senior chiefs to practice different ICS roles in the context of specific, complex incidents. This program should include incidents involving terrorism (e.g., biological, chemical and radiological agents), large numbers of victims, widespread damage to structures and disruption of communications or utility services.

We believe that the total annual cost of training the Department's 100 most senior chiefs (staff and deputy ranks) twice a year would be in the range of $1 million to $2 million.

2) FURTHER DEVELOP THE FIRE DEPARTMENT OPERATIONS CENTER

The existing Fire Department Operations Center (FDOC) today has three main functions: to notify senior staff of fire and EMS emergencies, to act as a point of contact for other city, state and federal agencies, and to prepare a daily report of Department activities. It is staffed 24 hours a day with one officer, three firefighters and an EMT.

We recommend that the FDNY expand the center into a fully functional emergency operations center with infrastructure and communications capabilities to provide citywide command, control, and operational planning for the Fire Department during routine operations and major incidents. Senior personnel should report to the FDOC during major incidents.

Specifically, the following activities should take place at the FDOC:

- Set the Department's operational priorities during resource-taxing events in the city.
- Keep up-to-date on the incidents taking place in and around the city and their current and future resource requirements.
- Monitor citywide coverage, analyzing the Department's resource availability and managing the Department's resource pool, including the initiation of recalls and mutual-aid requests.

- ¶ Be a single point of contact for other agencies to coordinate activities on a citywide or regional basis.
- ¶ Gather and analyze information on specific incidents and on relevant conditions throughout the city (e.g., relevant law enforcement activities, traffic and weather conditions) and disseminate this information to appropriate parties.
- ¶ Support the command and control of any major incident in the city as required (e.g., serving as temporary incident command post, leading the re-establishment of command and control structure).
- ¶ Serve as an area command post if multiple large incidents are taking place in the city.

The management structure of the FDOC should be consistent with the ICS deployed at the FDNY. Personnel will be assigned ICS roles such as operations and planning. All who regularly staff the FDOC will require ICS training (including civilian staff responsible for bureaus within the Department) and will be assigned to the FDOC for at least one year, after substantial training by experienced FDOC personnel.

The FDNY's ICS task force worked with McKinsey to develop a detailed set of guidelines for FDOC operations. The guidelines include multiple levels of readiness with corresponding staffing levels (which vary in numbers and seniority of the personnel at the FDOC), clear rules for decision-making within the FDOC, definition of roles and responsibilities, and communications needs.

We recommend that the Department implement the FDOC in line with the guidelines developed by the task force. The implementation must be followed by a set of planned drills for all responding staff.

3) CREATE INCIDENT MANAGEMENT TEAMS

ICS principles dictate that all first-responding chief officers and supervisors be able to perform any assigned role effectively at a variety of incidents. However, for large, complex incidents it is beneficial to deploy personnel who are highly trained and specialized in the specific functions of incident management (e.g., operations, planning or logistics).

To accomplish this, we recommend the Fire Department build at least two Incident Management Teams (IMTs), each composed of 21 individuals who will receive specific training. A minimum of two teams is required to guarantee that the Fire Department has adequate around-the-clock coverage capabilities over prolonged periods of time (e.g., weeks).

The teams should be made up of high-performing individuals who are selected by the Chiefs of Fire and EMS Operations. Each member of each team should be highly specialized in one specific function of ICS, but be able to carry out any other role within the ICS organization. These personnel would receive regular training, including scenario and tabletop training. They would continue to perform their regular functions at FDNY, but would be recalled when IMTs are activated to respond to a large, complex incident.

The effectiveness of highly trained individuals working in teams was evident on September 13, e.g., with the arrival of the U.S. Department of Forestry Southwest IMT, which assisted with the WTC rescue effort, and on the West Coast, where fire departments regularly deploy IMTs to manage the response to large forest fires, earthquakes and other major emergencies.

The FDNY ICS task force developed a specific proposal for the structure, roles and responsibilities for the IMTs. We recommend that FDNY create IMTs based on this proposal. We estimate that the one-time incremental cost to establish the two IMTs would be approximately $500,000 to $1 million with annual maintenance costs of approximately $500,000.

4) CREATE AND FULLY DEPLOY A FLEXIBLE RECALL PROCEDURE

Before September 11, the Department had not issued a recall of its personnel for more than 30 years. Firefighters and EMS personnel had not received much training or clear guidance on how to proceed in case of a recall.

We believe the Department should be able to efficiently mobilize all or part of its off-duty personnel in case of emergencies and increased threat levels. The recall process should enable the Department's operational leadership to mobilize specific, targeted capabilities, such as rescue or hazardous-materials units, and to recall large numbers of personnel in a simple, modular and orderly way.

An internal FDNY task force, with support from McKinsey, developed a set of detailed guidelines for the recall procedure. We recommend that the Department immediately take steps to finalize and deploy the recall policy consistent with these guidelines. We believe that once a recall procedure developed under these guidelines is fully deployed, the Department will rarely need to issue a full recall.

Below are the major aspects of the proposed recall guidelines.

- **Create pre-defined recall packages**. The Department should create multiple, pre-defined recall packages with different staffing levels and capabilities. These will form the building blocks necessary to tailor a recall to meet the needs of a specific situation. For example, different

recall packages could offer: manpower only, manpower with reserve apparatus, manpower and apparatus with special operations capabilities (e.g., hazardous-materials or rescue), rapid response teams, or incident management teams (IMTs). The packages should be designed to be self-contained, i.e., they should be organized so that, when a package is recalled, all necessary equipment and supporting personnel, such as logistics and planning, are mobilized. The Department should have the ability to issue a recall on a citywide basis or on a borough-by-borough basis. And it should be able to implement recall packages at different levels (e.g., different numbers of units of different types).

- **Clearly define who can issue a recall.** Only the Chief of Department or a specific designee (e.g., the Chief of Fire Operations or Chief of EMS Operations) at the FDOC should have the authority to issue a recall. Centralizing this authority ensures that citywide needs are considered (versus, for example, the needs of any specific incident or incidents). It also decreases the potential for confusion regarding the origin of the recall decision, who is being recalled, when and for what purposes.

- **Create pre-established recall trigger points.** The Chief of Department, or his designee, should be able to issue a recall at his discretion, or when specific trigger points are reached. Trigger points should be developed based on a number of variables, such as city coverage capabilities, identified threat levels and the need to proactively augment resources for pre-planned events such as VIP visits.

- **Enable FDOC to determine recall need and characteristics.** The planning personnel at the Fire Department Operations Center should play a major role in how recalls are ordered and conducted. They should have the responsibility and the capabilities to determine whether a recall is required (e.g., instead of or in addition to mutual aid), which personnel will be recalled and how the recall will be put into action. To make these determinations, they should leverage pre-determined recall packages, tables that detail the composition of these packages and staffing matrices. These determinations will allow them to develop a specific recall recommendation to the Chief of Department or his designee. Once the Chief or his designee authorizes the recall, the FDOC planning personnel should initiate the appropriate communications to all parties, such as Operations, the Public Information Office and Fleet Services.

- **Communicate recalls precisely and consistently.** The Department should develop a standard recall message to be communicated to FDNY members, consisting of specific instructions on who is being recalled and where they should report. The Department should have redundant means of communicating recall messages accurately. These should include

internal methods, such as phone trees and pager messages, and external methods such as the use of news media.

- **Create mobilization points.** The Department should instruct and train FDNY personnel to report to regular, pre-specified locations during a recall. In addition, the FDOC should maintain a list of alternative "mobilization points" for recalled personnel to be used when appropriate. For example, if the transportation infrastructure is compromised in a way that prevents recalled personnel from responding to their regular location, FDOC should identify a mobilization point and send personnel there. This will allow the Department to facilitate transportation, track and control recalled personnel.

- **Train for recalls.** The Department should communicate the new recall procedures to FDNY members and conduct regular training so that all personnel understand the procedures thoroughly. This regular training is especially important for those involved in the recall decision process – such as the Chief of Department, his designees and the FDOC personnel – along with those responsible for communicating recalls to FDNY personnel. The Department should conduct formal staff performance evaluations following this training. In addition, the Department should conduct drills on full deployment of different recall packages periodically (e.g., once or twice a year).

- **Enforce recall rules.** The Department should develop control measures and sanctions to ensure the appropriate response during drills and in the case of an actual recall. Recall discipline should be enforced, allowing only recalled personnel to respond. Off-duty personnel who are not recalled, but who report anyway should be sent away, if circumstances allow, and should be referred for disciplinary action. Company and Chief officers should not allow off-duty personnel to respond along with on-duty units.

5) DEVELOP MUTUAL AID AGREEMENTS FOR FIRE OPERATIONS

Mutual aid agreements allow emergency services agencies to utilize partnerships that augment their resource pools when necessary. The FDNY should develop a mutual aid policy for fire operations and sign agreements with other fire departments and agencies, allowing it to plan and operate joint responses to incidents that require additional resources beyond its own. It should also conduct joint training exercises with other agencies on deployment of mutual aid. Finally, it should ensure that its personnel (particularly FDOC personnel and chief

officers) are aware of the different capabilities of local, state, and federal agencies and understand the processes to activate them.

Increasing the resource pool available to FDNY through mutual aid agreements and inter-agency training will materially enhance the Department's ability to mobilize a large amount of resources in a short period of time. Such a system will not only allow FDNY to make targeted and measured responses to a broader variety of incidents, but will improve the coverage available to the city on a sustainable basis with limited investment.

5.1) Assess partner capabilities before signing agreements

Currently, local fire departments in New York State operate without close coordination and standardization.[30] Therefore, if the FDNY is to ensure that its mutual aid agreements are effective, it must first work with other departments and agencies to ensure that equipment and procedures interoperate. The first step in this process is for the FDNY and neighboring Departments to exchange information on their capabilities and procedures, such as resource availability, levels of training, special operations capabilities, command, control and communications procedures and interoperability of equipment and procedures with FDNY. This information will help FDNY determine how it should negotiate mutual aid agreements. For example, it will enable the FDNY to prioritize which departments would be the best initial candidates for such agreements.

5.2) Develop and deploy mutual aid agreements

We recommend that the Department negotiate mutual aid agreements for fire operations consistent with the following guidelines:

- **Develop memorandums of understanding.** These agreements with other public safety agencies pre-establish mutual aid procedures and guidelines for ongoing working relationships. They should define the levels of support that each partner can expect. They should include:
  - A detailed outline of responsibilities for all parties, such as equipment to be carried, response time, and operational requirements.

[30] This is not the case in several other states. In California, for example, the Governor's Office of Emergency Services ensures coordination among municipal and state agencies.

- A formalized mechanism for the communication of a mutual aid request and resulting response that incorporates standard language and specific instructions, such as units desired, time and place to respond to, and units responding.
- Standard terminology of units, equipment and capabilities to improve coordination and communication of units that would potentially work together.
- An agreement on the frequency and type of joint training to be pursued.
- Financial terms and conditions that guarantee parties are appropriately compensated (e.g., for overtime, equipment loss and damage).

¶ **Maintain FDNY command and control.** FDNY should develop procedures to ensure it has command and control of all mutual aid responders throughout the course of their deployment in response to incidents under FDNY's command.

- FDNY should develop procedures to activate and communicate mutual aid requests to partners and train personnel in the procedures. FDOC planning personnel should have the responsibility and capability to decide on the amount and type of resources to be requested from mutual aid partners, using information on each partner's resource levels, capabilities, estimated response time, and degree of interoperability. The Chief of Department or his designee at the FDOC should be responsible for authorizing the request of mutual aid for Fire Operations and for authorizing the release of FDNY resources to provide mutual aid to other agencies.
- FDNY should pre-define mobilization points in or around the city for responding mutual aid units, in order to establish initial command and control of those units. An FDNY chief or officer should meet mutual aid units at the mobilization point and serve as liaison to give them specific instructions.
- While FDNY would maintain overall command of all units responding to incidents under its jurisdiction, the immediate tactical command of responding mutual aid units would be handled by the unit's immediate chain of command (e.g., unit officer or supervisor).
- Only appropriately authenticated mutual aid units reporting to the pre-defined mobilization points should be allowed to participate in the incident response.

