

HEROISM AND HORROR

9.1 PREPAREDNESS AS OF SEPTEMBER 11

Emergency response is a product of preparedness. On the morning of September 11, 2001, the last best hope for the community of people working in or visiting the World Trade Center rested not with national policymakers but with private firms and local public servants, especially the first responders: fire, police, emergency medical service, and building safety professionals.

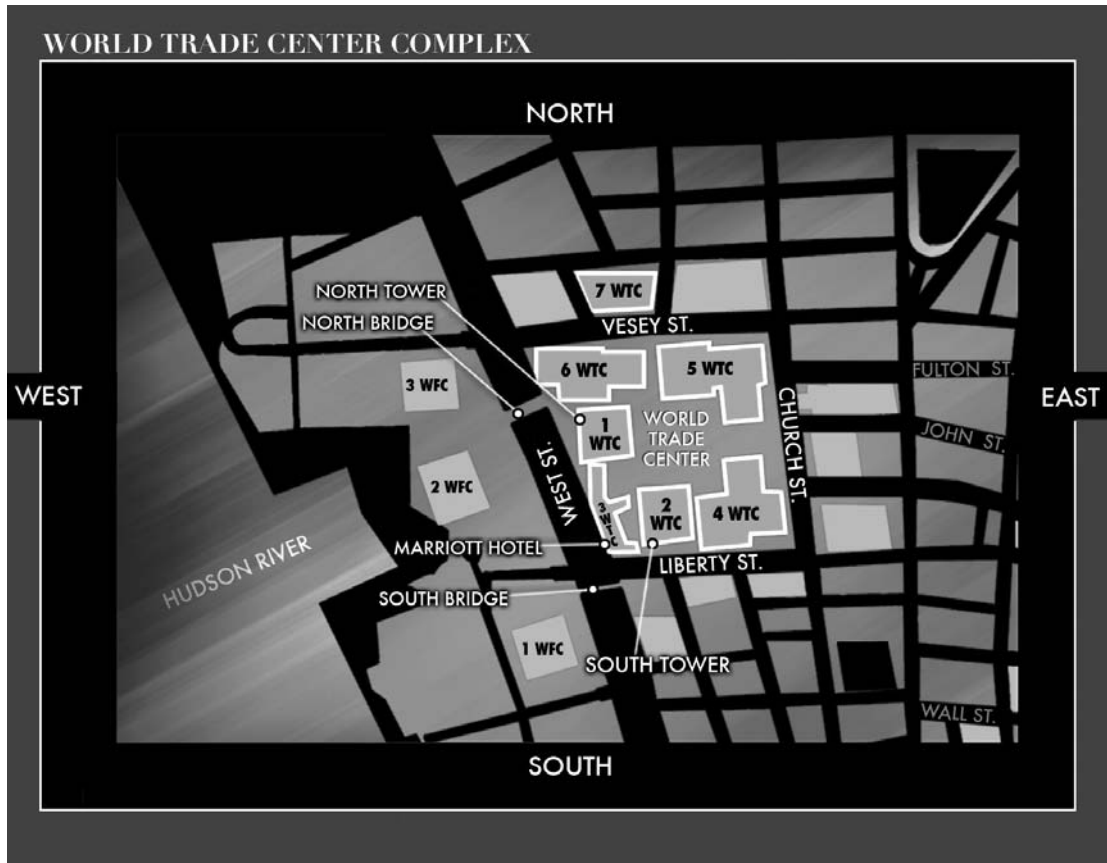
Building Preparedness

The World Trade Center. The World Trade Center (WTC) complex was built for the Port Authority of New York and New Jersey. Construction began in 1966, and tenants began to occupy its space in 1970. The Twin Towers came to occupy a unique and symbolic place in the culture of New York City and America.

The WTC actually consisted of seven buildings, including one hotel, spread across 16 acres of land. The buildings were connected by an underground mall (the concourse). The Twin Towers (1 WTC, or the North Tower, and 2 WTC, or the South Tower) were the signature structures, containing 10.4 million square feet of office space. Both towers had 110 stories, were about 1,350 feet high, and were square; each wall measured 208 feet in length. On any given workday, up to 50,000 office workers occupied the towers, and 40,000 people passed through the complex.¹

Each tower contained three central stairwells, which ran essentially from top to bottom, and 99 elevators. Generally, elevators originating in the lobby ran to “sky lobbies” on higher floors, where additional elevators carried passengers to the tops of the buildings.²

Stairwells A and C ran from the 110th floor to the raised mezzanine level of the lobby. Stairwell B ran from the 107th floor to level B6, six floors below ground, and was accessible from the West Street lobby level, which was one



The World Trade Center Complex as of 9/11
 Rendering by Marco Crupi

floor below the mezzanine. All three stairwells ran essentially straight up and down, except for two deviations in stairwells A and C where the staircase jutted out toward the perimeter of the building. On the upper and lower boundaries of these deviations were transfer hallways contained within the stairwell proper. Each hallway contained smoke doors to prevent smoke from rising from lower to upper portions of the building; they were kept closed but not locked. Doors leading from tenant space into the stairwells were never kept locked; reentry from the stairwells was generally possible on at least every fourth floor.³

Doors leading to the roof were locked. There was no rooftop evacuation plan. The roofs of both the North Tower and the South Tower were sloped and cluttered surfaces with radiation hazards, making them impractical for helicopter landings and as staging areas for civilians. Although the South Tower roof had a helipad, it did not meet 1994 Federal Aviation Administration guidelines.⁴

The 1993 Terrorist Bombing of the WTC and the Port Authority's Response. Unlike most of America, New York City and specifically the World

Trade Center had been the target of terrorist attacks before 9/11. At 12:18 P.M. on February 26, 1993, a 1,500-pound bomb stashed in a rental van was detonated on a parking garage ramp beneath the Twin Towers. The explosion killed six people, injured about 1,000 more, and exposed vulnerabilities in the World Trade Center's and the city's emergency preparedness.⁵

The towers lost power and communications capability. Generators had to be shut down to ensure safety, and elevators stopped. The public-address system and emergency lighting systems failed. The unlit stairwells filled with smoke and were so dark as to be impassable. Rescue efforts by the Fire Department of New York (FDNY) were hampered by the inability of its radios to function in buildings as large as the Twin Towers. The 911 emergency call system was overwhelmed. The general evacuation of the towers' occupants via the stairwells took more than four hours.⁶

Several small groups of people who were physically unable to descend the stairs were evacuated from the roof of the South Tower by New York Police Department (NYPD) helicopters. At least one person was lifted from the North Tower roof by the NYPD in a dangerous helicopter rappel operation—15 hours after the bombing. General knowledge that these air rescues had occurred appears to have left a number of civilians who worked in the Twin Towers with the false impression that helicopter rescues were part of the WTC evacuation plan and that rescue from the roof was a viable, if not favored, option for those who worked on upper floors. Although they were considered after 1993, helicopter evacuations in fact were not incorporated into the WTC fire safety plan.⁷

To address the problems encountered during the response to the 1993 bombing, the Port Authority spent an initial \$100 million to make physical, structural, and technological improvements to the WTC, as well as to enhance its fire safety plan and reorganize and bolster its fire safety and security staffs.⁸

Substantial enhancements were made to power sources and exits. Fluorescent signs and markings were added in and near stairwells. The Port Authority also installed a sophisticated computerized fire alarm system with redundant electronics and control panels, and state-of-the-art fire command stations were placed in the lobby of each tower.⁹

To manage fire emergency preparedness and operations, the Port Authority created the dedicated position of fire safety director. The director supervised a team of deputy fire safety directors, one of whom was on duty at the fire command station in the lobby of each tower at all times. He or she would be responsible for communicating with building occupants during an emergency.¹⁰

The Port Authority also sought to prepare civilians better for future emergencies. Deputy fire safety directors conducted fire drills at least twice a year, with advance notice to tenants. "Fire safety teams" were selected from among civilian employees on each floor and consisted of a fire warden, deputy fire wardens, and searchers. The standard procedure for fire drills was for fire wardens

to lead co-workers in their respective areas to the center of the floor, where they would use the emergency intercom phone to obtain specific information on how to proceed. Some civilians have told us that their evacuation on September 11 was greatly aided by changes and training implemented by the Port Authority in response to the 1993 bombing.¹¹

But during these drills, civilians were not directed into the stairwells, or provided with information about their configuration and about the existence of transfer hallways and smoke doors. Neither full nor partial evacuation drills were held. Moreover, participation in drills that were held varied greatly from tenant to tenant. In general, civilians were never told not to evacuate up. The standard fire drill announcement advised participants that in the event of an actual emergency, they would be directed to descend to at least three floors below the fire. Most civilians recall simply being taught to await the instructions that would be provided at the time of an emergency. Civilians were not informed that rooftop evacuations were not part of the evacuation plan, or that doors to the roof were kept locked. The Port Authority acknowledges that it had no protocol for rescuing people trapped above a fire in the towers.¹²

Six weeks before the September 11 attacks, control of the WTC was transferred by net lease to a private developer, Silverstein Properties. Select Port Authority employees were designated to assist with the transition. Others remained on-site but were no longer part of the official chain of command. However, on September 11, most Port Authority World Trade Department employees—including those not on the designated “transition team”—reported to their regular stations to provide assistance throughout the morning. Although Silverstein Properties was in charge of the WTC on September 11, the WTC fire safety plan remained essentially the same.¹³

Preparedness of First Responders

On 9/11, the principal first responders were from the Fire Department of New York, the New York Police Department, the Port Authority Police Department (PAPD), and the Mayor’s Office of Emergency Management (OEM).

Port Authority Police Department. On September 11, 2001, the Port Authority of New York and New Jersey Police Department consisted of 1,331 officers, many of whom were trained in fire suppression methods as well as in law enforcement. The PAPD was led by a superintendent. There was a separate PAPD command for each of the Port Authority’s nine facilities, including the World Trade Center.¹⁴

Most Port Authority police commands used ultra-high-frequency radios. Although all the radios were capable of using more than one channel, most PAPD officers used one local channel. The local channels were low-wattage and worked only in the immediate vicinity of that command. The PAPD also had an agencywide channel, but not all commands could access it.¹⁵

As of September 11, the Port Authority lacked any standard operating procedures to govern how officers from multiple commands would respond to and then be staged and utilized at a major incident at the WTC. In particular, there were no standard operating procedures covering how different commands should communicate via radio during such an incident.

The New York Police Department. The 40,000-officer NYPD was headed by a police commissioner, whose duties were not primarily operational but who retained operational authority. Much of the NYPD's operational activities were run by the chief of department. In the event of a major emergency, a leading role would be played by the Special Operations Division. This division included the Aviation Unit, which provided helicopters for surveys and rescues, and the Emergency Service Unit (ESU), which carried out specialized rescue missions. The NYPD had specific and detailed standard operating procedures for the dispatch of officers to an incident, depending on the incident's magnitude.¹⁶

The NYPD precincts were divided into 35 different radio zones, with a central radio dispatcher assigned to each. In addition, there were several radio channels for citywide operations. Officers had portable radios with 20 or more available channels, so that the user could respond outside his or her precinct. ESU teams also had these channels but at an operation would use a separate point-to-point channel (which was not monitored by a dispatcher).¹⁷

The NYPD also supervised the city's 911 emergency call system. Its approximately 1,200 operators, radio dispatchers, and supervisors were civilian employees of the NYPD. They were trained in the rudiments of emergency response. When a 911 call concerned a fire, it was transferred to FDNY dispatch.¹⁸

The Fire Department of New York. The 11,000-member FDNY was headed by a fire commissioner who, unlike the police commissioner, lacked operational authority. Operations were headed by the chief of department—the sole five-star chief.¹⁹

The FDNY was organized in nine separate geographic divisions. Each division was further divided into between four to seven battalions. Each battalion contained typically between three and four engine companies and two to four ladder companies. In total, the FDNY had 205 engine companies and 133 ladder companies. On-duty ladder companies consisted of a captain or lieutenant and five firefighters; on-duty engine companies consisted of a captain or lieutenant and normally four firefighters. Ladder companies' primary function was to conduct rescues; engine companies focused on extinguishing fires.²⁰