- **Conduct joint training.** FDNY should develop and conduct training drills with potential mutual aid partners. These drills must be built into the training cycle for FDNY units and conducted on a regular basis to increase the Department's understanding of mutual aid units' capabilities and increase the efficiency and coordination capabilities of FDNY and mutual aid units.

5.3) Seek help coordinating agreements

Establishing mutual aid agreements is likely to require a substantial commitment from the FDNY and its neighbors. We believe these agreements have great potential to significantly increase the pool of resources available to the Department on very short notice, thus improving the Department's preparedness. Their benefits more than justify the effort required to establish such agreements. However, as the number of mutual aid agreement grows, the Department will find it increasingly difficult to manage relationships with multiple agencies. Therefore, as it pursues mutual aid agreements, FDNY should seek to coordinate its Fire Operations mutual aid policies with the city Office of Emergency Management (OEM).

5.4) Participate in regional EMS mutual aid planning

EMS agencies deal with mutual aid policies differently than Fire Operations. FDNY'S EMS mutual aid policy is dictated by the New York Regional EMS Council, which creates a regional mutual aid plan and ensures coordination and standardization of procedures and equipment. The Department will take a leading role in the implementation and deployment of this plan.

We also recommend that the Department continue to implement the procedures established by the regional plan. And, we recommend that the Department develop, in cooperation with neighboring EMS agencies, a detailed, periodic inter-agency training program for regional EMS mutual aid.

6) MODIFY AND ENFORCE FIRE STAGING PROTOCOLS

FDNY should modify its current staging protocols to ensure that the incident commander can effectively maintain command and control of resources deployed at an incident as it escalates.

Below are the key aspects of our proposed staging protocol guidelines:

- **Use staging on third alarm or greater.** While the incident commander can use staging at his discretion at any time prior to a third alarm, staging areas must be used for all third alarm assignments and greater.

¶ **Let incident commander determine staging location.** The incident commander should use pre-identified factors to help him determine the location of the staging area(s). These factors might include: pre-planned, suggested staging areas, the effectiveness of unit response, unit ingress and egress routes, distance from the incident, safety of the location, location of responding resources, and proximity to other incidents. The FDOC should give the incident commander information on where responding units are most likely to be arriving from so that he can incorporate that information into the choice of staging location.

¶ **Assign staging chiefs.** A battalion chief should be assigned to control the staging area as his sole function. He should be responsible for maintaining personnel accountability at the staging site, command and control of the site and coordination and communication with the incident commander. If units arrive at the staging area before the designated staging chief, the first arriving officer should perform the staging coordination function until the designated chief officer relieves him.

¶ **Enforce staging protocols.** If staging protocols are to be effective, they must be adhered to at all levels by responding units. Discipline at the unit level must be maintained and enforced by the responding company officers, the battalion chief in charge of the staging area, the incident commander, and ultimately by the senior leadership of the Fire Department. To do this, the Department should:

- Clearly assess, during training and post-incident evaluations, how well units and individuals adhered to staging procedures.
- Develop and apply sanctions for personnel not adhering to procedures during training or on a daily basis.
- Ensure that Dispatch and responding units adhere to communications protocols when information on designated staging areas is relayed to units.
- Seek ways to leverage technology as a tool to help manage staging and enforce discipline. For instance, track the location of units assigned to staging areas, and enable chiefs in command posts to track which units have been assigned the incident area (either directly or after being released from a staging area).

7) EXPAND HAZMAT CAPABILITIES AND RE-EVALUATE OTHER SPECIAL OPERATIONS CAPABILITIES

The FDNY has just one hazardous materials unit (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 to assess and detect threats, rescue and evacuate civilians, and perform decontamination tasks.

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 the FDNY expand its hazmat capabilities and re-evaluate its heavy rescue and marine operations capabilities. In addition, we believe that the city or state should create an inter-agency planning process that ensures all local, state and federal agencies likely to be involved in hazmat incidents respond cohesively and effectively.

7.1) FDNY initiative

The FDNY's Operational Planning Unit [31] should lead the Department's effort to expand hazmat and re-evaluate heavy rescue and marine operations. It 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, 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.

7.2) Inter-agency initiative

The FDNY should participate in an inter-agency initiative with other city, state and federal agencies. The initiative should include all agencies likely to be involved in the prevention of, and the response to, incidents that require hazmat

[31] The Planning and Management section of this report includes a series of additional recommendations for expansion of the Operational Planning Unit.

and special operations capabilities, such as the NYPD, the FBI, the Federal Emergency Management Agency, the U.S. Departments of Defense, Justice, and Energy, the Environmental Protection Agency, and the Coast Guard. The initiative should have these goals:

- Clearly define the processes, capabilities and responsibilities of all agencies that are likely to respond to incidents involving hazardous materials, heavy rescue or marine operations.
- Ensure that all such agencies understand each other's processes, capabilities and responsibilities, and that they possess the information and resources required to perform those responsibilities.

In order for the initiative to be truly effective and comprehensive, it must include a number of steps:

- Assessing different threats, their likely impact on the city and its citizens, and the effect of different prevention and response measures.
- Understanding the city's maximum level of tolerable risk for different types of hazmat attacks and incidents, or other attacks requiring a special operations response.
- Determining the right balance between investing in measures to prevent these attacks and to responding to them after the fact.
- Evaluating how well different city, state, and federal agencies could complement and/or extend the FDNY's special operations capabilities in responding to these attacks.
- Defining investments, processes, plans and policies to ensure that the city is adequately protected.

This initiative, if and when it is undertaken, would help determine 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.

Improve planning and management

Better planning will enhance FDNY's preparedness by identifying and implementing the most effective methods of responding to events of all kinds, before those events occur. Senior staff chiefs and administrators will be able to establish Department-wide priorities and ensure that individuals are working together toward common goals. Better planning and management will also help the Department efficiently address necessary changes in its response systems, procedures, policies and skill sets. As a result, we recommend that the FDNY:

1) Enhance its planning and management processes.

2) Expand and reorganize its Operational Planning Unit.

1) ENHANCE PLANNING AND MANAGEMENT PROCESSES

The key to effective planning is the creation of a formal Annual Plan, consisting of clear objectives, along with initiatives designed to meet those objectives. FDNY should enhance its planning by instituting a formal process to track the performance of the Department and its bureaus, create initiatives, revise them when necessary, track their execution and incorporate them into the Annual Plan. This process of continuous planning will:

- Enhance the ability of the Department's senior leaders to shape and manage the Department's readiness and efficiency.
- Improve coordination among FDNY bureaus.
- Increase the transparency of the objectives, roles, and responsibilities associated with each initiative to all parties involved.

We recommend that the Department form a Planning Oversight Committee (POC) to lead the planning process, supported by the existing Management Analysis and Planning (MAP) group. The POC should be comprised of the Fire Commissioner, Chief of Department, Chiefs of Fire and EMS Operations, and Deputy Commissioners of Administration, Management & Planning, Legal, and Intergovernmental Affairs.

The Planning Oversight Committee should be responsible for approving and overseeing the execution of FDNY's Annual Plan and evaluating, prioritizing and assigning funding for all new initiatives within that plan. It should also review the

status of the Plan throughout the year and discuss and approve amendments, including new or modified initiatives within individual FDNY bureaus, or across multiple bureaus. The POC should meet monthly to discuss the progress of ongoing initiatives, address any roadblocks in the way of major initiatives, and assess the overall performance of the Department and its bureaus. In addition, the POC should hold quarterly meetings to discuss funding for new Department initiatives, and to conduct a comprehensive progress review of all major initiatives and overall Department performance.

The MAP group, which currently prepares reports (e.g., Mayor's Management Report), analyzes statistics and coordinates initiatives, should support this new planning and management process. The MAP group will probably have to be expanded with additional personnel to perform its new responsibilities. Below, we describe our recommendations for how the POC and the MAP group should work together to: 1) prepare the Annual Plan, 2) track the progress of all FDNY initiatives and 3) approve new initiatives throughout the year.

1.1) Preparing the Annual Plan

The job of coordinating the creation of the Annual Plan should fall to the MAP Group. At the start of each planning cycle, each FDNY bureau should submit the following to MAP:

- **The bureau's year-end objectives**, such as specific, measurable improvements in day-to-day operations, enhancement of preparedness to respond to specific types of emergencies, completion of ongoing initiatives and change programs. Each bureau should also submit in writing specific, measurable performance objectives (including a budget) for the next year, whether or not they require approval of any initiative by the POC.
- **A comprehensive list of internal bureau initiatives** (new and ongoing) in support of achieving these objectives. Each initiative should include a written discussion of how it supports the objectives of the bureau and the Department, how the bureau and/or the Department would benefit from the initiative, and how the impact of each initiative would be evaluated. Each initiative should have a budget and a timeline (past and future) with specific milestones.
- **A list of ongoing cross-bureau initiatives** in which the particular bureau is involved. This list should describe the commitment the bureau has made to support each initiative and how each initiative would help the bureau achieve its objectives.

- **A discussion of the bureau's overall performance** over the preceding 12 months. This should include how well the bureau has performed against specific metrics and milestones agreed on during the previous planning cycle, as well as a comparison between the budget for each initiative undertaken by the bureau and actual expenditures.
- **A set of quarterly milestones** over the next calendar year for each internal bureau initiative (ongoing and new). These milestones should be expressed in unambiguous metrics (e.g., overtime, accidents, response time) or in terms of clear achievements for each initiative (e.g., complete testing/certification of equipment, a pilot program in progress, a training program designed and ready to be deployed). The MAP group should track the progress of each bureau to meet these milestones.

The MAP group should compile and synthesize the information received from each bureau, along with its own information on the status of cross-bureau initiatives. In addition, the MAP Group should develop an independent perspective on the performance of different bureaus across multiple dimensions, based on pre-defined metrics it should track throughout the year. It should also develop a list of improvement needs and potential future initiatives for discussion by the POC.

The MAP group should consolidate these pieces into a single document that would be presented to the POC. This document should discuss the "State of the Department" and the progress made on an initiative-by-initiative, bureau-by-bureau basis since the last planning cycle. For large multi-year initiatives, the document should review that portion of the initiative that was to be implemented during that particular year. Finally, the document should list all new initiatives the MAP group believes should be launched over the coming year.

The Planning Oversight Committee should use this document to perform a number of tasks:

- Create and prioritize new initiatives.
- Resolve conflicts.
- Ensure that those working on initiatives are accountable to meet their key milestones.
- Agree upon key performance targets for each bureau in the Department.
- Develop a proposed Annual Plan for approval by the Chief of Department and the Commissioner.

Once approved, a summary of the plan should be made accessible to all relevant parties. Bureau initiatives should be prioritized and approved (or disapproved) by the POC based on an evaluation of risks, costs and benefits, and priority status vis-à-vis other initiatives in the Department.

1.2) Tracking progress of ongoing FDNY initiatives

Once each quarter, every bureau should provide the MAP group with a status report on all ongoing internal bureau initiatives, and the performance of the bureau according to pre-determined metrics. The MAP group should keep similar metrics for all cross-bureau initiatives. The MAP group should then create a quarterly report for the Planning Oversight Committee on the progress of every major initiative underway.

The POC should consider the issues in the MAP group's report at a quarterly meeting. The MAP group should document all decisions taken by the POC at this meeting, and work to ensure that those decisions are carried out. Also, following the quarterly meeting, each member of the POC should meet with subordinates to review the status (e.g., performance metrics, timing, issues) of key initiatives under his/her supervision.