The FDNY's Specialized Operations Command (SOC) contained a limited number of units that were of particular importance in responding to a terrorist attack or other major incident. The department's five rescue companies and seven squad companies performed specialized and highly risky rescue operations.²¹

The logistics of fire operations were directed by Fire Dispatch Operations Division, which had a center in each of the five boroughs. All 911 calls concerning fire emergencies were transferred to FDNY dispatch.²²

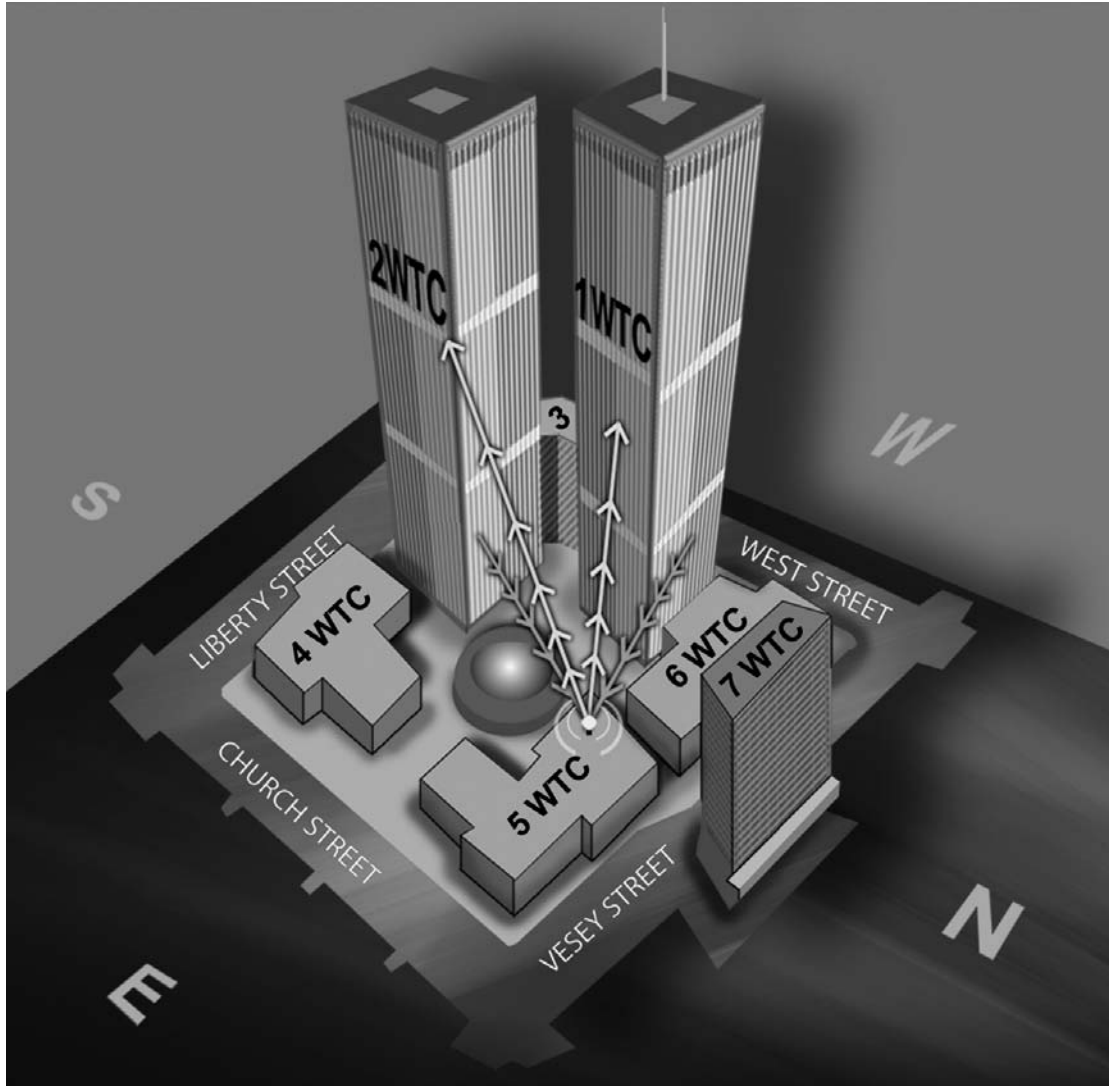
As of September 11, FDNY companies and chiefs responding to a fire used analog, point-to-point radios that had six normal operating channels. Typically, the companies would operate on the same tactical channel, which chiefs on the scene would monitor and use to communicate with the firefighters. Chiefs at a fire operation also would use a separate command channel. Because these point-to-point radios had weak signal strength, communications on them could be heard only by other FDNY personnel in the immediate vicinity. In addition, the FDNY had a dispatch frequency for each of the five boroughs; these were not point-to-point channels and could be monitored from around the city.²³

The FDNY's radios performed poorly during the 1993 WTC bombing for two reasons. First, the radios signals often did not succeed in penetrating the numerous steel and concrete floors that separated companies attempting to communicate; and second, so many different companies were attempting to use the same point-to-point channel that communications became unintelligible.²⁴

The Port Authority installed, at its own expense, a repeater system in 1994 to greatly enhance FDNY radio communications in the difficult high-rise environment of the Twin Towers. The Port Authority recommended leaving the repeater system on at all times. The FDNY requested, however, that the repeater be turned on only when it was actually needed because the channel could cause interference with other FDNY operations in Lower Manhattan. The repeater system was installed at the Port Authority police desk in 5 WTC, to be activated by members of the Port Authority police when the FDNY units responding to the WTC complex so requested. However, in the spring of 2000 the FDNY asked that an activation console for the repeater system be placed instead in the lobby fire safety desk of each of the towers, making FDNY personnel entirely responsible for its activation. The Port Authority complied.²⁵

Between 1998 and 2000, fewer people died from fires in New York City than in any three-year period since accurate measurements began in 1946. Fire-fighter deaths—a total of 22 during the 1990s—compared favorably with the most tranquil periods in the department's history.²⁶

Office of Emergency Management and Interagency Preparedness. In 1996, Mayor Rudolph Giuliani created the Mayor's Office of Emergency Management, which had three basic functions. First, OEM's Watch Command was to monitor the city's key communications channels—including radio frequencies of FDNY dispatch and the NYPD—and other data. A second purpose of the OEM was to improve New York City's response to major incidents, including terrorist attacks, by planning and conducting exercises and drills that would involve multiple city agencies, particularly the NYPD and FDNY. Third, the OEM would play a crucial role in managing the city's overall response to an



The World Trade Center Radio Repeater System
 Rendering by Marco Crupi

incident. After OEM's Emergency Operations Center was activated, designated liaisons from relevant agencies, as well as the mayor and his or her senior staff, would respond there. In addition, an OEM field responder would be sent to the scene to ensure that the response was coordinated.²⁷

The OEM's headquarters was located at 7 WTC. Some questioned locating it both so close to a previous terrorist target and on the 23rd floor of a building (difficult to access should elevators become inoperable). There was no backup site.²⁸

In July 2001, Mayor Giuliani updated a directive titled "Direction and Control of Emergencies in the City of New York." Its purpose was to eliminate "potential conflict among responding agencies which may have areas

of overlapping expertise and responsibility.” The directive sought to accomplish this objective by designating, for different types of emergencies, an appropriate agency as “Incident Commander.” This Incident Commander would be “responsible for the management of the City’s response to the emergency,” while the OEM was “designated the ‘On Scene Interagency Coordinator.’”²⁹

Nevertheless, the FDNY and NYPD each considered itself operationally autonomous. As of September 11, they were not prepared to comprehensively coordinate their efforts in responding to a major incident. The OEM had not overcome this problem.

9.2 SEPTEMBER 11, 2001

As we turn to the events of September 11, we are mindful of the unfair perspective afforded by hindsight. Nevertheless, we will try to describe what happened in the following 102 minutes:

- the 17 minutes from the crash of the hijacked American Airlines Flight 11 into 1 World Trade Center (the North Tower) at 8:46 until the South Tower was hit
- the 56 minutes from the crash of the hijacked United Airlines Flight 175 into 2 World Trade Center (the South Tower) at 9:03 until the collapse of the South Tower
- the 29 minutes from the collapse of the South Tower at 9:59 until the collapse of the North Tower at 10:28

From 8:46 until 9:03 A.M.

At 8:46:40, the hijacked American Airlines Flight 11 flew into the upper portion of the North Tower, cutting through floors 93 to 99. Evidence suggests that all three of the building’s stairwells became impassable from the 92nd floor up. Hundreds of civilians were killed instantly by the impact. Hundreds more remained alive but trapped.³⁰

Civilians, Fire Safety Personnel, and 911 Calls

North Tower. A jet fuel fireball erupted upon impact and shot down at least one bank of elevators. The fireball exploded onto numerous lower floors, including the 77th and 22nd; the West Street lobby level; and the B4 level, four stories below ground. The burning jet fuel immediately created thick, black smoke that enveloped the upper floors and roof of the North Tower. The roof of the South Tower was also engulfed in smoke because of prevailing light winds from the northwest.³¹

Within minutes, New York City’s 911 system was flooded with eyewitness-

ness accounts of the event. Most callers correctly identified the target of the attack. Some identified the plane as a commercial airliner.³²

The first response came from private firms and individuals—the people and companies in the building. Everything that would happen to them during the next few minutes would turn on their circumstances and their preparedness, assisted by building personnel on-site.

Hundreds of civilians trapped on or above the 92nd floor gathered in large and small groups, primarily between the 103rd and 106th floors. A large group was reported on the 92nd floor, technically below the impact but unable to descend. Civilians were also trapped in elevators. Other civilians below the impact zone—mostly on floors in the 70s and 80s, but also on at least the 47th and 22nd floors—were either trapped or waiting for assistance.³³

It is unclear when the first full building evacuation order was attempted over the public-address system. The deputy fire safety director in the lobby, while immediately aware that a major incident had occurred, did not know for approximately ten minutes that a commercial jet had directly hit the building. Following protocol, he initially gave announcements to those floors that had generated computerized alarms, advising those tenants to descend to points of safety—at least two floors below the smoke or fire—and to wait there for further instructions. The deputy fire safety director has told us that he began instructing a full evacuation within about ten minutes of the explosion. But the first FDNY chiefs to arrive in the lobby were advised by the Port Authority fire safety director—who had reported to the lobby although he was no longer the designated fire safety director—that the full building evacuation announcement had been made within one minute of the building being hit.³⁴

Because of damage to building systems caused by the impact of the plane, public-address announcements were not heard in many locations. For the same reason, many civilians may have been unable to use the emergency intercom phones, as they had been advised to do in fire drills. Many called 911.³⁵

The 911 system was not equipped to handle the enormous volume of calls it received. Some callers were unable to connect with 911 operators, receiving an “all circuits busy” message. Standard operating procedure was for calls relating to fire emergencies to be transferred from 911 operators to FDNY dispatch operators in the appropriate borough (in this case, Manhattan). Transfers were often plagued by delays and were in some cases unsuccessful. Many calls were also prematurely disconnected.³⁶

The 911 operators and FDNY dispatchers had no information about either the location or the magnitude of the impact zone and were therefore unable to provide information as fundamental as whether callers were above or below the fire. Because the operators were not informed of NYPD Aviation’s determination of the impossibility of rooftop rescues from the Twin Towers on that day, they could not knowledgeably answer when callers asked whether to go up or down. In most instances, therefore, the operators and the FDNY dispatchers relied on standard operating procedures for high-rise fires—that civil-

ians should stay low, remain where they are, and wait for emergency personnel to reach them. This advice was given to callers from the North Tower for locations both above and below the impact zone. Fire chiefs told us that the evacuation of tens of thousands of people from skyscrapers can create many new problems, especially for individuals who are disabled or in poor health. Many of the injuries after the 1993 bombing occurred during the evacuation.³⁷

Although the guidance to stay in place may seem understandable in cases of conventional high-rise fires, FDNY chiefs in the North Tower lobby determined at once that all building occupants should attempt to evacuate immediately. By 8:57, FDNY chiefs had instructed the PAPD and building personnel to evacuate the South Tower as well, because of the magnitude of the damage caused by the first plane's impact.³⁸

These critical decisions were not conveyed to 911 operators or to FDNY dispatchers. Departing from protocol, a number of operators told callers that they could break windows, and several operators advised callers to evacuate if they could.³⁹ Civilians who called the Port Authority police desk located at 5 WTC were advised to leave if they could.⁴⁰

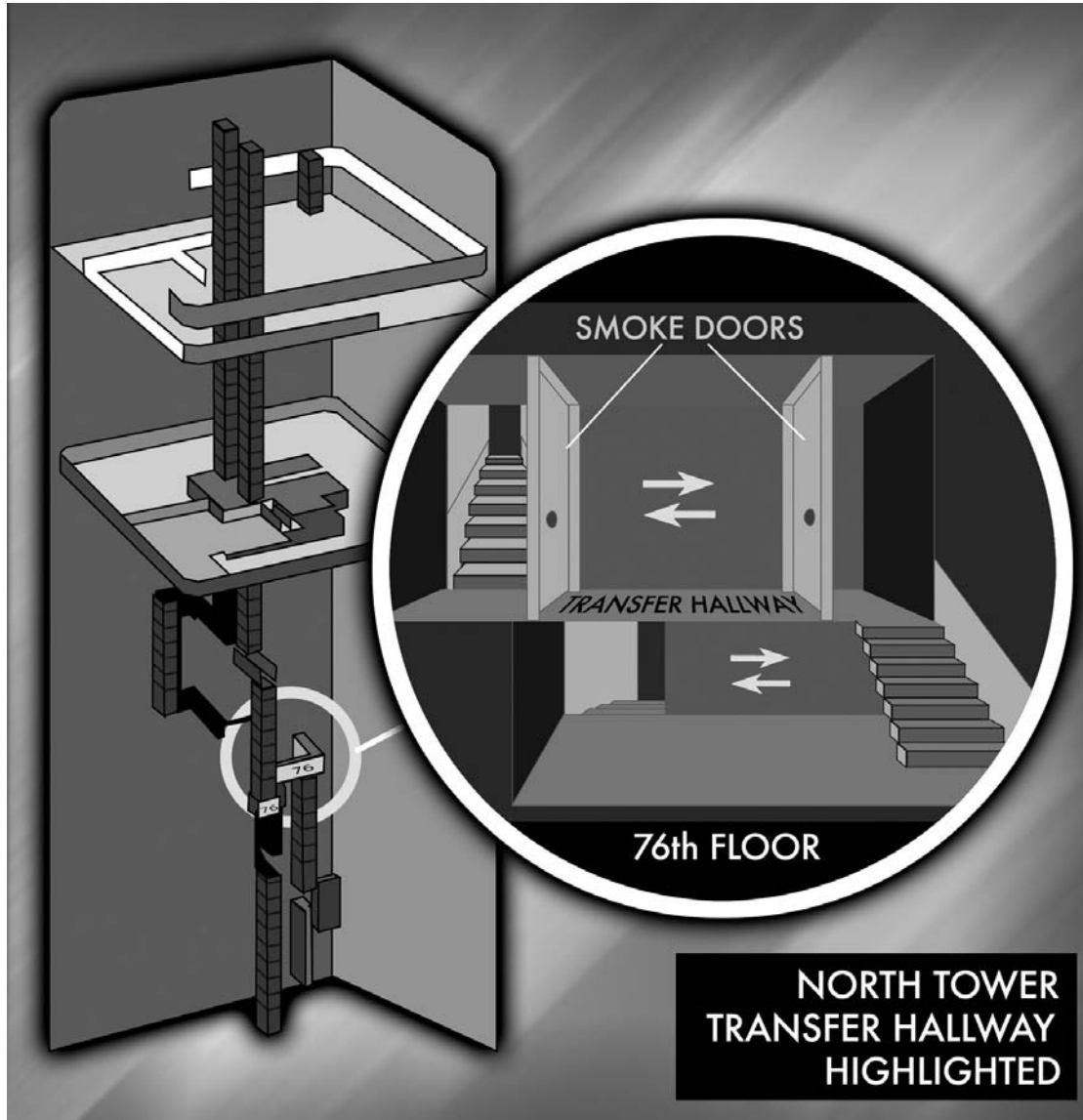
Most civilians who were not obstructed from proceeding began evacuating without waiting for instructions over the intercom system. Some remained to wait for help, as advised by 911 operators. Others simply continued to work or delayed to collect personal items, but in many cases were urged to leave by others. Some Port Authority civilian employees remained on various upper floors to help civilians who were trapped and to assist in the evacuation.⁴¹

While evacuating, some civilians had trouble reaching the exits because of damage caused by the impact. Some were confused by deviations in the increasingly crowded stairwells, and impeded by doors that appeared to be locked but actually were jammed by debris or shifting that resulted from the impact of the plane. Despite these obstacles, the evacuation was relatively calm and orderly.⁴²

Within ten minutes of impact, smoke was beginning to rise to the upper floors in debilitating volumes and isolated fires were reported, although there were some pockets of refuge. Faced with insufferable heat, smoke, and fire, and with no prospect for relief, some jumped or fell from the building.⁴³

South Tower. Many civilians in the South Tower were initially unaware of what had happened in the other tower. Some believed an incident had occurred in their building; others were aware that a major explosion had occurred on the upper floors of the North Tower. Many people decided to leave, and some were advised to do so by fire wardens. In addition, Morgan Stanley, which occupied more than 20 floors of the South Tower, evacuated its employees by the decision of company security officials.⁴⁴

Consistent with protocol, at 8:49 the deputy fire safety director in the South Tower told his counterpart in the North Tower that he would wait to hear from "the boss from the Fire Department or somebody" before ordering an evacuation.⁴⁵ At about this time, an announcement over the public-address system in



The World Trade Center North Tower Stairwell with Deviation
 Rendering by Marco Crupi

the South Tower stated that the incident had occurred in the other building and advised tenants, generally, that their building was safe and that they should remain on or return to their offices or floors. A statement from the deputy fire safety director informing tenants that the incident had occurred in the other building was consistent with protocol; the expanded advice did not correspond to any existing written protocol, and did not reflect any instruction known to have been given to the deputy fire safety director that day. We do not know the reason for the announcement, as both the deputy fire safety director believed to have made it and the director of fire safety for the WTC complex perished in the South Tower's collapse. Clearly, however, the prospect of another plane hitting the second building was beyond the contemplation of anyone giving advice. According

to one of the first fire chiefs to arrive, such a scenario was unimaginable, “beyond our consciousness.” As a result of the announcement, many civilians remained on their floors. Others reversed their evacuation and went back up.⁴⁶

Similar advice was given in person by security officials in both the ground-floor lobby—where a group of 20 that had descended by the elevators was personally instructed to go back upstairs—and in the upper sky lobby, where many waited for express elevators to take them down. Security officials who gave this advice were not part of the fire safety staff.⁴⁷

Several South Tower occupants called the Port Authority police desk in 5 WTC. Some were advised to stand by for further instructions; others were strongly advised to leave.⁴⁸

It is not known whether the order by the FDNY to evacuate the South Tower was received by the deputy fire safety director making announcements there. However, at approximately 9:02—less than a minute before the building was hit—an instruction over the South Tower’s public-address system advised civilians, generally, that they could begin an orderly evacuation if conditions warranted. Like the earlier advice to remain in place, it did not correspond to any prewritten emergency instruction.⁴⁹

FDNY Initial Response

Mobilization. The FDNY response began within five seconds of the crash. By 9:00, many senior FDNY leaders, including 7 of the 11 most highly ranked chiefs in the department, as well as the Commissioner and many of his deputies and assistants, had begun responding from headquarters in Brooklyn. While en route over the Brooklyn Bridge, the Chief of Department and the Chief of Operations had a clear view of the situation on the upper floors of the North Tower. They determined that because of the fire’s magnitude and location near the top of the building, their mission would be primarily one of rescue. They called for a fifth alarm, which would bring additional engine and ladder companies, as well as for two more elite rescue units. The Chief of Department arrived at about 9:00; general FDNY Incident Command was transferred to his location on the West Side Highway. In all, 22 of the 32 senior chiefs and commissioners arrived at the WTC before 10:00.⁵⁰

As of 9:00, the units that were dispatched (including senior chiefs responding to headquarters) included approximately 235 firefighters. These units consisted of 21 engine companies, nine ladder companies, four of the department’s elite rescue teams, the department’s single Hazmat team, two of the city’s elite squad companies, and support staff. In addition, at 8:53 nine Brooklyn units were staged on the Brooklyn side of the Brooklyn-Battery Tunnel to await possible dispatch orders.⁵¹

Operations. A battalion chief and two ladder and two engine companies arrived at the North Tower at approximately 8:52. As they entered the lobby, they encountered badly burned civilians who had been caught in the path of

the fireball. Floor-to-ceiling windows in the northwest corner of the West Street level of the lobby had been blown out; some large marble tiles had been dislodged from the walls; one entire elevator bank was destroyed by the fireball. Lights were functioning, however, and the air was clear of smoke.⁵²

As the highest-ranking officer on the scene, the battalion chief initially was the FDNY incident commander. Minutes later, the on-duty division chief for Lower Manhattan arrived and took over. Both chiefs immediately began speaking with the former fire safety director and other building personnel to learn whether building systems were working. They were advised that all 99 elevators in the North Tower appeared to be out, and there were no assurances that sprinklers or standpipes were working on upper floors. Chiefs also spoke with Port Authority police personnel and an OEM representative.⁵³

After conferring with the chiefs in the lobby, one engine and one ladder company began climbing stairwell C at about 8:57, with the goal of approaching the impact zone as scouting units and reporting back to the chiefs in the lobby. The radio channel they used was tactical 1. Following FDNY high-rise fire protocols, other units did not begin climbing immediately, as the chiefs worked to formulate a plan before sending them up. Units began mobilizing in the lobby, lining up and awaiting their marching orders.⁵⁴

Also by approximately 8:57, FDNY chiefs had asked both building personnel and a Port Authority police officer to evacuate the South Tower, because in their judgment the impact of the plane into the North Tower made the entire complex unsafe—not because of concerns about a possible second plane.⁵⁵

The FDNY chiefs in the increasingly crowded North Tower lobby were confronting critical choices with little to no information. They had ordered units up the stairs to report back on conditions, but did not know what the impact floors were; they did not know if any stairwells into the impact zone were clear; and they did not know whether water for firefighting would be available on the upper floors. They also did not know what the fire and impact zone looked like from the outside.⁵⁶

They did know that the explosion had been large enough to send down a fireball that blew out elevators and windows in the lobby and that conditions were so dire that some civilians on upper floors were jumping or falling from the building. They also knew from building personnel that some civilians were trapped in elevators and on specific floors. According to Division Chief for Lower Manhattan Peter Hayden, “We had a very strong sense we would lose firefighters and that we were in deep trouble, but we had estimates of 25,000 to 50,000 civilians, and we had to try to rescue them.”⁵⁷

The chiefs concluded that this would be a rescue operation, not a firefighting operation. One of the chiefs present explained:

We realized that, because of the impact of the plane, that there was some structural damage to the building, and most likely that the fire suppres-

sion systems within the building were probably damaged and possibly inoperable. . . . We knew that at the height of the day there were as many as 50,000 people in this building. We had a large volume of fire on the upper floors. Each floor was approximately an acre in size. Several floors of fire would have been beyond the fire-extinguishing capability of the forces that we had on hand. So we determined, very early on, that this was going to be strictly a rescue mission. We were going to vacate the building, get everybody out, and then we were going to get out.⁵⁸

The specifics of the mission were harder to determine, as they had almost no information about the situation 80 or more stories above them. They also received advice from senior FDNY chiefs that while the building might eventually suffer a partial collapse on upper floors, such structural failure was not imminent. No one anticipated the possibility of a total collapse.⁵⁹

Emergency medical services (EMS) personnel were directed to one of four triage areas being set up around the perimeter of the WTC. Some entered the lobby to respond to specific casualty reports. In addition, many ambulance paramedics from private hospitals were rushing to the WTC complex.⁶⁰

NYPD Initial Response

Numerous NYPD officers saw the plane strike the North Tower and immediately reported it to NYPD communications dispatchers.⁶¹

At 8:58, while en route, the NYPD Chief of Department raised the NYPD's mobilization to level 4, thereby sending to the WTC approximately 22 lieutenants, 100 sergeants, and 800 police officers from all over the city. The Chief of Department arrived at Church and Vesey at 9:00.⁶²

At 9:01, the NYPD patrol mobilization point was moved to West and Vesey in order to handle the greater number of patrol officers dispatched in the higher-level mobilization. These officers would be stationed around the perimeter of the complex to direct the evacuation of civilians. Many were diverted on the way to the scene by intervening emergencies related to the attack.⁶³

At 8:50, the Aviation Unit of the NYPD dispatched two helicopters to the WTC to report on conditions and assess the feasibility of a rooftop landing or of special rescue operations. En route, the two helicopters communicated with air traffic controllers at the area's three major airports and informed them of the commercial airplane crash at the World Trade Center. The air traffic controllers had been unaware of the incident.⁶⁴

At 8:56, an NYPD ESU team asked to be picked up at the Wall Street heliport to initiate rooftop rescues. At 8:58, however, after assessing the North Tower roof, a helicopter pilot advised the ESU team that they could not land on the roof, because "it is too engulfed in flames and heavy smoke condition."⁶⁵

By 9:00, a third NYPD helicopter was responding to the WTC complex.