1.3) Approving new initiatives throughout the year

In addition to the annual and quarterly planning processes, both the Planning Oversight Committee and the MAP group should be involved in an ongoing process to evaluate and approve new initiatives. This process would have five major steps:

- **Articulate problems or needs.** Each bureau head wishing to undertake an initiative articulates the problem or need to be addressed, in a preliminary initiative form. If the implementation or impact of the initiative has substantial dependencies on other bureaus, or if funding is needed from outside the primary bureau, the initiative continues in this process, otherwise it is handled by the bureau internally.
- **Define proposed initiatives.** The MAP group works with bureaus to appoint working committees for each proposed initiative (including a working committee leader) with appropriate representation from all

bureaus involved.[32] It is the MAP group's responsibility to prioritize the formation of these working committees. The committees define the proposed initiative in more detail (e.g., people involved, benefits, metrics, cost estimate, implementation plan, timing, deliverables, and resource needs and commitments from different bureaus).

- **Prepare proposals to the POC.** The MAP Group should have the ability and discretion to ensure that appropriately detailed information on proposed initiatives is provided in writing before they are brought to the POC (e.g., a clear and concrete articulation of their benefits, costs, resource requirements, discussion of their urgency, and a detailed implementation plan).

- **Obtain approvals from the POC.** The MAP group schedules a discussion of completed proposals at the next available monthly Planning Oversight Committee meeting. There the POC makes the final go, no-go decision and funding is assigned. Decisions that require an increase in FDNY funding should be made quarterly to coincide with the New York City budget process

- **Add initiatives to the Annual Plan.** The new initiatives approved by the POC are added to the Annual Plan and the MAP group tracks their progress. The working committee is responsible for implementing the initiatives and the Planning Oversight Committee reviews the status of each initiative and ensures it is completed.

2) EXPAND AND REORGANIZE OPERATIONAL PLANNING UNIT

The FDNY Operational Planning Unit currently creates and maintains the Department's standard operating procedures, schedules resources for specific tasks, coordinates special events, and maintains the FDNY relationship with the city Office of Emergency Management (OEM). We recommend that its roles be expanded to include risk assessment, bureau strategy, and management of technical information for Fire and EMS Operations.

To accomplish this, the Operational Planning Unit should be expanded and re-organized into five Sections: Risk Assessment & Operational Strategy, Policies & Plans, Technical, Resources, and Special Events & Major Operations. The unit should be managed by a Chief of Planning and an Assistant Chief of Planning,

[32] In the case of technology related initiatives, the working committee will be a new Technology Steering Committee, discussed in the Communications and Technology section of this report.

who should also be responsible for maintaining inter-agency relationships at the operational level, overseeing the planning staff at the Fire Department Operations Center and participating in after-incident critiques.

The Operational Planning Unit's new responsibilities should include:
1) conducting a comprehensive risk assessment of potential hazards to various city locations; 2) developing and maintaining an FDNY All-Hazards Emergency Response Plan; 3) expanding technical capabilities; and 4) improving inter-agency coordination. It should also continue to perform existing operational support functions.

2.1) Conduct a comprehensive risk assessment

The Risk Assessment & Operational Strategy Section of the Operational Planning Unit should assist Fire and EMS Operations in developing their quarterly status reports and their portion of the Annual Plan. It should also conduct a comprehensive, citywide risk assessment to find and prioritize potential hazards to various city locations.

Part of the risk assessment includes developing an FDNY risk database. This database should include information on hazards that are unique to specific locations, such as the presence of chemicals or radioactive materials. It should also include threats and vulnerabilities such as an increased risk of explosion, a large daytime population, or an increased threat of attack. The Risk Assessment & Operational Strategy Section should define the database fields and collect, document, and update data for the risk database. It should also disseminate it to all relevant and authorized parties within the Department.

The risk database will provide crucial input to the Risk Assessment & Operational Strategy Section as it prioritizes the hazard or threat levels at different locations. In turn, this prioritization effort will support the Department in developing location-specific pre-plans and event-specific annexes that will support FDNY responders at particularly high-risk locations. These pre-plans may include pre-defined staging areas and information on the best means of egress from the locations. In addition, the prioritization effort will help the Department define the type, frequency, and location of training exercises.

Other government agencies may also possess or create a broader, citywide risk database. However, this database may not immediately be made available to the Department. Until it is made available, the Risk Assessment & Operational Strategy Section should seek information on risks and hazards from other local, state and federal agencies for inclusion in the FDNY risk database. These

agencies might include the NYPD, the State Office for Public Security, and the U.S. Department of Energy.

In addition, it should work with the FDNY field divisions to ensure that the information in the CIDS system on hazards present at each location (e.g., vulnerabilities in building design) and standard operating procedures are up to date.

Ideally, the FDNY risk and hazard assessment and analyses should be conducted in close coordination with any citywide risk assessment to ensure that response plans, resources and priorities are aligned and consistent.

2.2) Develop and maintain an FDNY All-Hazards Emergency Response Plan

The Policies & Plans Section should continue to update FDNY Standard Operating Procedures and policies, but its immediate focus should be developing an FDNY All-Hazards Emergency Response Plan, including emergency-specific annexes on matters such as terrorism and chemical and biological attacks.

This plan should be based on existing emergency response plan templates from the Federal Emergency Management Agency and other emergency management organizations. It should include large-incident responsibilities organized by ICS functions, instructions for activation of the Fire Department Operations Center, instructions for use of all communication channels, contingency plans for FDNY Headquarters and firehouses, and detailed steps for making any changes or updates to the plan. The plan should be updated regularly based on feedback gained from tabletop exercises, full-scale drills, and actual events.

The Operational Planning Unit should ensure that other parts of the Department (e.g., Special Operations, Communications) have input into the creation of the All-Hazards plan.

2.3) Expand technical capabilities

A technical specialist should be designated to create a new Technical Section. This person should be dedicated to managing information to create maps, organizational charts, and databases to support the Operational Planning Unit.

2.4) Lead inter-agency coordination at the operational level

The Chief of Planning and the Assistant Chief of Planning should focus much of their time on representing FDNY in inter-agency coordination matters. They should establish ties with federal, state and local emergency management agencies to promote exchange of critical information, and ensure common command and control structures and terminology are used in plans and procedures.

They should represent the FDNY on emergency response or terrorism-related committees and establish ties with other fire departments and emergency services across the country to exchange information. In addition, they should seek to coordinate the development of plans and procedures (e.g., the FDNY All-Hazards Plan and its annexes) with other agencies such as the city's OEM and the NYPD.

2.5) Continue to perform existing operational support functions

The Resources Section and the Special Events &Major Operations Section of the Operational Planning Unit should continue to operate much as they do today. The Resources Section should continue to manage response capabilities (e.g., determining which units are out of service) and ambulance deployment, with the assistance of the MAP group. The Special Events & Major Operations Section should continue to develop plans for special events and work with other agencies to coordinate activities (e.g., drills and exercises).

Improve communications and technology capabilities

Firefighters and EMS personnel were hindered in their response on September 11 by multiple failures of communications systems and processes and technology limitations. We recommend that the FDNY proceed simultaneously on two tracks to answer these challenges:

1) Revamp the management process it uses to evaluate, acquire and deploy communications systems and protocols and technology.

2) Immediately address urgent needs in its technology infrastructure, processes and protocols.

1) REVAMP THE COMMUNICATIONS AND TECHNOLOGY MANAGEMENT PROCESS

Currently, the FDNY lacks an effective, well-established process to manage the progress of technology initiatives involving multiple Department bureaus. It also lacks the ability to ensure that these bureaus exchange information effectively. These shortcomings pose perhaps the largest hindrance to the Department's ability to effectively address some long-standing communications and technology problems.

The key to facilitating good working relationships across bureaus and establishing effective management controls is the creation of a cross-functional, standing Technology Steering Committee (TSC) responsible for managing all technology and communications initiatives within the Department. The TSC should also provide to the MAP group, and the Planning Oversight Committee,[33] on a quarterly basis, up-to-date information on the initiatives' progress, impact and major obstacles.

The TSC should be comprised of one senior representative from each of the following bureaus and groups: Fire Operations, EMS Operations, Technology, Communications, and Administration. It should be led by an appointee of the

[33] The TSC will be the working committee for all technology related initiatives within the Department. (See planning recommendations section).

Commissioner and the Chief of Department. In addition, a technology-specific, project management group of three people should be created to support the TSC in managing these multiple initiatives.

The TSC's responsibilities can be broken down into two broad areas:

- Leading development of a long-term FDNY Technology Plan that includes technology initiatives.
- Managing the implementation of these initiatives using a standardized process.

1.1) Lead the development of a long-term Technology Plan

The TSC should be responsible for leading development of the Department's forward-looking Technology Plan and ensuring that all specific technology initiatives included in that plan support the operational requirements of the Department. The plan should cover a 5-year period and should be submitted via the MAP Group to the Planning Oversight Committee for incorporation into the Department's overall Plan. Specific steps in developing this plan include:

- **Assess and document the needs** of the Fire Department – primarily those of Fire and EMS Operations – that would be addressed by technology initiatives. Those defining these needs and initiatives should not feel constrained by what they perceive as technologically possible. They should let the needs drive the solutions. Once this is done, the needs can be compared to current technology capabilities to determine any gaps that must be addressed.
- **Act as a centralized clearinghouse** for internally generated ideas for technology initiatives, aggregating these ideas and including appropriate ones in the Technology Plan. This should be done by proactively seeking out Department members to get their needs and suggestions.
- **Define the Department's technology strategy**, which should be aligned with the operational needs and financial constraints of the Department, and prioritize the identified technology initiatives in accordance with that strategy. Document the strategy in the formal 5-year Technology Plan.
- **Annually develop and describe in detail** those portions of the Technology Plan that should be undertaken in the coming 12 months. Determine the key milestones, deliverables, responsibilities, and budget for that one-year period.

1.2) Manage implementation of initiatives using a standardized process

The TSC will be responsible for coordinating staffing of teams, along with managing and tracking the progress of all technology initiatives in the Department. Bureaus that are involved in evaluation, acquisition and deployment of initiatives will use TSC as a mechanism to help them agree upon their specific responsibilities, milestones, deliverables and resource commitments. TSC will ensure that the responsibilities and commitments of individuals and bureaus are documented for all parties, explained to them and understood by them.

TSC should standardize the process for managing technology initiatives in the Department. This will help ensure the initiatives can be successfully developed, tracked and pushed toward completion in an efficient and thorough manner. We recommend the following process that can be used for any initiative:

- **Describe needs to be addressed in detail.** The first step in developing an initiative is identifying the specific needs it will address. TSC should ensure that those undertaking a technology initiative perform this task.
- **Evaluate potential solutions.** Once these details are developed, TSC should work with appropriate bureaus to evaluate potential technology solutions through the issuance of RFIs and RFPs. As part of this process, TSC should ensure that input from all relevant bureaus is collected, documented and unambiguously articulated in the RFIs and RFPs. For instance, TSC could have bureaus fill out structured survey forms that allow them to easily offer this input. As RFIs and RFPs are developed, TSC should make sure that appropriate criteria are developed to evaluate the proposals resulting from them, with input from all relevant bureaus.
- **Choose and test solutions.** After all responses to RFIs/RFPs are fully evaluated, TSC should be closely involved in the process of deciding which solutions should be acquired or evaluated further. TSC should also put in place a structured process for conducting tests and pilots, including test/pilot planning, development of testing protocols, documentation and rollout.
- **Train personnel.** TSC should coordinate the design and implementation of training programs and procedures to support the deployment of new technology issued to FDNY personnel. TSC should ensure that bureaus commit adequate resources for training, that they create training timetables, materials, and a quality control process for all training programs.
- **Deploy solutions.** TSC should establish and document deployment plans for newly acquired solutions after testing and training has been completed. Deployment plans should include guidelines, checklists and

feedback forms. TSC should manage the deployment and provide a mechanism for collecting feedback and refining the use of the technology.

Throughout the implementation process, the TSC should provide periodic (e.g., monthly) updates to the MAP group, the Operational Planning Unit and the Planning Oversight Committee describing technology milestones achieved, the progress of ongoing initiatives (including deliverables by each bureau and individual) and any specific roadblocks that need resolution.