NYPD helicopters and ESU officers remained on the scene throughout the morning, prepared to commence rescue operations on the roof if conditions improved. Both FDNY and NYPD protocols called for FDNY personnel to be placed in NYPD helicopters in the event of an attempted rooftop rescue at a high-rise fire. No FDNY personnel were placed in NYPD helicopters on September 11.⁶⁶

The 911 operators and FDNY dispatchers were not advised that rooftop rescues were not being undertaken. They thus were not able to communicate this fact to callers, some of whom spoke of attempting to climb to the roof.⁶⁷

Two on-duty NYPD officers were on the 20th floor of the North Tower at 8:46. They climbed to the 29th floor, urging civilians to evacuate, but did not locate a group of civilians trapped on the 22nd floor.⁶⁸

Just before 9:00, an ESU team began to walk from Church and Vesey to the North Tower lobby, with the goal of climbing toward and setting up a triage center on the upper floors for the severely injured. A second ESU team would follow them to assist in removing those individuals.⁶⁹

Numerous officers responded in order to help injured civilians and to urge those who could walk to vacate the area immediately. Putting themselves in danger of falling debris, several officers entered the plaza and successfully rescued at least one injured, nonambulatory civilian, and attempted to rescue others.⁷⁰

Also by about 9:00, transit officers began shutting down subway stations in the vicinity of the World Trade Center and evacuating civilians from those stations.⁷¹

Around the city, the NYPD cleared major thoroughfares for emergency vehicles to access the WTC. The NYPD and PAPD coordinated the closing of bridges and tunnels into Manhattan.⁷²

PAPD Initial Response

The Port Authority's on-site commanding police officer was standing in the concourse when a fireball erupted out of elevator shafts and exploded onto the mall concourse, causing him to dive for cover. The on-duty sergeant initially instructed the officers in the WTC Command to meet at the police desk in 5 WTC. Soon thereafter, he instructed officers arriving from outside commands to meet him at the fire safety desk in the North Tower lobby. A few of these officers from outside commands were given WTC Command radios.⁷³

One Port Authority police officer at the WTC immediately began climbing stairwell C in the North Tower.⁷⁴ Other officers began performing rescue and evacuation operations on the ground floors and in the PATH (Port Authority Trans-Hudson) station below the WTC complex.

Within minutes of impact, Port Authority police officers from the PATH, bridges, tunnels, and airport commands began responding to the WTC. The PAPD lacked written standard operating procedures for personnel responding from outside commands to the WTC during a major incident. In addition, offi-

cers from some PAPD commands lacked interoperable radio frequencies. As a result, there was no comprehensive coordination of PAPD's overall response.⁷⁵

At 9:00, the PAPD commanding officer of the WTC ordered an evacuation of all civilians in the World Trade Center complex, because of the magnitude of the calamity in the North Tower. This order was given over WTC police radio channel W, which could not be heard by the deputy fire safety director in the South Tower.⁷⁶

Also at 9:00, the PAPD Superintendent and Chief of Department arrived separately and made their way to the North Tower.⁷⁷

OEM Initial Response

By 8:48, officials in OEM headquarters on the 23rd floor of 7 WTC—just to the north of the North Tower—began to activate the Emergency Operations Center by calling such agencies as the FDNY, NYPD, Department of Health, and the Greater Hospital Association and instructing them to send their designated representatives to the OEM. In addition, the Federal Emergency Management Agency (FEMA) was called and asked to send at least five federal Urban Search and Rescue Teams (such teams are located throughout the United States). At approximately 8:50, a senior representative from the OEM arrived in the lobby of the North Tower and began to act as the OEM field responder to the incident. He soon was joined by several other OEM officials, including the OEM Director.⁷⁸

Summary

In the 17-minute period between 8:46 and 9:03 A.M. on September 11, New York City and the Port Authority of New York and New Jersey had mobilized the largest rescue operation in the city's history. Well over a thousand first responders had been deployed, an evacuation had begun, and the critical decision that the fire could not be fought had been made.

Then the second plane hit.

From 9:03 until 9:59 A.M.

At 9:03:11, the hijacked United Airlines Flight 175 hit 2 WTC (the South Tower) from the south, crashing through the 77th to 85th floors. What had been the largest and most complicated rescue operation in city history instantly doubled in magnitude. The plane banked as it hit the building, leaving portions of the building undamaged on impact floors. As a consequence—and in contrast to the situation in the North Tower—one of the stairwells (A) initially remained passable from at least the 91st floor down, and likely from top to bottom.⁷⁹

Civilians, Fire Safety Personnel, and 911 Calls

South Tower. At the lower end of the impact, the 78th-floor sky lobby, hundreds had been waiting to evacuate when the plane hit. Many had attempted but failed to squeeze into packed express elevators. Upon impact, many were

killed or severely injured; others were relatively unharmed. We know of at least one civilian who seized the initiative and shouted that anyone who could walk should walk to the stairs, and anyone who could help should help others in need of assistance. As a result, at least two small groups of civilians descended from that floor. Others remained on the floor to help the injured and move victims who were unable to walk to the stairwell to aid their rescue.⁸⁰

Still others remained alive in the impact zone above the 78th floor. Damage was extensive, and conditions were highly precarious. The only survivor known to have escaped from the heart of the impact zone described the 81st floor—where the wing of the plane had sliced through his office—as a “demolition” site in which everything was “broken up” and the smell of jet fuel was so strong that it was almost impossible to breathe. This person escaped by means of an unlikely rescue, aided by a civilian fire warden descending from a higher floor, who, critically, had been provided with a flashlight.⁸¹

At least four people were able to descend stairwell A from the 81st floor or above. One left the 84th floor immediately after the building was hit. Even at that point, the stairway was dark, smoky, and difficult to navigate; glow strips on the stairs and handrails were a significant help. Several flights down, however, the evacuee became confused when he reached a smoke door that caused him to believe the stairway had ended. He was able to exit that stairwell and switch to another.⁸²

Many civilians in and above the impact zone ascended the stairs. One small group reversed its descent down stairwell A after being advised by another civilian that they were approaching a floor “in flames.” The only known survivor has told us that their intention was to exit the stairwell in search of clearer air. At the 91st floor, joined by others from intervening floors, they perceived themselves to be trapped in the stairwell and began descending again. By this time, the stairwell was “pretty black,” intensifying smoke caused many to pass out, and fire had ignited in the 82nd-floor transfer hallway.⁸³

Others ascended to attempt to reach the roof but were thwarted by locked doors. At approximately 9:30 a “lock release” order—which would unlock all areas in the complex controlled by the buildings’ computerized security system, including doors leading to the roofs—was transmitted to the Security Command Center located on the 22nd floor of the North Tower. Damage to the software controlling the system, resulting from the impact of the plane, prevented this order from being executed.⁸⁴

Others, attempting to descend, were frustrated by jammed or locked doors in stairwells or confused by the structure of the stairwell deviations. By the lower 70s, however, stairwells A and B were well-lit, and conditions were generally normal.⁸⁵

Some civilians remained on affected floors, and at least one ascended from a lower point into the impact zone, to help evacuate colleagues or assist the injured.⁸⁶

Within 15 minutes after the impact, debilitating smoke had reached at least

one location on the 100th floor, and severe smoke conditions were reported throughout floors in the 90s and 100s over the course of the following half hour. By 9:30, a number of civilians who had failed to reach the roof remained on the 105th floor, likely unable to descend because of intensifying smoke in the stairwell. There were reports of tremendous smoke on that floor, but at least one area remained less affected until shortly before the building collapsed. There were several areas between the impact zone and the uppermost floors where conditions were better. At least a hundred people remained alive on the 88th and 89th floors, in some cases calling 911 for direction.⁸⁷

The 911 system remained plagued by the operators' lack of awareness of what was occurring. Just as in the North Tower, callers from below and above the impact zone were advised to remain where they were and wait for help. The operators were not given any information about the inability to conduct rooftop rescues and therefore could not advise callers that they had essentially been ruled out. This lack of information, combined with the general advice to remain where they were, may have caused civilians above the impact not to attempt to descend, although stairwell A may have been passable.⁸⁸

In addition, the 911 system struggled with the volume of calls and rigid standard operating procedures according to which calls conveying crucial information had to wait to be transferred to either EMS or FDNY dispatch.⁸⁹ According to one civilian who was evacuating down stairwell A from the heart of the impact zone and who stopped on the 31st floor in order to call 911,

I told them when they answered the phone, where I was, that I had passed somebody on the 44th floor, injured—they need to get a medic and a stretcher to this floor, and described the situation in brief, and the person then asked for my phone number, or something, and they said—they put me on hold. “You gotta talk to one of my supervisors”—and suddenly I was on hold. And so I waited a considerable amount of time. Somebody else came back on the phone, I repeated the story. And then it happened again. I was on hold a second time, and needed to repeat the story for a third time. But I told the third person that I am only telling you once. I am getting out of the building, here are the details, write it down, and do what you should do.⁹⁰

Very few 911 calls were received from floors below the impact, but at least one person was advised to remain on the 73rd floor despite the caller's protests that oxygen was running out. The last known 911 call from this location came at 9:52.⁹¹

Evidence suggests that the public-address system did not continue to function after the building was hit. A group of people trapped on the 97th floor, however, made repeated references in calls to 911 to having heard “announcements” to go down the stairs. Evacuation tones were heard in locations both above and below the impact zone.⁹²

By 9:35, the West Street lobby level of the South Tower was becoming overwhelmed by injured people who had descended to the lobby but were having difficulty going on. Those who could continue were directed to exit north or east through the concourse and then out of the WTC complex.⁹³

By 9:59, at least one person had descended from as high as the 91st floor of that tower, and stairwell A was reported to have been almost empty. Stairwell B was also reported to have contained only a handful of descending civilians at an earlier point in the morning. But just before the tower collapsed, a team of NYPD ESU officers encountered a stream of civilians descending an unidentified stairwell in the 20s. These civilians may have been descending from at or above the impact zone.⁹⁴

North Tower. In the North Tower, civilians continued their evacuation. On the 91st floor, the highest floor with stairway access, all civilians but one were uninjured and able to descend. While some complained of smoke, heat, fumes, and crowding in the stairwells, conditions were otherwise fairly normal on floors below the impact. At least one stairwell was reported to have been “clear and bright” from the upper 80s down.⁹⁵

Those who called 911 from floors below the impact were generally advised to remain in place. One group trapped on the 83rd floor pleaded repeatedly to know whether the fire was above or below them, specifically asking if 911 operators had any information from the outside or from the news. The callers were transferred back and forth several times and advised to stay put. Evidence suggests that these callers died.⁹⁶

At 8:59, the Port Authority police desk at Newark Airport told a third party that a group of Port Authority civilian employees on the 64th floor should evacuate. (The third party was not at the WTC, but had been in phone contact with the group on the 64th floor.) At 9:10, in response to an inquiry from the employees themselves, the Port Authority police desk in Jersey City confirmed that employees on the 64th floor should “be careful, stay near the stairwells, and wait for the police to come up.” When the third party inquired again at 9:31, the police desk at Newark Airport advised that they “absolutely” evacuate. The third party informed the police desk that the employees had previously received contrary advice from the FDNY, which could only have come via 911. These workers were not trapped, yet unlike most occupants on the upper floors, they had chosen not to descend immediately after impact. They eventually began to descend the stairs, but most of them died in the collapse of the North Tower.⁹⁷