In addition, the TSC should develop and maintain relationships with external parties connected to technology initiatives (e.g., National Institute of Standards and Technology and the NYC Department of Information Technology and Telecommunications). It should participate in externally sponsored technology events such as symposiums and conferences, and should reach out to other fire departments and emergency services agencies to exchange information.

2) IMMEDIATELY ADDRESS URGENT NEEDS

At the same time the Department revamps the process for deploying and managing new technologies, we believe it must address a number of current needs right away. These fall into four broad areas:

1) Improve communications capabilities.
2) Improve the Department's ability to receive and disseminate critical incident information.
3) Give chief officers at incident scenes better ways to manage information and track personnel.
4) Improve EMS Operations' ability to track patients during incidents.

2.1) Improve communications capabilities

Fire and EMS personnel have experienced a variety of significant communications problems: the portable radios used in the World Trade Center response lacked more advanced features available in the marketplace; FDNY personnel often cannot communicate reliably in high-rise buildings, subways and tunnels; and EMS personnel face excess radio traffic due, in part, to the fact that two communications channels operate on the same frequency and personnel do not adhere strictly to communications protocols. The following recommendations address these issues.

2.1.1) Complete testing of UHF portable radios. The Department purchased new UHF portable radios in 1999, but has not deployed them. An unsuccessful deployment attempt occurred in early 2001.

While the Department still must evaluate important aspects of the performance of these new radios, they do have several features that could give them significant advantages over the currently deployed VHF portable radios. They support a larger number of channels, providing an opportunity to fit Fire, EMS and interagency channels, including NYPD channels, on the same radio. Their signals usually reach further inside structures, and they can be used in conjunction with the new Police Radio System now being deployed for the subways. All these features suggest that deployment of these radios could improve the communications capabilities of the FDNY, but only if they pass rigorous testing and evaluation.

We recommend that the Department continue to accelerate the testing and evaluation of the new radios. If the radios provide improved quality and reliability, the Department should deploy them. This will require the following six steps:

- Finalize the codification of FDNY operational communications needs and the related technology features of these radios. For example, decide which of the following two features is more important: increasing the power output of transmissions over the command channel vs. the corresponding decrease in the radio's battery life.
- Establish a detailed testing procedure and a comprehensive testing plan to determine if the radios meet FDNY's operational needs better than the current radios, without compromising personnel safety. The testing plan should ensure proper, rigorous documentation of the results of the tests.
- Based on the test results, decide whether to deploy the radios.
- If the radios fail the tests, seek alternative solutions, including issuing a new RFP. If they pass, update communications protocols and procedures as necessary to effectively deploy them.
- If the radios are deployed, develop and implement a comprehensive training plan that ensures FDNY personnel are fully aware of the features of the radios and know how to use them effectively.
- Deploy the radios into the field with appropriate performance tracking and feedback mechanisms.

We estimate that the accelerated testing and (potential) deployment of the new UHF radios throughout FDNY should not require additional external funding and could be completed within four months.

2.1.2) Improve communication capabilities in high-rises There are approximately 2,000 high-rise buildings[34] in New York City today. Field experience suggests that FDNY personnel can communicate reliably in just a fraction of these buildings.[35] To address this shortcoming, the FDNY should immediately evaluate, acquire and deploy equipment, together with the associated procedures and personnel training.

High-rise communications gaps can be addressed with the deployment of repeating infrastructure that receives, amplifies and retransmits radio communication signals to improve coverage. Repeaters that are portable, mobile (e.g., truck-mounted), or air-based (e.g., on a deployable balloon) may help mitigate in-building communications difficulties, but do not provide full coverage for high-rises. Stationary repeating infrastructure can support reliable communications in most cases if it is designed, installed and maintained properly. This kind of infrastructure can be installed inside or outside a building. We propose the Department pursue all of these options, but do it along two parallel and complementary paths.

- **Test and deploy portable, mobile and air-based repeaters.** FDNY should complete rigorous tests with portable, mobile, and air-based repeaters to develop and document guidelines for optimal use of this equipment (e.g., where to place the equipment for best coverage, which combinations of equipment types are most effective). FDNY should also develop an understanding of the limitations of this equipment. Once guidelines for optimal use of it are established, the Department should acquire appropriate equipment, train personnel to use it, and deploy it. We believe that deployment of portable or mobile repeaters by FDNY would cost approximately $1 million to $2 million[36] and could be completed within six months.
- **Pursue stationary communications infrastructure.** In addition to accelerating deployment of portable, mobile and/or air-based repeaters,

[34] High-rise buildings are defined here as all buildings seven stories and higher. Our recommendations for high-rise buildings should also be applied to other types of buildings such as large malls, hospitals, and jails. Shorter buildings with substantial underground areas should be treated similarly to high rises since FDNY communications in underground environments are also inadequate.

[35] Reliable in-building communications means clear point-to-point communications in nearly 100 percent of the building, even in the case of building power loss, fire, or partial destruction. The Department does not have a comprehensive view of how its radios perform in different kinds of buildings and, hence, does not have an exact estimate of the number of buildings where its personnel can communicate reliably. There is some anecdotal evidence suggesting that firefighters and officers would not be able to communicate effectively and reliably in most high-rises in the city.

[36] Estimate based on this formula: three repeaters (two portable and one mobile) for each of the Department's nine divisions

the Department must foster the deployment of stationary repeaters that will ensure that FDNY personnel and NYC's other first responders can communicate reliably in high-rise and other large buildings. Therefore, as the second path to effective high-rise communications, we recommend that the FDNY take three simultaneous steps.

- **Step 1: Require high-rises to support first-responder communications.** FDNY should develop and seek adoption of changes in the city building code requiring that all NYC high-rise and other large buildings, existing and new, support first-responder communications needs. The code should not mandate a specific technology or solution, but should require that minimum performance standards for communications are met. One possible solution could be installation of fixed, building-specific repeaters. The city should consider establishing a subsidy system to give incentives to owners of existing buildings to expedite compliance with the new building code. Such subsidies should be structured to reward speed of deploying equipment and cost-effectiveness. We estimate that deployment of this infrastructure for all high-rises in the city would cost approximately $150 million to $250 million[37] and could be implemented within three years.

- **Step 2: Evaluate the deployment of additional city-owned infrastructure.** It is possible that the most cost-effective way to ensure in-building high-rise radio coverage requires a mix of solutions. An alternative or complementary solution to building-specific solutions might be a citywide radio infrastructure that would be installed, owned and operated by the city or one of its agencies. Therefore, we recommend that FDNY develop and issue an RFI/RFP for building such an infrastructure. The RFI/RFP should be written so that the city may determine the capabilities and performance of this infrastructure, along with the costs to deploy and operate it, and the likely time necessary for deployment. The RFI/RFP should also allow for the possibility of purchasing new end-user radios,[38] including radios using different technologies and

[37] Estimate based on solution for NYC high-rise buildings above seven stories at the cost of $0.30-$0.60 per square foot.

[38] It could be the case that deploying citywide infrastructure and replacing all FDNY portable radios is more effective than retaining the current radios (or the UHF radios currently under testing). The Department should seek to understand the costs and benefits of both alternatives: deploying infrastructure compatible with its VHF or UHF radios and deploying infrastructure that would require replacement of all portable radios.

standards than the VHF and UHF radios currently owned by the FDNY.

- **Step 3: Seek ways to leverage the NYPD's infrastructure to meet FDNY's needs**. The FDNY should work together with the NYPD to explore whether and how the citywide communications networking infrastructure of the Police Department can be leveraged to support all or some of FDNY's communications needs. For example, the RFI/RFP mentioned above should determine whether a common NYPD and FDNY communications infrastructure would be more effective for the city, rather than two separate police and fire networks.[39] The FDNY should work with the NYPD to understand which facilities and assets (e.g., sites, towers, transport capacity, and power equipment) currently owned or operated by the NYPD can be easily shared with the FDNY in ways that would benefit both Departments – should the FDNY or the city decide to deploy additional network capacity.

2.1.3) Improve communications in the subways. Department personnel also have difficulty communicating via radio in subways. Portable repeaters could provide a limited, interim solution. However, firefighter and EMS communications in the system could be greatly improved with the completion of the Police Radio System (PRS) project, which is managed and funded by the Metropolitan Transportation Authority. This project enables two-way voice radio communication throughout the subway via UHF radios. The project has already covered a small portion of the subway, but important portions of the system will not be finished for at least 12 months and the entire project is not scheduled for completion until December 2004. FDNY preparedness would clearly benefit from earlier completion.

In order for FDNY to use the PRS system, it would have to replace its current VHF portable radios with UHF radios such as those that are now being tested. If this replacement takes place and if the Department elects to use the PRS system, it should have a deployment plan in place. As certain subway areas become operational, this deployment plan should provide for testing the new infrastructure to ensure its adequacy for FDNY use. The plan should also provide for development of procedures to communicate in upgraded subway areas and training of personnel to communicate effectively in the subway.

[39] While total cost of ownership is, of course, an important element to evaluate whether or not one or two networks are more effective, redundancy, reliability, and the ability of a common network to meet the different operational needs of both Departments are also important. It is possible that the optimal solution is neither two separate networks nor a single one, but two networks that share multiple elements.

2.1.4) Improve communication in tunnels. The tunnels pose a different problem. FDNY units currently cannot communicate with the Dispatch center by voice or by Mobile Data Terminal as they pass through many of them. FDNY should expeditiously implement a satisfactory communication solution for voice and data communications in tunnels. Such a solution should provide virtually ubiquitous coverage throughout the tunnel – both between units and Dispatch and point-to-point (handie talkie) communications within the tunnels. This solution should also be redundant in case of a major impact on the tunnel (e.g., partial destruction, power loss).

For the four major auto tunnels (Battery, Holland, Lincoln and Midtown), the Department should approach the MTA and the Port Authority of New York and New Jersey to coordinate the evaluation, acquisition, deployment, and maintenance of communications options available to ensure reliable communications in the tunnels. If a tunnel's oversight agency lacks resources to implement such solutions, FDNY should seek to facilitate the technology acquisition and implementation processes, while closely coordinating all steps with that agency.

Before solutions are implemented, FDNY should develop a deployment plan that involves testing, updating relevant protocols and procedures, and personnel training.

The Department estimates that installing stationary solutions in the four major tunnels would cost about $6 million[40] and could be implemented within 12 months.

2.1.5) Determine the most effective EMS radio channel deployment. One of the issues highlighted on September 11 was the potential for congestion on the EMS command channel, which hindered the EMS leadership's ability to conduct effective radio communication. This situation was due to three factors: 1) the overlapping frequencies between the command and citywide channels that result in all citywide traffic also being heard on the command channel; 2) a breakdown in radio communications protocols; and 3) the increased radio traffic due to the size and complexity of the response.

The Technology Steering Committee should establish the criteria and conduct a detailed evaluation with EMS Operations to determine EMS radio channel needs. One major question for this evaluation is whether to deploy a separate, dedicated command channel and/or an additional citywide channel to support multiple casualty incidents. Deployment of additional radio channels would require a

[40] Estimate based on proprietary solution for FDNY in four major tunnels, including dedicated radiax cable, necessary radio/electronic and connectivity equipment, and construction of equipment rooms.

comprehensive implementation program, including a new radio configuration (e.g., adding the additional channel), an update of protocols and procedures, testing, training, and a field deployment plan.

In addition to re-evaluating its radio channel needs, EMS should place a major emphasis on enforcing radio discipline and should also explore alternatives for leveraging its existing Mobile Data Terminals (MDTs) to minimize radio traffic congestion.

2.2) Improve the Department's ability to receive and disseminate critical incident information

The second set of FDNY's urgent communications needs involves how it receives critical information about an emergency incident and then disseminates that information to the appropriate personnel. The events of September 11 highlighted the importance of this information sharing within FDNY and among the city's other public safety agencies. 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. The two departments are also exchanging liaison officers and conducting regular meetings of senior NYPD and FDNY personnel. However, more needs to be done. The FDNY should focus its immediate attention on improving information flows in three key areas: 1) receiving aerial surveillance information such as video and audio feeds, from NYPD and media helicopters, 2) streamlining information flows within EMS Dispatch; and 3) ensuring that the FDOC can reliably communicate with other responding agencies.