All civilians who reached the lobby were directed by NYPD and PAPD officers into the concourse, where other police officers guided them to exit the concourse and complex to the north and east so that they might avoid falling debris and victims.⁹⁸

By 9:55, only a few civilians were descending above the 25th floor in stair-

well B; these primarily were injured, handicapped, elderly, or severely overweight civilians, in some cases being assisted by other civilians.⁹⁹

By 9:59, tenants from the 91st floor had already descended the stairs and exited the concourse. However, a number of civilians remained in at least stairwell C, approaching lower floors. Other evacuees were killed earlier by debris falling on the street.¹⁰⁰

FDNY Response

Increased Mobilization. Immediately after the second plane hit, the FDNY Chief of Department called a second fifth alarm.¹⁰¹

By 9:15, the number of FDNY personnel en route to or present at the scene was far greater than the commanding chiefs at the scene had requested. Five factors account for this disparity. First, while the second fifth alarm had called for 20 engine and 8 ladder companies, in fact 23 engine and 13 ladder companies were dispatched. Second, several other units self-dispatched. Third, because the attacks came so close to the 9:00 shift change, many firefighters just going off duty were given permission by company officers to “ride heavy” and became part of those on-duty teams, under the leadership of that unit’s officer. Fourth, many off-duty firefighters responded from firehouses separately from the on-duty unit (in some cases when expressly told not to) or from home. The arrival of personnel in excess of that dispatched was particularly pronounced in the department’s elite units. Fifth, numerous additional FDNY personnel—such as fire marshals and firefighters in administrative positions—who lacked a predetermined operating role also reported to the WTC.¹⁰²

The Repeater System. Almost immediately after the South Tower was hit, senior FDNY chiefs in the North Tower lobby huddled to discuss strategy for the operations in the two towers. Of particular concern to the chiefs—in light of FDNY difficulties in responding to the 1993 bombing—was communications capability. One of the chiefs recommended testing the repeater channel to see if it would work.¹⁰³

Earlier, an FDNY chief had asked building personnel to activate the repeater channel, which would enable greatly-enhanced FDNY portable radio communications in the high-rises. One button on the repeater system activation console in the North Tower was pressed at 8:54, though it is unclear by whom. As a result of this activation, communication became possible between FDNY portable radios on the repeater channel. In addition, the repeater’s master handset at the fire safety desk could hear communications made by FDNY portable radios on the repeater channel. The activation of *transmission* on the master handset required, however, that a second button be pressed. That second button was never activated on the morning of September 11.¹⁰⁴

At 9:05, FDNY chiefs tested the WTC complex’s repeater system. Because the second button had not been activated, the chief on the master handset could

not transmit. He was also apparently unable to hear another chief who was attempting to communicate with him from a portable radio, either because of a technical problem or because the volume was turned down on the console (the normal setting when the system was not in use). Because the repeater channel seemed inoperable—the master handset appeared unable to transmit or receive communications—the chiefs in the North Tower lobby decided not to use it. The repeater system was working at least partially, however, on portable FDNY radios, and firefighters subsequently used repeater channel 7 in the South Tower.¹⁰⁵

FDNY North Tower Operations. Command and control decisions were affected by the lack of knowledge of what was happening 30, 60, 90, and 100 floors above. According to one of the chiefs in the lobby, “One of the most critical things in a major operation like this is to have information. We didn’t have a lot of information coming in. We didn’t receive any reports of what was seen from the [NYPD] helicopters. It was impossible to know how much damage was done on the upper floors, whether the stairwells were intact or not.”¹⁰⁶ According to another chief present, “People watching on TV certainly had more knowledge of what was happening a hundred floors above us than we did in the lobby. . . . [W]ithout critical information coming in . . . it’s very difficult to make informed, critical decisions[.]”¹⁰⁷

As a result, chiefs in the lobby disagreed over whether anyone at or above the impact zone possibly could be rescued, or whether there should be even limited firefighting for the purpose of cutting exit routes through fire zones.¹⁰⁸

Many units were simply instructed to ascend toward the impact zone and report back to the lobby via radio. Some units were directed to assist specific groups of individuals trapped in elevators or in offices well below the impact zone. One FDNY company successfully rescued some civilians who were trapped on the 22nd floor as a result of damage caused by the initial fireball.¹⁰⁹

An attempt was made to track responding units’ assignments on a magnetic board, but the number of units and individual firefighters arriving in the lobby made this an overwhelming task. As the fire companies were not advised to the contrary, they followed protocol and kept their radios on tactical channel 1, which would be monitored by the chiefs in the lobby. Those battalion chiefs who would climb would operate on a separate command channel, which also would be monitored by the chiefs in the lobby.¹¹⁰

Fire companies began to ascend stairwell B at approximately 9:07, laden with about 100 pounds of heavy protective clothing, self-contained breathing apparatuses, and other equipment (including hoses for engine companies and heavy tools for ladder companies).¹¹¹

Firefighters found the stairways they entered intact, lit, and clear of smoke. Unbeknownst to the lobby command post, one battalion chief in the North Tower found a working elevator, which he took to the 16th floor before beginning to climb.¹¹²

In ascending stairwell B, firefighters were passing a steady and heavy stream of descending civilians. Firemen were impressed with the composure and total lack of panic shown by almost all civilians. Many civilians were in awe of the firefighters and found their mere presence to be calming.¹¹³

Firefighters periodically stopped on particular floors and searched to ensure that no civilians were still on it. In a few instances healthy civilians were found on floors, either because they still were collecting personal items or for no apparent reason; they were told to evacuate immediately. Firefighters deputized healthy civilians to be in charge of others who were struggling or injured.¹¹⁴

Climbing up the stairs with heavy protective clothing and equipment was hard work even for physically fit firefighters. As firefighters began to suffer varying levels of fatigue, some became separated from others in their unit.¹¹⁵

At 9:32, a senior chief radioed all units in the North Tower to return to the lobby, either because of a false report of a third plane approaching or because of his judgment about the deteriorating condition of the building. Once the rumor of the third plane was debunked, other chiefs continued operations, and there is no evidence that any units actually returned to the lobby. At the same time, a chief in the lobby was asked to consider the possibility of a rooftop rescue but was unable to reach FDNY dispatch by radio or phone. Out on West Street, however, the FDNY Chief of Department had already dismissed any rooftop rescue as impossible.¹¹⁶

As units climbed higher, their ability to communicate with chiefs on tactical 1 became more limited and sporadic, both because of the limited effectiveness of FDNY radios in high-rises and because so many units on tactical 1 were trying to communicate at once. When attempting to reach a particular unit, chiefs in the lobby often heard nothing in response.¹¹⁷

Just prior to 10:00, in the North Tower one engine company had climbed to the 54th floor, at least two other companies of firefighters had reached the sky lobby on the 44th floor, and numerous units were located between the 5th and 37th floors.¹¹⁸

FDNY South Tower and Marriott Hotel Operations. Immediately after the repeater test, a senior chief and a battalion chief commenced operations in the South Tower lobby. Almost at once they were joined by an OEM field responder. They were not, however, joined right away by a sizable number of fire companies, as units that had been in or en route to the North Tower lobby at 9:03 were not reallocated to the South Tower.¹¹⁹

A battalion chief and a ladder company found a working elevator to the 40th floor and from there proceeded to climb stairwell B. Another ladder company arrived soon thereafter, and began to rescue civilians trapped in an elevator between the first and second floors. The senior chief in the lobby expressed frustration about the lack of units he initially had at his disposal for South Tower operations.¹²⁰

Unlike the commanders in the North Tower, the senior chief in the lobby

and the ascending battalion chief kept their radios on repeater channel 7. For the first 15 minutes of the operations, communications among them and the ladder company climbing with the battalion chief worked well. Upon learning from a company security official that the impact zone began at the 78th floor, a ladder company transmitted this information, and the battalion chief directed an engine company staged on the 40th floor to attempt to find an elevator to reach that upper level.¹²¹

To our knowledge, no FDNY chiefs outside the South Tower realized that the repeater channel was functioning and being used by units in that tower. The senior chief in the South Tower lobby was initially unable to communicate his requests for more units to chiefs either in the North Tower lobby or at the outdoor command post.¹²²

From approximately 9:21 on, the ascending battalion chief was unable to reach the South Tower lobby command post because the senior chief in the lobby had ceased to communicate on repeater channel 7. The vast majority of units that entered the South Tower did not communicate on the repeater channel.¹²³

The first FDNY fatality of the day occurred at approximately 9:30, when a civilian landed on and killed a fireman near the intersection of West and Liberty streets.¹²⁴

By 9:30, chiefs in charge of the South Tower still were in need of additional companies. Several factors account for the lag in response. First, only two units that had been dispatched to the North Tower prior to 9:03 reported immediately to the South Tower. Second, units were not actually sent until approximately five minutes after the FDNY Chief of Department ordered their dispatch. Third, those units that had been ordered at 8:53 to stage at the Brooklyn-Battery Tunnel—and thus very close to the WTC complex—were not dispatched after the plane hit the South Tower. Fourth, units parked further north on West Street, then proceeded south on foot and stopped at the overall FDNY command post on West Street, where in some cases they were told to wait. Fifth, some units responded directly to the North Tower. (Indeed, radio communications indicated that in certain cases some firemen believed that the South Tower was 1 WTC when in fact it was 2 WTC.) Sixth, some units couldn't find the staging area (at West Street south of Liberty) for the South Tower. Finally, the jumpers and debris that confronted units attempting to enter the South Tower from its main entrance on Liberty Street caused some units to search for indirect ways to enter that tower, most often through the Marriott Hotel, or simply to remain on West Street.¹²⁵

A chief at the overall outdoor command post was under the impression that he was to assist in lobby operations of the South Tower, and in fact his aide already was in that lobby. But because of his lack of familiarity with the WTC complex and confusion over how to get to there, he instead ended up in the Marriott at about 9:35. Here he came across about 14 units, many of which had been trying to find safe access to the South Tower. He directed them to

secure the elevators and conduct search-and-rescue operations on the upper floors of the Marriott. Four of these companies searched the spa on the hotel's top floor—the 22nd floor—for civilians, and found none.¹²⁶

Feeling satisfied with the scope of the operation in the Marriott, the chief in the lobby there directed some units to proceed to what he thought was the South Tower. In fact, he pointed them to the North Tower. Three of the FDNY companies who had entered the North Tower from the Marriott found a working elevator in a bank at the south end of the lobby, which they took to the 23rd floor.¹²⁷

In response to the shortage of units in the South Tower, at 9:37 an additional second alarm was requested by the chief at the West and Liberty streets staging area. At this time, the units that earlier had been staged on the Brooklyn side of the Brooklyn-Battery Tunnel were dispatched to the South Tower; some had gone through the tunnel already and had responded to the Marriott, not the South Tower.¹²⁸

Between 9:45 and 9:58, the ascending battalion chief continued to lead FDNY operations on the upper floors of the South Tower. At 9:50, an FDNY ladder company encountered numerous seriously injured civilians on the 70th floor. With the assistance of a security guard, at 9:53 a group of civilians trapped in an elevator on the 78th-floor sky lobby were found by an FDNY company. They were freed from the elevator at 9:58. By that time the battalion chief had reached the 78th floor on stairwell A; he reported that it looked open to the 79th floor, well into the impact zone. He also reported numerous civilian fatalities in the area.¹²⁹

FDNY Command and Control Outside the Towers. The overall command post consisted of senior chiefs, commissioners, the field communications van (Field Comm), numerous units that began to arrive after the South Tower was hit, and EMS chiefs and personnel.¹³⁰

Field Comm's two main functions were to relay information between the overall operations command post and FDNY dispatch and to track all units operating at the scene on a large magnetic board. Both of these missions were severely compromised by the magnitude of the disaster on September 11. First, the means of transmitting information were unreliable. For example, while FDNY dispatch advised Field Comm that 100 people were reported via 911 to be trapped on the 105th floor of the North Tower, and Field Comm then attempted to convey that report to chiefs at the outdoor command post, this information did not reach the North Tower lobby. Second, Field Comm's ability to keep track of which units were operating where was limited, because many units reported directly to the North Tower, the South Tower, or the Marriott. Third, efforts to track units by listening to tactical 1 were severely hampered by the number of units using that channel; as many people tried to speak at once, their transmissions overlapped and often became indecipherable. In the opinion of one of the members of the Field

Comm group, tactical 1 simply was not designed to handle the number of units operating on it that morning.¹³¹

The primary Field Comm van had access to the NYPD's Special Operations channel (used by NYPD Aviation), but it was in the garage for repairs on September 11. The backup van lacked that capability.¹³²

The Chief of Department, along with civilian commissioners and senior EMS chiefs, organized ambulances on West Street to expedite the transport of injured civilians to hospitals.¹³³

To our knowledge, none of the chiefs present believed that a total collapse of either tower was possible. One senior chief did articulate his concern that upper floors could begin to collapse in a few hours, and that firefighters thus should not ascend above floors in the 60s. That opinion was not conveyed to chiefs in the North Tower lobby, and there is no evidence that it was conveyed to chiefs in the South Tower lobby either.¹³⁴

Although the Chief of Department had general authority over operations, tactical decisions remained the province of the lobby commanders. The highest-ranking officer in the North Tower was responsible for communicating with the Chief of Department. They had two brief conversations. In the first, the senior lobby chief gave the Chief of Department a status report and confirmed that this was a rescue, not firefighting, operation. In the second conversation, at about 9:45, the Chief of Department suggested that given how the North Tower appeared to him, the senior lobby chief might want to consider evacuating FDNY personnel.¹³⁵

At 9:46, the Chief of Department called an additional fifth alarm, and at 9:54 an additional 20 engine and 6 ladder companies were sent to the WTC. As a result, more than one-third of all FDNY companies now had been dispatched to the WTC. At about 9:57, an EMS paramedic approached the FDNY Chief of Department and advised that an engineer in front of 7 WTC had just remarked that the Twin Towers in fact were in imminent danger of a total collapse.¹³⁶

NYPD Response

Immediately after the second plane hit, the Chief of Department of the NYPD ordered a second Level 4 mobilization, bringing the total number of NYPD officers responding to close to 2,000.¹³⁷

The NYPD Chief of Department called for Operation Omega, which required the protection of sensitive locations around the city. NYPD headquarters were secured and all other government buildings were evacuated.¹³⁸

The ESU command post at Church and Vesey streets coordinated all NYPD ESU rescue teams. After the South Tower was hit, the ESU officer running this command post decided to send one ESU team (each with approximately six police officers) up each of the Twin Towers' stairwells. While he continued to monitor the citywide SOD channel, which NYPD helicopters were using, he also monitored the point-to-point tactical channel that the ESU teams climbing in the towers would use.¹³⁹

The first NYPD ESU team entered the West Street–level lobby of the North Tower and prepared to begin climbing at about 9:15 A.M. They attempted to check in with the FDNY chiefs present, but were rebuffed. OEM personnel did not intervene. The ESU team began to climb the stairs. Shortly thereafter, a second NYPD ESU team entered the South Tower. The OEM field responder present ensured that they check in with the FDNY chief in charge of the lobby, and it was agreed that the ESU team would ascend and support FDNY personnel.¹⁴⁰

A third ESU team subsequently entered the North Tower at its elevated mezzanine lobby level and made no effort to check in with the FDNY command post. A fourth ESU team entered the South Tower. By 9:59, a fifth ESU team was next to 6 WTC and preparing to enter the North Tower.¹⁴¹

By approximately 9:50, the lead ESU team had reached the 31st floor, observing that there appeared to be no more civilians still descending. This ESU team encountered a large group of firefighters and administered oxygen to some of them who were exhausted.¹⁴²

At about 9:56, the officer running the ESU command post on Church and Vesey streets had a final radio communication with one of the ESU teams in the South Tower. The team then stated that it was ascending via stairs, was somewhere in the 20s, and was making slow progress because of the numerous descending civilians crowding the stairwell.¹⁴³

Three plainclothes NYPD officers without radios or protective gear had begun ascending either stairwell A or C of the North Tower. They began checking every other floor above the 12th for civilians. Only occasionally did they find any, and in those few cases they ordered the civilians to evacuate immediately. While checking floors, they used office phones to call their superiors. In one phone call an NYPD chief instructed them to leave the North Tower, but they refused to do so. As they climbed higher, they encountered increasing smoke and heat. Shortly before 10:00 they arrived on the 54th floor.¹⁴⁴

Throughout this period (9:03 to 9:59), a group of NYPD and Port Authority police officers, as well as two Secret Service agents, continued to assist civilians leaving the North Tower. They were positioned around the mezzanine lobby level of the North Tower, directing civilians leaving stairwells A and C to evacuate down an escalator to the concourse. The officers instructed those civilians who seemed composed to evacuate the complex calmly but rapidly. Other civilians exiting the stairs who were either injured or exhausted collapsed at the foot of these stairs; officers then assisted them out of the building.¹⁴⁵

When civilians reached the concourse, another NYPD officer stationed at the bottom of the escalator directed them to exit through the concourse to the north and east and then out of the WTC complex. This exit route ensured that civilians would not be endangered by falling debris and people on West Street, on the plaza between the towers, and on Liberty Street.¹⁴⁶

Some officers positioned themselves at the top of a flight of stairs by 5 WTC that led down into the concourse, going into the concourse when necessary

to evacuate injured or disoriented civilians. Numerous other NYPD officers were stationed throughout the concourse, assisting burned, injured, and disoriented civilians, as well as directing all civilians to exit to the north and east. NYPD officers were also in the South Tower lobby to assist in civilian evacuation. NYPD officers stationed on Vesey Street between West Street and Church Street urged civilians not to remain in the area and instead to keep walking north.¹⁴⁷

At 9:06, the NYPD Chief of Department instructed that no units were to land on the roof of either tower. At about 9:30, one of the helicopters present advised that a rooftop evacuation still would not be possible. One NYPD helicopter pilot believed one portion of the North Tower roof to be free enough of smoke that a hoist could be lowered in order to rescue people, but there was no one on the roof. This pilot's helicopter never attempted to hover directly over the tower. Another helicopter did attempt to do so, and its pilot stated that the severity of the heat from the jet fuel-laden fire in the North Tower would have made it impossible to hover low enough for a rescue, because the high temperature would have destabilized the helicopter.¹⁴⁸

At 9:51, an aviation unit warned units of large pieces of debris hanging from the building. Prior to 9:59, no NYPD helicopter pilot predicted that either tower would collapse.¹⁴⁹

Interaction of 911 Calls and NYPD Operations. At 9:37, a civilian on the 106th floor of the South Tower reported to a 911 operator that a lower floor—the “90-something floor”—was collapsing. This information was conveyed inaccurately by the 911 operator to an NYPD dispatcher. The dispatcher further confused the substance of the 911 call by telling NYPD officers at the WTC complex that “the 106th floor is crumbling” at 9:52, 15 minutes after the 911 call was placed. The NYPD dispatcher conveyed this message on the radio frequency used in precincts in the vicinity of the WTC and subsequently on the Special Operations Division channel, but not on City Wide channel 1.¹⁵⁰

PAPD Response

Initial responders from outside PAPD commands proceeded to the police desk in 5 WTC or to the fire safety desk in the North Tower lobby. Some officers were then assigned to assist in stairwell evacuations; others were assigned to expedite evacuation in the plaza, concourse, and PATH station. As information was received of civilians trapped above ground-level floors of the North Tower, other PAPD officers were instructed to climb to those floors for rescue efforts. Still others began climbing toward the impact zone.¹⁵¹

At 9:11, the PAPD Superintendent and an inspector began walking up stairwell B of the North Tower to assess damage near and in the impact zone. The PAPD Chief and several other PAPD officers began ascending a stairwell in

order to reach the Windows on the World restaurant on the 106th floor, from which calls had been made to the PAPD police desk reporting at least 100 people trapped.¹⁵²

Many PAPD officers from different commands responded on their own initiative. By 9:30, the PAPD central police desk requested that responding officers meet at West and Vesey and await further instructions. In the absence of a predetermined command structure to deal with an incident of this magnitude, a number of PAPD inspectors, captains, and lieutenants stepped forward at around 9:30 to formulate an on-site response plan. They were hampered by not knowing how many officers were responding to the site and where those officers were operating. Many of the officers who responded to this command post lacked suitable protective equipment to enter the complex.¹⁵³

By 9:58, one PAPD officer had reached the 44th-floor sky lobby of the North Tower. Also in the North Tower, one team of PAPD officers was in the mid-20s and another was in the lower 20s. Numerous PAPD officers were also climbing in the South Tower, including the PAPD ESU team. Many PAPD officers were on the ground floors of the complex—some assisting in evacuation, others manning the PAPD desk in 5 WTC or assisting at lobby command posts.¹⁵⁴

OEM Response

After the South Tower was hit, OEM senior leadership decided to remain in its “bunker” and continue conducting operations, even though all civilians had been evacuated from 7 WTC. At approximately 9:30, a senior OEM official ordered the evacuation of the facility, after a Secret Service agent in 7 WTC advised him that additional commercial planes were not accounted for. Prior to its evacuation, no outside agency liaisons had reached OEM. OEM field responders were stationed in each tower’s lobby, at the FDNY overall command post, and, at least for some period of time, at the NYPD command post at Church and Vesey.¹⁵⁵

Summary

The emergency response effort escalated with the crash of United 175 into the South Tower. With that escalation, communications as well as command and control became increasingly critical and increasingly difficult. First responders assisted thousands of civilians in evacuating the towers, even as incident commanders from responding agencies lacked knowledge of what other agencies and, in some cases, their own responders were doing.

From 9:59 until 10:28 A.M.

At 9:58:59, the South Tower collapsed in ten seconds, killing all civilians and emergency personnel inside, as well a number of individuals—both first responders and civilians—in the concourse, in the Marriott, and on neighboring streets. The building collapsed into itself, causing a ferocious windstorm and

creating a massive debris cloud. The Marriott hotel suffered significant damage as a result of the collapse of the South Tower.¹⁵⁶

Civilian Response in the North Tower

The 911 calls placed from most locations in the North Tower grew increasingly desperate as time went on. As late as 10:28, people remained alive in some locations, including on the 92nd and 79th floors. Below the impact zone, it is likely that most civilians who were physically and emotionally capable of descending had exited the tower. The civilians who were nearing the bottom of stairwell C were assisted out of the building by NYPD, FDNY, and PAPD personnel. Others, who experienced difficulty evacuating, were being helped by first responders on lower floors.¹⁵⁷

FDNY Response

Immediate Impact of the Collapse of the South Tower. The FDNY overall command post and posts in the North Tower lobby, the Marriott lobby, and the staging area on West Street south of Liberty all ceased to operate upon the collapse of the South Tower, as did EMS staging areas, because of their proximity to the building.¹⁵⁸

Those who had been in the North Tower lobby had no way of knowing that the South Tower had suffered a complete collapse. Chiefs who had fled from the overall command post on the west side of West Street took shelter in the underground parking garage at 2 World Financial Center and were not available to influence FDNY operations for the next ten minutes or so.¹⁵⁹

When the South Tower collapsed, firefighters on upper floors of the North Tower heard a violent roar, and many were knocked off their feet; they saw debris coming up the stairs and observed that the power was lost and emergency lights activated. Nevertheless, those firefighters not standing near windows facing south had no way of knowing that the South Tower had collapsed; many surmised that a bomb had exploded, or that the North Tower had suffered a partial collapse on its upper floors.¹⁶⁰

We do not know whether the repeater channel continued to function after 9:59.¹⁶¹

Initial Evacuation Instructions and Communications. The South Tower's total collapse was immediately communicated on the Manhattan dispatch channel by an FDNY boat on the Hudson River; but to our knowledge, no one at the site received this information, because every FDNY command post had been abandoned—including the overall command post, which included the Field Comm van. Despite his lack of knowledge of what had happened to the South Tower, a chief in the process of evacuating the North Tower lobby sent out an order within a minute of the collapse: "Command to all units in Tower 1, evacuate the building." Another chief from the North Tower lobby soon followed with an additional evacuation order issued on tactical 1.¹⁶²