(While these steps would bring substantial benefits to the FDNY, resolution of the fundamental issues related to information flow among agencies requires an enhanced approach to inter-agency coordination. Part III of this report discusses these coordination issues in greater detail.)

2.2.1) Receiving aerial surveillance. FDNY should seek the ability to receive audio and video feeds from NYPD and media helicopters. These would be made available to the Incident Commander (in the Mobile Command Center, Field Communication Units or elsewhere) and the Fire Department Operations Center (FDOC). This would require formal agreements with the NYPD and local media companies. These agreements should include voice and data communications links between the helicopters and the FDNY. For instance, the helicopter radios might be equipped with channels that allow the FDNY incident commander to request that the pilot offer a specific aerial perspective.

Once such agreements are finalized, FDNY should acquire necessary receiving equipment, update relevant protocols and procedures, and develop a

comprehensive joint training plan that ensures all parties involved know how to work together effectively and that FDNY's chiefs are fully aware of new information flow capabilities available to them, and know how and when to use them effectively. Throughout this process, FDNY should seek input from other fire departments that have already deployed such capabilities in coordination with other agencies.

2.2.2) Streamlining information flows in the EMS Dispatch center. Another issue highlighted by September 11 was the fact that the current organization of EMS Dispatch impedes operators from effectively handling unusually large amounts of information that are likely to emerge from large incidents. Currently, operators have multiple responsibilities, so that when an incident reaches a certain size, the massive flow of information overwhelms them. Therefore, they are not able to synthesize and disseminate information effectively. In addition, operators work in separate areas of the EMS Dispatch Center with little or no ability to integrate information they receive from different sources.

The FDNY is now re-evaluating the organization of EMS Dispatch. It is working on a pilot program that will test a new configuration for EMS Dispatch, similar to the model used by Fire Dispatch. This will help resolve the question of whether EMS operators should continue to perform multiple tasks or should focus on specific, functionally defined tasks.

2.2.3) Communicating with other agencies. The FDNY needs to ensure that it can effectively and rapidly communicate with other agencies, such as the NYPD, over the radio and over existing data networks. For instance, the FDNY should ensure that SPRINT data messages sent between NYPD and EMS are instantaneously copied to the Fire Department Operations Center as a backstop. The FDOC should also monitor NYPD radio communications on key channels.

2.3) Give chief officers at incident scenes better ways to manage information and track personnel

The FDNY's third group of urgent technology need involves giving chief officers the ability to quickly and reliably locate personnel at any point in time, and improving the functionality and flexibility of the Department's command boards.

It is important for FDNY leadership to know whether an FDNY member is on duty and whether he/she is deployed to a certain incident. Ideally senior FDNY chiefs should also be able to know where this member is located throughout the incident area. There are two steps that, if taken immediately, could allow the Department to materially improve its personnel tracking capabilities.

2.3.1) Ensure discipline on the company level. Beyond addressing discipline issues related to staging and recall, FDNY should take steps immediately to ensure that officers enter reliable information into on-duty databases and riding lists, and that names on riding lists always correspond to the people riding the apparatus. In addition, the Department should explore alternatives to make this entry process more efficient and simple by setting up easy-to-use software in firehouse PCs. The Technology Steering Committee should also evaluate adding new capabilities to Mobile Data Terminals (MDTs) that would allow Fire personnel to log in and log off from their apparatus.

2.3.2) Evaluate and, if appropriate, deploy electronic command boards. The events of September 11 highlighted the need for FDNY to replicate and store up-to-date deployment information. This might be done by replacing the Department's magnetic command boards with electronic boards equipped with wireless transmission equipment. However, it is unclear whether currently available wireless technology and infrastructure is reliable and robust enough for use by the Department. For instance, it is unknown if the infrastructure would continue to operate properly during most major incidents and how well it would operate from inside high-rise buildings and other structures.

Nonetheless, portable PC-based electronic command boards have much greater functionality than magnetic boards. These boards could help communications coordinators and operations chiefs with their tracking, communications and tactical coordination tasks. For example, PC-based boards can store and display maps and multiple building plans. This could enable chiefs to look at structural and electrical characteristics of high-rises and zoom into specific floors or building areas. PC-based boards could also store detailed hazard lists and FDNY procedures.

The TSC should coordinate development of an RFP for electronic command boards. It should evaluate the boards' functionality separately from the capabilities and costs of backing up and updating deployment information through wireless connections.

As with all other technologies, if the Department decides to acquire electronic command boards, it should update relevant protocols and procedures and develop a comprehensive training plan that ensures that the chiefs are fully aware of the features of the boards and know how to use them effectively.

Our estimates show that implementation of electronic command boards throughout FDNY would cost approximately $500,000 to $1 million.[41]

2.4) Improve EMS's capability to track patients during large-scale incidents

This is the fourth area of urgent communications and technology needs. The events of September 11 highlighted the need for EMS Operations to have a flexible patient-tracking process that can aggregate, verify, and disseminate patient-tracking information during large-scale incidents. There are several technology solutions that could help automate the process of tracking patients and accurately capture patient information. EMS Operations should work with the Technology Steering Committee to evaluate the deployment of such a technology and the associated processes and infrastructure.

If the Department decides to change its patient tracking process, it should coordinate this work with other medical care providers in the region, such as hospitals and private ambulance services. This new tracking system should be formalized and become part of an official agreement among the relevant entities, including voluntary and community-based ambulance operators and hospitals, with each having clear functions and responsibilities. Once such an agreement is established, the TSC and EMS Operations should develop detailed internal protocols and procedures for patient tracking.

We estimate the total cost of enabling EMS to track patients more accurately is $2 million to $4 million.

[41] Estimate based on one command board per battalion (including cost of software installation and provisioning of initial wireless connectivity).

Enhance the system to provide support services to families and members

FDNY's support services to families and members include notifying specified emergency contacts of a Department member who is injured, killed or missing on duty, and providing counseling services to affected families and other Department members. These are important priorities for the Department. Traditionally, the FDNY support infrastructure was established to function in incidents with few casualties. This system was sufficient before September 11. The events of that day created a need for family and member support services vastly greater than the capabilities of the existing system. As a result, we recommend that the Department establish a flexible infrastructure and process that enables it to provide these services efficiently and reliably should such a large-scale need ever arise again.

The foundation of this new system will be a Support Services Committee that will create and manage the new system. The committee should be a permanent, cross-functional group. It should be comprised of one senior representative from each of the following FDNY bureaus and groups: Fire Operations, EMS Operations, Bureau of Health Services (Counseling), Family Assistance, Personnel, the MAP Group, and Technology. An appointee of the Commissioner and the Chief of Department should lead it.

The committee would be responsible for creating and maintaining the necessary infrastructure, including up-to-date emergency contact names for all FDNY personnel, lists of peer counselors, and information on specialized service providers that could be activated by the Department in different scenarios. It should also ensure that the necessary communications infrastructure is put in place to carry out support services in case of large incidents.

The committee would also define and supervise the process used to provide family and member support services, including deployment plans for FDNY personnel and external personnel resources. It would act as a central point of contact for internal and external inquiries related to support services and it would mobilize quickly to manage family and member support services during a large-scale incident.

Over the last two months, an internal FDNY taskforce has started to develop guidelines for the emergency activation of the Support Services Committee, family notification, external communications (e.g., answering phone calls during

and immediately after large-scale incidents), peer counseling and family counseling.

We recommend that the Support Services Committee complete these guidelines and immediately develop and deploy detailed, well documented procedures. We believe these procedures could be completed and deployed within four months. As it further develops the guidelines, the committee should seek input from the Family Advisory Board and the unions.

PART II
RECOMMENDATIONS

Introduction to Recommendations

The recommendations in this report result from the lessons that emerged from our detailed examination of the FDNY's response on September 11, and from the many interviews we conducted with Department personnel, and with other emergency services 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.

Our examination and analyses indicate 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 demonstrated 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 considered 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 also 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 would 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 of our 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, our 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 this expansion, it is impossible to estimate the cost.

These are our recommendations for increasing operational preparedness, improving planning and management, enhancing communications and technology capabilities and expanding family and member support services.

PART III

ADDITIONAL ISSUES TO BE ADDRESSED

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, the city or state must establish an enhanced coordination process that encourages government agencies to plan and execute their response to major incidents together.

This coordination would give decision makers a comprehensive view of the capabilities and responsibilities of *all* relevant agencies. It would give them a common perspective on the types of threats, the level of threats, the potential consequences, and the ability of responding agencies to mitigate those threats and their consequences.

The coordination would also offer a number of specific benefits, including establishment of compatible incident response procedures, and the deployment of improved, citywide emergency response plans. It would also help the FDNY expand its hazmat capabilities and re-evaluate its marine and heavy rescue capabilities, a recommendation discussed in the Operational Preparedness section of this report.

ESTABLISHMENT OF COMPATIBLE PROCEDURES

An enhanced inter-agency planning process would give agencies a greater ability to identify, discuss and resolve important tactical issues, establish compatible procedures, and improve communication. Ideally, all agencies that might take part in the response to emergencies in the city would participate in and be committed to this process and its results. It will probably take time to create the process given the potentially large number of agencies involved, including the FDNY, NYPD, city Office of Emergency Management, the Port Authority of New York and New Jersey, the FBI, the Federal Emergency Management Agency, the U.S. Departments of Justice, Defense and Energy, the Environmental Protection Agency and the Homeland Security Agency.

It is particularly crucial and urgent to improve the coordination between the FDNY and the NYPD. Commissioners Scoppetta and Kelly have taken positive first steps to improve the coordination and cooperation between the two departments. But more needs to be done. For instance, the FDNY, NYPD and other agencies should seek to:

- ¶ Create common command and control structures and terminology, and agree on the roles and responsibilities of each agency for managing the response to any incident, in accordance with ICS principles.
- ¶ Deploy interoperable communications infrastructures and protocols to improve response coordination and the exchange of information among agencies.
- ¶ Improve the flow of vital information among agencies to ensure it is clear and unambiguous, appropriately prioritized, and reaches the appropriate parties in a timely fashion during incidents and in day-to-day operations.
- ¶ Plan and execute joint training exercises and evaluate these exercises together to ensure that agencies can and will cooperate effectively during incidents, e.g., by operating under a unified command and control structure.
- ¶ Ensure that agencies exchange information on traffic to minimize gridlock and facilitate access to incident areas by emergency services vehicles and personnel.
- ¶ Establish processes to enforce security at incident sites quickly and efficiently, including a credentialing system adequate for first responders in incident areas.

DEPLOYMENT OF IMPROVED EMERGENCY RESPONSE PLANS

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

- ¶ Clearly define the roles and responsibilities of different local, state and federal agencies, including the level and type of response they would be expected to deploy under different scenarios.
- ¶ Ensure that an appropriate agency is assigned responsibility for every important element of the emergency response plan, and ensure that each agency receives ample resources to meet its responsibilities.
- ¶ Serve as a blueprint for joint training exercises.

EXPANSION OF HAZMAT CAPABILITIES

As mentioned earlier in this report, there are a number of plausible scenarios for attacks involving radiological, chemical, and biological agents, and/or multiple,

simultaneous incidents, either on land or over water. Many of these could require hazmat and other special operations resources well beyond the FDNY's current capabilities.

An enhanced inter-agency coordination 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 incidents cohesively and effectively.

* * *

The attack on the World Trade Center has created a new urgency for the Department to make improvements in its preparedness. We believe that, if the recommendations in this report are implemented, they will help 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.

APPENDIX K
FEDERAL EMERGENCY MANAGEMENT AGENCY INCIDENT COMMAND SYSTEM FORMS

ICS Form 201

INCIDENT BRIEFING	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Map Sketch			
ICS 201 Page 1 of 4	**5. Prepared by (Name and Position)**		

6. Summary of Current Actions	
ICS 201	Page 2

7. Current Organization	
ICS 201	Page 3

8. Resources Summary				
Resources Ordered	**Resource Identification**	**ETA**	**On Scene**	**Location/Assignment**
ICS 201	Page 4			

ICS Form 202

INCIDENT OBJECTIVES	1. INCIDENT NAME	2. DATE	3. TIME
4. OPERATIONAL PERIOD (DATE/TIME)			
5. GENERAL CONTROL OBJECTIVES FOR THE INCIDENT (INCLUDE ALTERNATIVES)			
6. WEATHER FORECAST FOR OPERATIONAL PERIOD			
7. GENERAL SAFETY MESSAGE			

8. Attachments (☑ if attached)

☐ Organization List (ICS 203)	☐ Medical Plan (ICS 206)	☐ Weather Forecast
☐ Assignment List (ICS 204)	☐ Incident Map	☐
☐ Communications Plan (ICS 205)	☐ Traffic Plan	☐

9. PREPARED BY (PLANNING SECTION CHIEF)	10. APPROVED BY (INCIDENT COMMANDER)

Organization Assignment List, ICS Form 203

ORGANIZATION ASSIGMENT LIST	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED

POSITION NAME

4. OPERATIONAL PERIOD (DATE/TIME)

5. INCIDENT COMMAND AND STAFF

INCIDENT COMMANDER	
DEPUTY	
SAFETY OFFICER	
INFORMATION OFFICER	
LIAISON OFFICER	

6. AGENCY REPRESENTATIVES

AGENCY	NAME

7. PLANNING SECTION

CHIEF	
DEPUTY	
RESOURCES UNIT	
SITUATION UNIT	
DOCUMENTATION UNIT	
DEMOBILIZATION UNIT	
TECHNICAL SPECIALISTS	

8. LOGISTICS SECTION

CHIEF	
DEPUTY	

a. SUPPORT BRANCH

DIRECTOR	
SUPPLY UNIT	
FACILITIES UNIT	
GROUND SUPPORT UNIT	

b. SERVICE BRANCH

DIRECTOR	
COMMUNICATIONS UNIT	
MEDICAL UNIT	
FOOD UNIT	

9. OPERATIONS SECTION

CHIEF		
DEPUTY		
a. BRANCH I- DIVISION/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/ GROUP		
DIVISION/ GROUP		
DIVISION/GROUP		
DIVISION /GROUP		
b. BRANCH II- DIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		
c. BRANCH III- DIVISIONS/GROUPS		
BRANCH DIRECTOR		
DEPUTY		
DIVISION/GROUP		
DIVISION/GROUP		
DIVISION/GROUP		

d. AIR OPERATIONS BRANCH

AIR OPERATIONS BR. DIR.	
AIR TACTICAL GROUP SUP.	
AIR SUPPORT GROUP SUP.	
HELICOPTER COORDINATOR	
AIR TANKER/FIXED WING CRD.	

10. FINANCE/ADMINISTRATION SECTION

CHIEF	
DEPUTY	
TIME UNIT	
PROCUREMENT UNIT	
COMPENSATION/CLAIMS UNIT	
COST UNIT	

PREPARED BY (RESOURCES UNIT)

Sample Assignment List, ICS Form 204

1. BRANCH	2. DIVISION/GROUP	**ASSIGNMENT LIST**
3. INCIDENT NAME	4. OPERATIONAL PERIOD DATE _____ TIME _____	

5. OPERATIONAL PERSONNEL

OPERATIONS CHIEF _____ DIVISION/GROUP SUPERVISOR _____
BRANCH DIRECTOR _____ AIR TACTICAL GROUP SUPERVISOR _____

6. RESOURCES ASSIGNED TO THIS PERIOD

STRIKE TEAM/TASK FORCE/ RESOURCE DESIGNATOR	EMT	LEADER	NUMBER PERSONS	TRANS. NEEDED	PICKUP PT./TIME	DROP OFF PT./TIME

7. CONTROL OPERATIONS

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN.	FUNCTION		FREQ.	SYSTEM	CHAN.
COMMAND	LOCAL				SUPPORT	LOCAL			
	REPEAT					REPEAT			
DIV./GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCE UNIT LEADER)	APPROVED BY (PLANNING SECT. CH.)	DATE	TIME

Sample Incident Communications Plan, ICS Form 205

INCIDENT RADIO COMMUNICATIONS PLAN

1. INCIDENT NAME	2. DATE/TIME PREPARED	3. OPERATIONAL PERIOD DATE/TIME

4. BASIC RADIO CHANNEL UTILIZATION

SYSTEM/CACHE	CHANNEL	FUNCTION	FREQUENCY	ASSIGNMENT	REMARKS

5. PREPARED BY (COMMUNICATIONS UNIT)

205 ICS 9/86

NFES 1330

MEDICAL PLAN	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED	4. OPERATIONAL PERIOD

5. INCIDENT MEDICAL AID STATIONS

MEDICAL AID STATIONS	LOCATION	PARAMEDICS	
		YES	NO

6. TRANSPORTATION

A. AMBULANCE SERVICES

NAME	ADDRESS	PHONE	PARAMEDICS	
			YES	NO

B. INCIDENT AMBULANCES

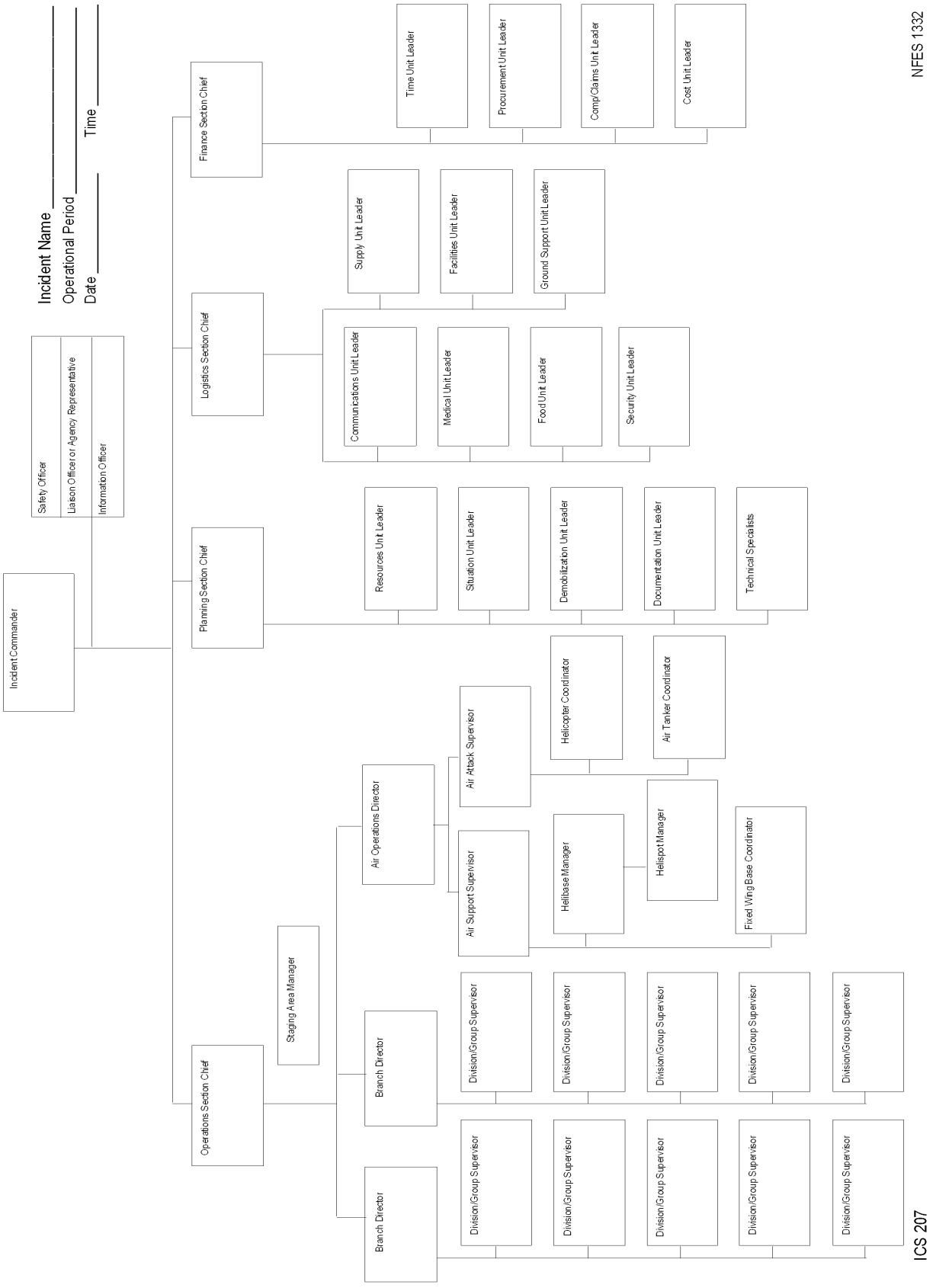
NAME	LOCATION	PARAMEDICS	
		YES	NO

7. HOSPITALS

NAME	ADDRESS	TRAVEL TIME		PHONE	HELIPAD		BURN CENTER	
		AIR	GRND		YES	NO	YES	NO

8. MEDICAL EMERGENCY PROCEDURES

206 **ICS** 8-78	9. PREPARED BY (MEDICAL UNIT LEADER)	10. REVIEWED BY (SAFETY OFFICER)


Incident Name
Operational Period
Date
Time
Incident Commander
Safety Officer
Liaison Officer or Agency Representative
Information Officer
Operations Section Chief
Planning Section Chief
Logistics Section Chief
Finance Section Chief
Staging Area Manager
Branch Director
Branch Director
Air Operations Director
Air Attack Supervisor
Air Support Supervisor
Helicopter Coordinator
Air Tanker Coordinator
Helibase Manager
Helispot Manager
Fixed Wing Base Coordinator
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Division/Group Supervisor
Resources Unit Leader
Situation Unit Leader
Demobilization Unit Leader
Documentation Unit Leader
Technical Specialists
Communications Unit Leader
Medical Unit Leader
Food Unit Leader
Security Unit Leader
Supply Unit Leader
Facilities Unit Leader
Ground Support Unit Leader
Time Unit Leader
Procurement Unit Leader
Comp/Claims Unit Leader
Cost Unit Leader
NFES 1332
ICS 207

INCIDENT STATUS SUMMARY
FS-5100-11

1. Date/Time	2. Initial ☐ Update ☐ Final ☐	3. Incident Name	4. Incident Number

5. Incident Commander	6. Jurisdiction	7. County	8. Type incident	9. Location	10. Started Date/Time

11. Cause	12. Area Involved	13. % Controlled	14. Expected Containment Date/Time	15. Estimated Controlled Date/Time	16. Declared Controlled Date/Time

17. Current Threat	18. Control Problems

19. Est. Loss	20. Est. Savings	21. Injuries	Deaths	22. Line Built	23. Line to Build

24. Current Weather	25. Predicted Weather	26. Cost to Date	27. Est. Total Cost
WS Temp WD RH	WS Temp WD RH		

28. Agencies

29. Resources																				Totals
Kind of Resource	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	SR	ST	
ENGINES																					
DOZERS																					
CREWS Number of Crews:																					
Number of Crew Personnel:																					
HELICOPTERS																					
AIR TANKERS																					
TRUCK COS.																					
RESCUE/MED.																					
WATER TENDERS																					
OVERHEAD PERSONNEL																					
TOTAL PERSONNEL																					

30. Cooperating Agencies

31. Remarks

32. Prepared by	33. Approved by	34. Sent to: Date Time By

DESIGNATOR
NAME/ ID. NO. _____

_____

STATUS

☐ ASSIGNED ☐ AVAILABLE ☐ O/S REST
☐ O/S MECHANICAL ☐ O/S MANNING
_____ ETR (O/S= Out of Service)

FROM	LOCATION	TO
	DIVISION/GROUP	
	STAGING AREA	
	BASE/ICP	
	CAMP	
	ENROUTE	ETA
	HOME AGENCY	

MESSAGES

RESTAT

TIME_____ PROCESS ☐

ICS FORM 210 6/83 STATUS CHANGE CARD NFES 1334

ICS Form 211

INCIDENT CHECK-IN LIST

1. Incident Name

2. Check-In Location (complete all that apply)

☐ Base ☐ Camp ☐ Staging Area ☐ ICP Restat ☐ Helibase

3. Date/Time

Check one:

☐ Personnel ☐ Handcrew ☐ Misc.
☐ Engines ☐ Dozers
☐ Helicopters ☐ Aircraft

Check-In Information

4. List Personnel (overhead) by Agency & Name -OR- List equipment by the following format.				5.	6.	7.	8.	9.		10.	11.	12.	13.	14.	15.	16.
Agency	Single Kind	Type	I.D. No/Name	Order/Request Number	Date/ Time Check-In	Leader's Name	Total No. Personnel	Manifest Yes	No	Crew or Individual's Weight	Home Base	Departure Point	Method of Travel	Incident Assignment	Other Qualifications	Sent to RESTAT Time/Int.