Evacuation orders did not follow the protocol for giving instructions when a building's collapse may be imminent—a protocol that includes constantly repeating “Mayday, Mayday, Mayday”—during the 29 minutes between the fall of the South Tower and that of the North Tower. In addition, most of the evacuation instructions did not mention that the South Tower had collapsed. However, at least three firefighters heard evacuation instructions which stated that the North Tower was in danger of “imminent collapse.”¹⁶³

FDNY Personnel above the Ground Floors of the North Tower. Within minutes, some firefighters began to hear evacuation orders over tactical 1. At least one chief also gave the evacuation instruction on the command channel used only by chiefs in the North Tower, which was much less crowded.¹⁶⁴

At least two battalion chiefs on upper floors of the North Tower—one on the 23rd floor and one on the 35th floor—heard the evacuation instruction on the command channel and repeated it to everyone they came across. The chief on the 23rd floor apparently aggressively took charge to ensure that all firefighters on the floors in the immediate area were evacuating. The chief on the 35th floor also heard a separate radio communication stating that the South Tower had collapsed (which the chief on the 23rd floor may have heard as well). He subsequently acted with a sense of urgency, and some firefighters heard the evacuation order for the first time when he repeated it on tactical 1. This chief also had a bullhorn and traveled to each of the stairwells and shouted the evacuation order: “All FDNY, get the fuck out!” As a result of his efforts, many firefighters who had not been in the process of evacuating began to do so.¹⁶⁵

Other firefighters did not receive the evacuation transmissions, for one of four reasons: First, some FDNY radios did not pick up the transmission because of the difficulties of radio communications in high-rises. Second, the numbers trying to use tactical 1 after the South Tower collapsed may have drowned out some evacuation instructions. According to one FDNY lieutenant who was on the 31st floor of the North Tower at the time, “[Tactical] channel 1 just might have been so bogged down that it may have been impossible to get that order through.”¹⁶⁶ Third, some firefighters in the North Tower were off-duty and did not have radios. Fourth, some firefighters in the North Tower had been dispatched to the South Tower and likely were on the different tactical channel assigned to that tower.¹⁶⁷

FDNY personnel in the North Tower who received the evacuation orders did not respond uniformly. Some units—including one whose officer knew that the South Tower had collapsed—either delayed or stopped their evacuation in order to assist nonambulatory civilians. Some units whose members had become separated during the climb attempted to regroup so they could descend together. Some units began to evacuate but, according to eyewitnesses, did not hurry. At least several firefighters who survived believed that they and others would have evacuated more urgently had they known of the South Tower's complete collapse. Other firefighters continued to sit and rest on floors

while other companies descended past them and reminded them that they were supposed to evacuate. Some firefighters were determined not to leave the building while other FDNY personnel remained inside and, in one case, convinced others to remain with them. In another case, firefighters had successfully descended to the lobby, where another firefighter then persuaded them to reascend in order to look for specific FDNY personnel.¹⁶⁸

Other FDNY personnel did not hear the evacuation order on their radio but were advised orally to leave the building by other firefighters and police who were themselves evacuating.¹⁶⁹

By 10:24, approximately five FDNY companies reached the bottom of stairwell B and entered the North Tower lobby. They stood in the lobby for more than a minute, not certain what to do, as no chiefs were present. Finally, one firefighter—who had earlier seen from a window that the South Tower had collapsed—urged that they all leave, as this tower could fall as well. The units then proceeded to exit onto West Street. While they were doing so, the North Tower began its pancake collapse, killing some of these men.¹⁷⁰

Other FDNY Personnel. The Marriott Hotel suffered significant damage in the collapse of the South Tower. Those in the lobby were knocked down and enveloped in the darkness of a debris cloud. Some were hurt but could walk. Others were more severely injured, and some were trapped. Several firefighters came across a group of about 50 civilians who had been taking shelter in the restaurant and assisted them in evacuating. Up above, at the time of the South Tower's collapse four companies were descending the stairs single file in a line of approximately 20 men. Four survived.¹⁷¹

At the time of the South Tower's collapse, two FDNY companies were either at the eastern side of the North Tower lobby, near the mall concourse, or actually in the mall concourse, trying to reach the South Tower. Many of these men were thrown off their feet by the collapse of the South Tower; they then attempted to regroup in the darkness of the debris cloud and evacuate civilians and themselves, not knowing that the South Tower had collapsed. Several of these firefighters subsequently searched the PATH station below the concourse—unaware that the PAPD had cleared the area of all civilians by 9:19.¹⁷²

At about 10:15, the FDNY Chief of Department and the Chief of Safety, who had returned to West Street from the parking garage, confirmed that the South Tower had collapsed. The Chief of Department issued a radio order for all units to evacuate the North Tower, repeating it about five times. He then directed that the FDNY command post be moved further north on West Street and told FDNY units in the area to proceed north on West Street toward Chambers Street. At approximately 10:25, he radioed for two ladder companies to respond to the Marriott, where he was aware that both FDNY personnel and civilians were trapped.¹⁷³

Many chiefs, including several of those who had been in the North Tower lobby, did not learn that the South Tower had collapsed until 30 minutes or

more after the event. According to two eyewitnesses, however, one senior FDNY chief who knew that the South Tower had collapsed strongly expressed the opinion that the North Tower would not collapse, because unlike the South Tower, it had not been hit on a corner.¹⁷⁴

After the South Tower collapsed, some firefighters on the streets neighboring the North Tower remained where they were or came closer to the North Tower. Some of these firefighters did not know that the South Tower had collapsed, but many chose despite that knowledge to remain in an attempt to save additional lives. According to one such firefighter, a chief who was preparing to mount a search-and-rescue mission in the Marriott, "I would never think of myself as a leader of men if I had headed north on West Street after [the] South Tower collapsed." Just outside the North Tower on West Street one firefighter was directing others exiting the building, telling them when no jumpers were coming down and it was safe to run out. A senior chief had grabbed an NYPD bullhorn and was urging firefighters exiting onto West Street to continue running north, well away from the WTC. Three of the most senior and respected members of the FDNY were involved in attempting to rescue civilians and firefighters from the Marriott.¹⁷⁵

NYPD Response

A member of the NYPD Aviation Unit radioed that the South Tower had collapsed immediately after it happened, and further advised that all people in the WTC complex and nearby areas should be evacuated. At 10:04, NYPD aviation reported that the top 15 stories of the North Tower "were glowing red" and that they might collapse. At 10:08, a helicopter pilot warned that he did not believe the North Tower would last much longer.¹⁷⁶

Immediately after the South Tower collapsed, many NYPD radio frequencies became overwhelmed with transmissions relating to injured, trapped, or missing officers. As a result, NYPD radio communications became strained on most channels. Nevertheless, they remained effective enough for the two closest NYPD mobilization points to be moved further from the WTC at 10:06.¹⁷⁷

Just like most firefighters, the ESU rescue teams in the North Tower had no idea that the South Tower had collapsed. However, by 10:00 the ESU officer running the command post at Church and Vesey ordered the evacuation of all ESU units from the WTC complex. This officer, who had observed the South Tower collapse, reported it to ESU units in the North Tower in his evacuation instruction.¹⁷⁸

This instruction was clearly heard by the two ESU units already in the North Tower and the other ESU unit preparing to enter the tower. The ESU team on the 31st floor found the full collapse of the South Tower so unfathomable that they radioed back to the ESU officer at the command post and asked him to repeat his communication. He reiterated his urgent message.¹⁷⁹

The ESU team on the 31st floor conferred with the FDNY personnel there to ensure that they, too, knew that they had to evacuate, then proceeded down

stairwell B. During the descent, they reported seeing many firefighters who were resting and did not seem to be in the process of evacuating. They further reported advising these firefighters to evacuate, but said that at times they were not acknowledged. In the opinion of one of the ESU officers, some of these firefighters essentially refused to take orders from cops. At least one firefighter who was in the North Tower has supported that assessment, stating that he was not going to take an evacuation instruction from a cop that morning. However, another firefighter reports that ESU officers ran past him without advising him to evacuate.¹⁸⁰

The ESU team on the 11th floor began descending stairwell C after receiving the evacuation order. Once near the mezzanine level—where stairwell C ended—this team spread out in chain formation, stretching from several floors down to the mezzanine itself. They used their flashlights to provide a path of beacons through the darkness and debris for civilians climbing down the stairs. Eventually, when no one else appeared to be descending, the ESU team exited the North Tower and ran one at a time to 6 WTC, dodging those who still were jumping from the upper floors of the North Tower by acting as spotters for each other. They remained in the area, conducting additional searches for civilians; all but two of them died.¹⁸¹

After surviving the South Tower's collapse, the ESU team that had been preparing to enter the North Tower spread into chain formation and created a path for civilians (who had exited from the North Tower mezzanine) to evacuate the WTC complex by descending the stairs on the north side of 5 and 6 WTC, which led down to Vesey Street. They remained at this post until the North Tower collapsed, yet all survived.¹⁸²

The three plainclothes NYPD officers who had made it up to the 54th floor of the North Tower felt the building shake violently at 9:59 as the South Tower collapsed (though they did not know the cause). Immediately thereafter, they were joined by three firefighters from an FDNY engine company. One of the firefighters apparently heard an evacuation order on his radio, but responded in a return radio communication, "We're not fucking coming out!" However, the firefighters urged the police officers to descend because they lacked the protective gear and equipment needed to handle the increasing smoke and heat. The police officers reluctantly began descending, checking that the lower floors were clear of civilians. They proceeded down stairwell B, poking their heads into every floor and briefly looking for civilians.¹⁸³

Other NYPD officers helping evacuees on the mezzanine level of the North Tower were enveloped in the debris cloud that resulted from the South Tower's collapse. They struggled to regroup in the darkness and to evacuate both themselves and civilians they encountered. At least one of them died in the collapse of the North Tower. At least one NYPD officer from this area managed to evacuate out toward 5 WTC, where he teamed up with a Port Authority police officer and acted as a spotter in advising the civilians who were still exiting

when they could safely run from 1 WTC to 5 WTC and avoid being struck by people and debris falling from the upper floors.¹⁸⁴

At the time of the collapse of the South Tower, there were numerous NYPD officers in the concourse, some of whom are believed to have died there. Those who survived struggled to evacuate themselves in darkness, assisting civilians as they exited the concourse in all directions.¹⁸⁵

Port Authority Response

The collapse of the South Tower forced the evacuation of the PAPD command post on West and Vesey, compelling PAPD officers to move north. There is no evidence that PAPD officers without WTC Command radios received an evacuation order by radio. Some of these officers in the North Tower decided to evacuate, either on their own or in consultation with other first responders they came across. Some greatly slowed their own descent in order to assist nonambulatory civilians.¹⁸⁶

After 10:28 A.M.

The North Tower collapsed at 10:28:25 A.M., killing all civilians alive on upper floors, an undetermined number below, and scores of first responders. The FDNY Chief of Department, the Port Authority Police Department Superintendent, and many of their senior staff were killed. Incredibly, twelve firefighters, one PAPD officer, and three civilians who were descending stairwell B of the North Tower survived its collapse.¹⁸⁷

On September 11, the nation suffered the largest loss of life—2,973—on its soil as a result of hostile attack in its history. The FDNY suffered 343 fatalities—the largest loss of life of any emergency response agency in history. The PAPD suffered 37 fatalities—the largest loss of life of any police force in history. The NYPD suffered 23 fatalities—the second largest loss of life of any police force in history, exceeded only by the number of PAPD officers lost the same day.¹⁸⁸

Mayor Giuliani, along with the Police and Fire commissioners and the OEM director, moved quickly north and established an emergency operations command post at the Police Academy. Over the coming hours, weeks, and months, thousands of civilians and city, state, and federal employees devoted themselves around the clock to putting New York City back on its feet.¹⁸⁹

9.3 EMERGENCY RESPONSE AT THE PENTAGON

If it had happened on any other day, the disaster at the Pentagon would be remembered as a singular challenge and an extraordinary national story. Yet the calamity at the World Trade Center that same morning included catastrophic damage 1,000 feet above the ground that instantly imperiled tens of thousands of people. The two experiences are not comparable. Nonetheless, broader les-

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The Twin Towers following the impact of American Airlines Flight 11 and United Airlines Flight 175



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The Pentagon, after being struck by American Airlines Flight 77



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United Airlines Flight 93 crash site, Shanksville, Pennsylvania

sons in integrating multiagency response efforts are apparent when we analyze the response at the Pentagon.