Page ___ of ___

17. Prepared by (Name and Position) *Use back for remarks or comments*

ICS 213

GENERAL MESSAGE		
TO:	POSITION:	
FROM:	POSITION:	
SUBJECT:	DATE:	TIME:
MESSAGE:		
SIGNATURE:	POSITION:	
REPLY:		
DATE:	TIME:	SIGNATURE/POSITION:

UNIT LOG	1. Incident Name	2. Date Prepared	3. Time Prepared
4. Unit Name/Designators	5. Unit Leader (Name and Position)		6. Operational Period

7. Personnel Roster Assigned

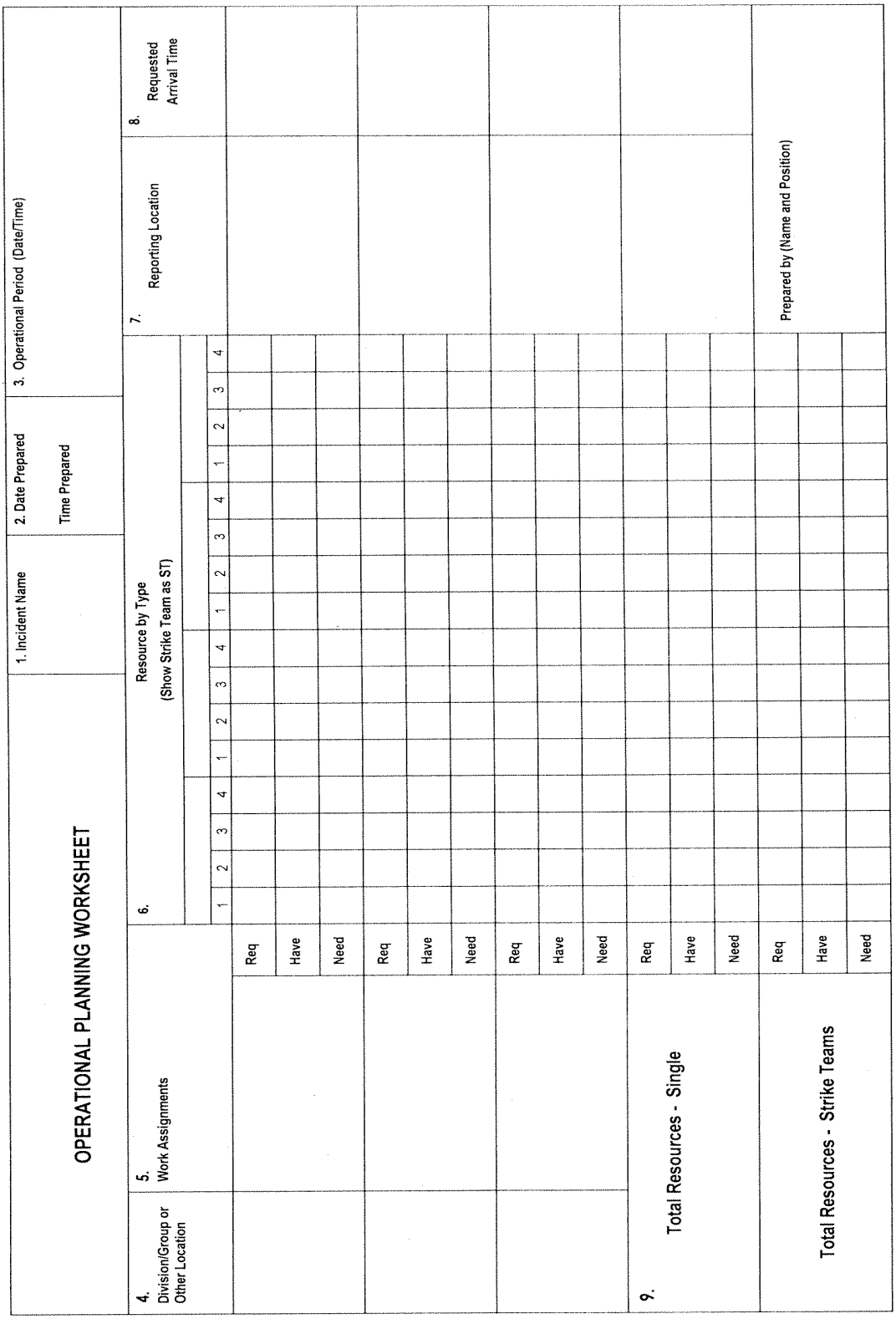
Name	ICS Position	Home Base

8. Activity Log

Time	Major Events

9. Prepared by (Name and Position)

ICS 215


OPERATIONAL PLANNING WORKSHEET
1. Incident Name
2. Date Prepared
Time Prepared
3. Operational Period (Date/Time)
4. Division/Group or Other Location
5. Work Assignments
6. Resource by Type (Show Strike Team as ST)
7. Reporting Location
8. Requested Arrival Time
Req
Have
Need
9. Total Resources - Single
Total Resources - Strike Teams
Prepared by (Name and Position)

Incident Action Plan Safety and Risk Analysis Form, ICS 215A

INCIDENT ACTION PLAN SAFETY ANALYSIS	1. Incident Name	2. Date	3. Time						
Division or Group	Potential Hazards	Mitigations (e.g., PPE, buddy system, escape routes)							Prepared by (Name and Position)
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							
		Type of Hazard:							

RADIO REQUIREMENTS WORKSHEET	1. Incident Name	2. Date	3. Time
4. Branch	5. Agency	6. Operational Period	7. Tactical Frequency

8. Division/Group			Division/Group			Division/Group			Division/Group		
Agency			Agency			Agency			Agency		
9. Agency	ID No.	Radio Requirements	Agency	ID No.	Radio Requirements	Agency	ID No.	Radio Requirements	Agency	ID No.	Radio Requirements

Page 1 of	10. Prepared by (Name and Position)

RADIO FREQUENCY ASSIGNMENT WORKSHEET

1. INCIDENT NAME | 2. DATE | 3. OPERATIONAL PERIOD (DATE/TIME)

3. RADIO DATA / 4. INCIDENT ORGANIZATION				BRANCH	DIVISION	DIVISION	DIVISION	BRANCH	DIVISION	DIVISION	DIVISION	BRANCH	DIVISION	DIVISION	DIVISION	INCIDENT COMMANDER	SAFETY OFFICER	OPERATIONS SECTION CHIEF	AIR OPERATIONS	AIR TACTICAL GROUP SUPERVISOR	PLANNING SECTION CHIEF	GROUND SUPPORT UNIT	BASE UNIT								COMM CENTER	TOTAL BY REQ.
SOURCE	FUNCTION	CH#	FREQUENCY																													
5. AGENCY ID.		CH#	FREQUENCY																													
6. TOTAL RADIOS REQUIRED																																

7. PREPARED BY (NAME/POSITION)

SUPPORT VEHICLE INVENTORY (Use separate sheet for each vehicle category)	1. Incident Name	2. Date Prepared	3. Time Prepared

Vehicle Category: ☐ Buses ☐ Dozers ☐ Engines ☐ Lowboys ☐ Pickups/Sedans ☐ Tenders ☐ Other

4. Vehicle/Equipment Information

Resource Order No. "E" Number	Incident ID No.	Vehicle Type	Vehicle Make	Capacity Size	Agency/Owner	Vehicle License Rig Number	Location	Release Time

Page ___of ____ | 5. Prepared by (Ground Support Unit)

Green Card Stock (Crew)

AGENCY | ST | KIND | TYPE | I.D. NO.

ORDER/REQUEST NO. | DATE/TIME CHECK IN

HOME BASE

DEPARTURE POINT

LEADER NAME

CREW ID NO./NAME (FOR STRIKE TEAMS)

NO. PERSONNEL | MANIFEST ☐ YES ☐ NO | WEIGHT

METHOD OF TRAVEL ☐ OWN ☐ BUS ☐ AIR

OTHER

DESTINATION POINT | ETA

TRANSPORTATION NEEDS ☐ OWN ☐ BUS ☐ AIR

OTHER

ORDERED DATE/TIME | CONFIRMED DATE/TIME

REMARKS

ICS 219-2 (Rev. 4/82) CREW NFES 1344

AGENCY | TF | KIND | TYPE | I.D. NO./NAME

INCIDENT LOCATION | TIME

STATUS
☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.
☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS
☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.
☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS
☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.
☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

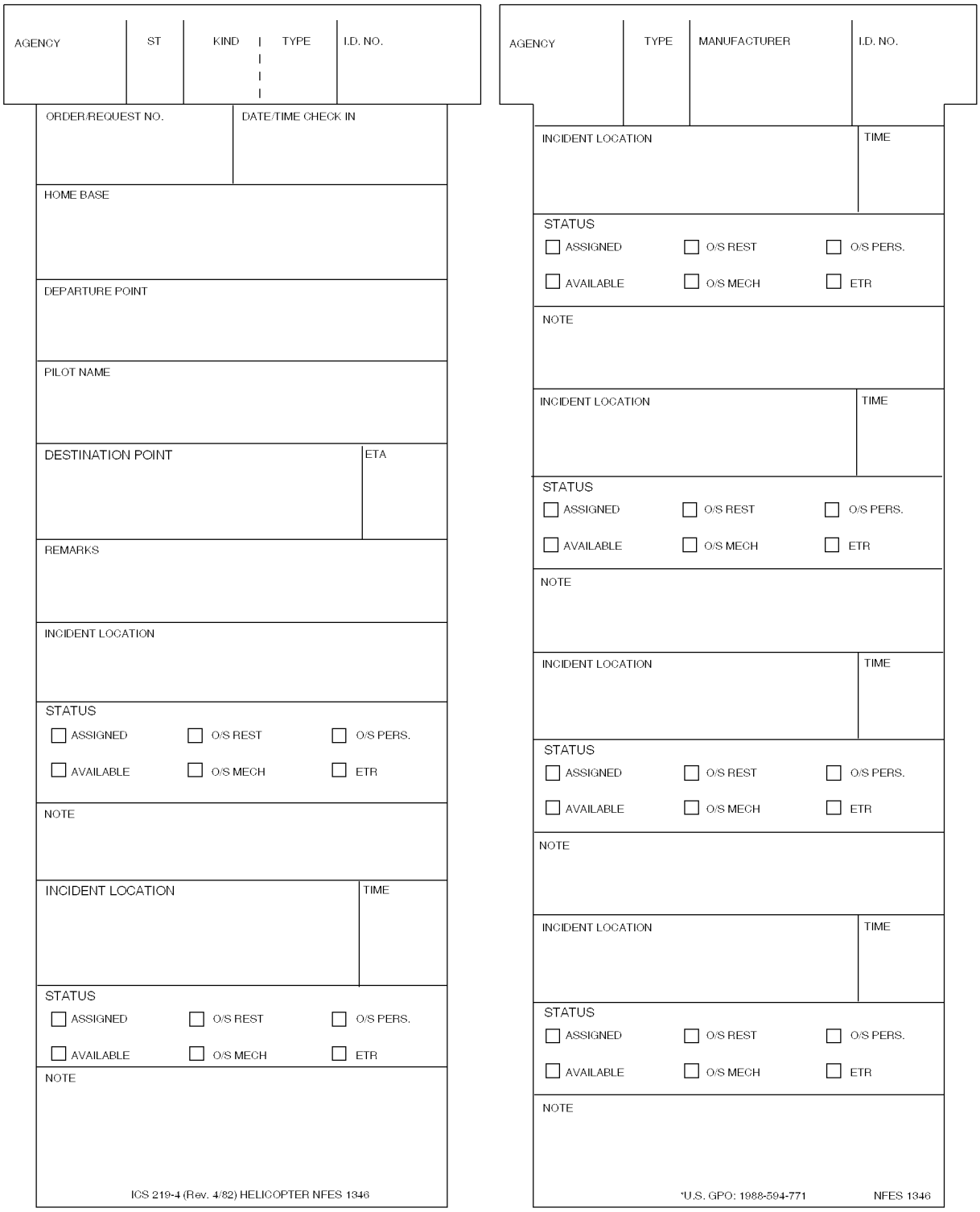
INCIDENT LOCATION | TIME

STATUS
☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.
☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

*U.S. GPO: 1990-794-001

Blue Card Stock (Helicopter)



Orange Card Stock (Aircraft)

AGENCY	TYPE	MANUFACTURER	I.D. NO.

ORDER/REQUEST NO. | DATE/TIME CHECK IN

HOME BASE

DATE TIME RELEASED

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

ICS 219-6 (4/82) AIRCRAFT

AGENCY	TYPE	MANUFACTURER NAME/NO.	I.D. NO.

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION | TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

*U.S. GPO: 695-162-1986 NFES 1348

Yellow Card Stock (Dozers)

AGENCY	ST	TF	KIND	TYPE	I.D. NO.

ORDER/REQUEST NO.	DATE/TIME CHECK IN

HOME BASE

DEPARTURE POINT

LEADER NAME

RESOURCE ID. NO.S/NAMES

DESTINATION POINT	ETA

REMARKS

INCIDENT LOCATION	TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

ICS 219-7 (Rev. 4/82) DOZERS NFES 1349

AGENCY	ST	TF	KIND	TYPE	I.D. NO.

INCIDENT LOCATION	TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION	TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION	TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

INCIDENT LOCATION	TIME

STATUS

☐ ASSIGNED ☐ O/S REST ☐ O/S PERS.

☐ AVAILABLE ☐ O/S MECH ☐ ETR

NOTE

*U.S. GPO: 1990-794-006

AIR OPERATIONS SUMMARY		1. Incident Name		2.Operational Period (Date & Time)	3. Distribution Helibases Fixed Wing Bases
4. Personnel and Communications	Name	Air/Air Frequency	Air/Ground Frequency	5. Remarks (Spec. Instructions, Safety Notes, Hazards, Priorities)	
Air Operations Director					
Air Attack Supervisor					
Helicopter Coordinator					
Air Tanker Coordinator					

6. Location/Function	7. Assignment	8. Fixed Wing		9. Helicopters		10. Time		11. Aircraft Assigned	12. Operating Base
		No.	Type	No.	Type	Available	Commence		
13. Totals									

14. Air Operations Support Equipment	15. Prepared by *(include Date and Time)*

DEMOBILIZATION CHECKOUT

ICS-221

1. INCIDENT NAME/NUMBER	2. DATE/TIME	3. DEMOB NO.

4. UNIT/PERSONNEL RELEASED

5. TRANSPORTATION TYPE/NO.

6. ACTUAL RELEASE DATE/TIME

7. MANIFEST YES NO

NUMBER _____

8. DESTINATION

_____

9. AREA/AGENCY/REGION NOTIFIED

NAME _____

DATE _____

10. UNIT LEADER RESPONSIBLE FOR COLLECTING PERFORMANCE RATING

11. UNIT/PERSONNEL YOU AND YOUR RESOURCES HAVE BEEN RELEASED SUBJECT TO SIGNOFF FROM THE FOLLOWING:

(DEMOB. UNIT LEADER CHECK ✓ APPROPRIATE BOX)

LOGISTICS SECTION

☐ SUPPLY UNIT _____

☐ COMMUNICATIONS UNIT _____

☐ FACILITIES UNIT _____

☐ GROUND SUPPORT UNIT LEADER _____

PLANNING SECTION

☐ DOCUMENTATION UNIT _____

FINANCE/ADMINISTRATION SECTION

☐ TIME UNIT _____

OTHER

☐ _____ _____

☐ _____ _____

12. REMARKS

_____

_____

221 ICS 1/83	

NFES 1353

INSTRUCTIONS ON BACK

January 1, 1983 ICS-221

INSTRUCTIONS FOR COMPLETING THE DEMOBILIZATION CHECKOUT
(ICS FORM 221)

Prior to actual demobilization, Planning Section (Demobilization Unit) should check with the Command Staff (Liaison Officer) to determine any agency specific needs related to demobilization and release. If any, add to line Number 11.

Item Number	Item Title	Instructions
1.	Incident Name/No.	Print Name and/or Number of incident.
2.	Date/Time	Enter Date and Time prepared.
3.	Demob No.	Enter Agency Request Number, Order Number, or Agency Demobilization Number if applicable.
4.	Unit/Personnel Released	Enter appropriate vehicle or Strike Team/Task Force I.D. Number(s) and Leader's name or individual over-head or staff personnel being released.
5.	Transportation Type/No.	Method and vehicle I.D. Number for transportation back to home unit. Enter N/A if own transportation is provided. *Additional specific details should be included in Remarks, block #12.
6.	Actual Release Date/time	To be completed at conclusion of demobilization at time of actual release from incident. Would normally be last item of form to be completed.
7.	Manifest	Mark appropriate box. If yes, enter manifest number. Some agencies require a manifest for air travel.
8.	Destination	Location to which Unit or personnel have been released, i.e., Area, Region, Home base, Airport, Mobilization Center, etc.
9.	Area/Agency/ Region Notified	Identify Area, Agency, or Region notified and enter date & time of notification.
10.	Unit Leader Responsible for Collecting Performance Ratings	Self-explanatory. Note, not all agencies require these ratings.
11.	Unit/Personnel	Demobilization Unit Leader will identify with a check in the box to the left of those units requiring check-out. Identified Unit Leaders are to initial to the right to indicate release. Blank boxes are provided for any additional check (unit requirements as needed), i.e., Safety Officer, Agency Representative, etc.
12.	Remarks	Any additional information pertaining to demobilization or release.

*GPO 1985-0-593-005/14032

INDIVIDUAL PERFORMANCE RATING

INSTRUCTIONS: The immediate supervisor will prepare this form for a subordinate person. Rating will be reviewed with the individual who will sign and date the form. The completed rating will be given to the Planning Section Chief before the rater leaves the incident.

1. NAME	2. INCIDENT NAME AND NUMBER	START DATE OF INCIDENT
3. HOME UNIT ADDRESS	4. INCIDENT AGENCY AND ADDRESS	

5. POSITION HELD ON INCIDENT	6. TRAINEE POSITION ☐ YES ☐ NO	7. INCIDENT COMPLEXITY ☐ I ☐ II ☐ III	8. DATE OF ASSIGNMENT FROM: TO:

9. List the main duties from the Position Checklist, on which the position will be rated. Enter X under the appropriate column indicating the individuals level of performance for each duty listed.	PERFORMANCE LEVEL				
	Did not apply on this Incident	Unacceptable	Need to Improve	Fully Successful	Exceeds Successful
	EXPLAIN IN REMARKS				

10. REMARKS

11. THIS RATING HAS BEEN DISCUSSED WITH ME (Signature of individual being rated.)	12. DATE

13. RATED BY (Signature)	14. HOME UNIT	15. POSITION HELD ON THIS INCIDENT	16. DATE

*U.S. GPO: 1991-594-696/40141

NFES 2074 ICS FORM 226 (6/89)

INCIDENT/PROJECT ORDER NUMBER

RESOURCE ORDER

INITIAL DATE/TIME

2. INCIDENT/PROJECT NAME

3. INCIDENT /PROJECT ORDER NUMBER

4. OFFICE REFERENCE NUMBER

5. DESCRIPTIVE LOCATION/RESPONSE AREA

6. SEC. | TWN | RNG | Base MDM

7. MAP REFERENCE

8. INCIDENT BASE/PHONE NUMBER

9. JURISDICTION/AGENCY

10. ORDERING OFFICE

11. AIRCRAFT INFORMATION

LAT.

LONG.

BEARING	DISTANCE	BASE OR OMNI	AIR CONTACT	FREQUENCY	Ground Contact	FREQUENCY	RELOAD BASE	OTHER AIRCRAFT/HAZARDS

12. Request Number	Ordered Date/Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA

13. ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN	ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN

ICS 259-3 (7/87) NFES 2202

INCIDENT/PROJECT ORDER NUMBER: I D - 0 3 - E 6 - 1 2 3 4

RESOURCE ORDER

Personnel

INITIAL DATE/TIME: 04-05-03

2. INCIDENT/PROJECT NAME: Mormon Cricket #1

3. INCIDENT /PROJECT ORDER NUMBER: 10-03-E6-1234

4. OFFICE REFERENCE NUMBER: USDA-APHIS-I4

5. DESCRIPTIVE LOCATION/RESPONSE AREA: Southern Elmore County

6. SEC. | TWN | RNG | Base MDM

7. MAP REFERENCE

8. INCIDENT BASE/PHONE NUMBER: 208-123-4567

9. JURISDICTION/AGENCY ID - Dept. of Ag.

10. ORDERING OFFICE ID - Dept. of Ag.

11. AIRCRAFT INFORMATION | LAT. | LONG.

BEARING	DISTANCE	BASE OR OMNI	AIR CONTACT	FREQUENCY	Ground Contact	FREQUENCY	RELOAD BASE	OTHER AIRCRAFT/HAZARDS

12. Request Number	Ordered Date/Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA
0-1	04/05 1000	10 M. Smith/ T. Able	1	Entomologist	04-07 1200	see action taken	T. Pole/ C. Davis	1030	PPQ 05	Bill Paxton	0800/ 1030			
0-2	04/05 1000	10 M. Smith/ T. Able	1	Entomologist	04-07 1200	see action taken	T. Pole/ C. Davis	1030	PPQ 06	Martha Hill	0800/ 1030			
0-3	04/06 1300	10 T. Fray/ T. Able	1	Operations S.C.	04-08 0800	ICP	T. Pole/ C. Davis	1310	PPQ 25	Brent Woods	4-7 1500/ 4-7 1900			

13. ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN	ORDER RELAYED Req. No.	Date	Time	To/From	ACTION TAKEN
0-1/2	04/05	1030	T. Pole/C. Davis	Request filled. ETA 04-07					Will be met in BOI by Kelly
				1030 UA 235 departs LAX					Phone#: 208-344-7825.
				0800 arrives BOI 1100. Plane.		04/05	1030	M. Smith/T.Pole	Relayed. Confirmed phone #.

ICS 259-3 (7/87) NFES 2202

CONTINUATION SHEET NO._____ OF _____

Order No.	**RESOURCE ORDER**	2. INCIDENT/PROJECT NAME	3. INCIDENT /PROJECT ORDER NUMBER	4. OFFICE REFERENCE NUMBER

12. Request Number	Ordered Date/Time	From / To	Q T Y	RESOURCE REQUESTED	Needed Date/Time	Deliver To	To / From	Time	Agency ID	RESOURCE ASSIGNED	ETD / ETA	RELEASED Date	RELEASED To	Time / ETA

NFES 2203 (7/87)