The emergency response at the Pentagon represented a mix of local, state, and federal jurisdictions and was generally effective. It overcame the inherent complications of a response across jurisdictions because the Incident Command System, a formalized management structure for emergency response, was in place in the National Capital Region on 9/11.¹⁹⁰

Because of the nature of the event—a plane crash, fire, and partial building collapse—the Arlington County Fire Department served as incident commander. Different agencies had different roles. The incident required a major rescue, fire, and medical response from Arlington County at the U.S. military's headquarters—a facility under the control of the secretary of defense. Since it was a terrorist attack, the Department of Justice was the lead federal agency in charge (with authority delegated to the FBI for operational response). Additionally, the terrorist attack affected the daily operations and emergency management requirements of Arlington County and all bordering and surrounding jurisdictions.¹⁹¹

At 9:37, the west wall of the Pentagon was hit by hijacked American Airlines Flight 77, a Boeing 757. The crash caused immediate and catastrophic damage. All 64 people aboard the airliner were killed, as were 125 people inside the Pentagon (70 civilians and 55 military service members). One hundred six people were seriously injured and transported to area hospitals.¹⁹²

While no emergency response is flawless, the response to the 9/11 terrorist attack on the Pentagon was mainly a success for three reasons: first, the strong professional relationships and trust established among emergency responders; second, the adoption of the Incident Command System; and third, the pursuit of a regional approach to response. Many fire and police agencies that responded had extensive prior experience working together on regional events and training exercises. Indeed, at the time preparations were under way at many of these agencies to ensure public safety at the annual meetings of the International Monetary Fund and the World Bank scheduled to be held later that month in Washington, D.C.¹⁹³

Local, regional, state, and federal agencies immediately responded to the Pentagon attack. In addition to county fire, police, and sheriff's departments, the response was assisted by the Metropolitan Washington Airports Authority, Ronald Reagan Washington National Airport Fire Department, Fort Myer Fire Department, the Virginia State Police, the Virginia Department of Emergency Management, the FBI, FEMA, a National Medical Response Team, the Bureau of Alcohol, Tobacco, and Firearms, and numerous military personnel within the Military District of Washington.¹⁹⁴

Command was established at 9:41. At the same time, the Arlington County Emergency Communications Center contacted the fire departments of Fairfax County, Alexandria, and the District of Columbia to request mutual aid.

The incident command post provided a clear view of and access to the crash site, allowing the incident commander to assess the situation at all times.¹⁹⁵

At 9:55, the incident commander ordered an evacuation of the Pentagon impact area because a partial collapse was imminent; it occurred at 9:57, and no first responder was injured.¹⁹⁶

At 10:15, the incident commander ordered a full evacuation of the command post because of the warning of an approaching hijacked aircraft passed along by the FBI. This was the first of three evacuations caused by reports of incoming aircraft, and the evacuation order was well communicated and well coordinated.¹⁹⁷

Several factors facilitated the response to this incident, and distinguish it from the far more difficult task in New York. There was a single incident, and it was not 1,000 feet above ground. The incident site was relatively easy to secure and contain, and there were no other buildings in the immediate area. There was no collateral damage beyond the Pentagon.¹⁹⁸

Yet the Pentagon response encountered difficulties that echo those experienced in New York. As the “Arlington County: After-Action Report” notes, there were significant problems with both self-dispatching and communications: “Organizations, response units, and individuals proceeding on their own initiative directly to an incident site, without the knowledge and permission of the host jurisdiction and the Incident Commander, complicate the exercise of command, increase the risks faced by bonafide responders, and exacerbate the challenge of accountability.” With respect to communications, the report concludes: “Almost all aspects of communications continue to be problematic, from initial notification to tactical operations. Cellular telephones were of little value. . . . Radio channels were initially oversaturated. . . . Pagers seemed to be the most reliable means of notification when available and used, but most firefighters are not issued pagers.”¹⁹⁹

It is a fair inference, given the differing situations in New York City and Northern Virginia, that the problems in command, control, and communications that occurred at both sites will likely recur in any emergency of similar scale. The task looking forward is to enable first responders to respond in a coordinated manner with the greatest possible awareness of the situation.

9.4 ANALYSIS

Like the national defense effort described in chapter 1, the emergency response to the attacks on 9/11 was necessarily improvised. In New York, the FDNY, NYPD, the Port Authority, WTC employees, and the building occupants themselves did their best to cope with the effects of an unimaginable catastrophe—unfolding furiously over a mere 102 minutes—for which they were unprepared in terms of both training and mindset. As a result of the

efforts of first responders, assistance from each other, and their own good instincts and goodwill, the vast majority of civilians below the impact zone were able to evacuate the towers.

The National Institute of Standards and Technology has provided a preliminary estimation that between 16,400 and 18,800 civilians were in the WTC complex as of 8:46 A.M. on September 11. At most 2,152 individuals died at the WTC complex who were not (1) fire or police first responders, (2) security or fire safety personnel of the WTC or individual companies, (3) volunteer civilians who ran to the WTC after the planes' impact to help others, or (4) on the two planes that crashed into the Twin Towers. Out of this total number of fatalities, we can account for the workplace location of 2,052 individuals, or 95.35 percent. Of this number, 1,942 or 94.64 percent either worked or were supposed to attend a meeting at or above the respective impact zones of the Twin Towers; only 110, or 5.36 percent of those who died, worked below the impact zone. While a given person's office location at the WTC does not definitively indicate where that individual died that morning or whether he or she could have evacuated, these data strongly suggest that the evacuation was a success for civilians below the impact zone.²⁰⁰

Several factors influenced the evacuation on September 11. It was aided greatly by changes made by the Port Authority in response to the 1993 bombing and by the training of both Port Authority personnel and civilians after that time. Stairwells remained lit near unaffected floors; some tenants relied on procedures learned in fire drills to help them to safety; others were guided down the stairs by fire safety officials based in the lobby. Because of damage caused by the impact of the planes, the capability of the sophisticated building systems may have been impaired. Rudimentary improvements, however, such as the addition of glow strips to the handrails and stairs, were credited by some as the reason for their survival. The general evacuation time for the towers dropped from more than four hours in 1993 to under one hour on September 11 for most civilians who were not trapped or physically incapable of enduring a long descent.

First responders also played a significant role in the success of the evacuation. Some specific rescues are quantifiable, such as an FDNY company's rescue of civilians trapped on the 22d floor of the North Tower, or the success of FDNY, PAPD, and NYPD personnel in carrying nonambulatory civilians out of both the North and South Towers. In other instances, intangibles combined to reduce what could have been a much higher death total. It is impossible to measure how many more civilians who descended to the ground floors would have died but for the NYPD and PAPD personnel directing them—via safe exit routes that avoided jumpers and debris—to leave the complex urgently but calmly. It is impossible to measure how many more civilians would have died but for the determination of many members of the FDNY, PAPD, and NYPD to continue assisting civilians after the South Tower collapsed. It is

impossible to measure the calming influence that ascending firefighters had on descending civilians or whether but for the firefighters' presence the poor behavior of a very few civilians could have caused a dangerous and panicked mob flight. But the positive impact of the first responders on the evacuation came at a tremendous cost of first responder lives lost.²⁰¹

Civilian and Private-Sector Challenges

The "first" first responders on 9/11, as in most catastrophes, were private-sector civilians. Because 85 percent of our nation's critical infrastructure is controlled not by government but by the private sector, private-sector civilians are likely to be the first responders in any future catastrophes. For that reason, we have assessed the state of private sector and civilian preparedness in order to formulate recommendations to address this critical need. Our recommendations grow out of the experience of the civilians at the World Trade Center on 9/11.

Lack of Protocol for Rooftop Rescues. Civilians at or above the impact zone in the North Tower had the smallest hope of survival. Once the plane struck, they were prevented from descending because of damage to or impassable conditions in the building's three stairwells. The only hope for those on the upper floors of the North Tower would have been a swift and extensive air rescue. Several factors made this impossible. Doors leading to the roof were kept locked for security reasons, and damage to software in the security command station prevented a lock release order from taking effect. Even if the doors had not been locked, structural and radiation hazards made the rooftops unsuitable staging areas for a large number of civilians; and even if conditions permitted general helicopter evacuations—which was not the case—only several people could be lifted at a time.

The WTC lacked any plan for evacuation of civilians on upper floors of the WTC in the event that all stairwells were impassable below.

Lack of Comprehensive Evacuation of South Tower Immediately after the North Tower Impact. No decision has been criticized more than the decision of building personnel not to evacuate the South Tower immediately after the North Tower was hit. A firm and prompt evacuation order would likely have led many to safety. Even a strictly "advisory" announcement would not have dissuaded those who decided for themselves to evacuate. The advice to stay in place was understandable, however, when considered in its context. At that moment, no one appears to have thought a second plane could hit the South Tower. The evacuation of thousands of people was seen as inherently dangerous. Additionally, conditions were hazardous in some areas outside the towers.²⁰²

Less understandable, in our view, is the instruction given to some civilians

who had reached the lobby to return to their offices. They could have been held in the lobby or perhaps directed through the underground concourse.

Despite the initial advice given over its public-address system, the South Tower was ordered to be evacuated by the FDNY and PAPD within 12 minutes of the North Tower's being hit. If not for a second, unanticipated attack, the evacuation presumably would have proceeded.

Impact of Fire Safety Plan and Fire Drills on Evacuation. Once the South Tower was hit, civilians on upper floors wasted time ascending the stairs instead of searching for a clear path down, when stairwell A was at least initially passable. Although rooftop rescues had not been conclusively ruled out, civilians were not informed in fire drills that roof doors were locked, that rooftop areas were hazardous, and that no helicopter evacuation plan existed.

In both towers, civilians who were able to reach the stairs and descend were also stymied by the deviations in the stairways and by smoke doors. This confusion delayed the evacuation of some and may have obstructed that of others. The Port Authority has acknowledged that in the future, tenants should be made aware of what conditions they will encounter during descent.

Impact of 911 Calls on Evacuation. The NYPD's 911 operators and FDNY dispatch were not adequately integrated into the emergency response. In several ways, the 911 system was not ready to cope with a major disaster. These operators and dispatchers were one of the only sources of information for individuals at and above the impact zone of the towers. The FDNY ordered both towers fully evacuated by 8:57, but this guidance was not conveyed to 911 operators and FDNY dispatchers, who for the next hour often continued to advise civilians not to self-evacuate, regardless of whether they were above or below the impact zones. Nor were 911 operators or FDNY dispatchers advised that rooftop rescues had been ruled out. This failure may have been harmful to civilians on the upper floors of the South Tower who called 911 and were not told that their only evacuation hope was to attempt to descend, not to ascend. In planning for future disasters, it is important to integrate those taking 911 calls into the emergency response team and to involve them in providing up-to-date information and assistance to the public.

Preparedness of Individual Civilians. One clear lesson of September 11 is that individual civilians need to take responsibility for maximizing the probability that they will survive, should disaster strike. Clearly, many building occupants in the World Trade Center did not take preparedness seriously. Individuals should know the exact location of every stairwell in their workplace. In addition, they should have access at all times to flashlights, which were deemed invaluable by some civilians who managed to evacuate the WTC on September 11.

Challenges Experienced by First Responders

The Challenge of Incident Command. As noted above, in July 2001, Mayor Giuliani updated a directive titled “Direction and Control of Emergencies in the City of New York.” The directive designated, for different types of emergencies, an appropriate agency as “Incident Commander”; it would be “responsible for the management of the City’s response to the emergency.” The directive also provided that where incidents are “so multifaceted that no one agency immediately stands out as the Incident Commander, OEM will assign the role of Incident Commander to an agency as the situation demands.”²⁰³

To some degree, the Mayor’s directive for incident command was followed on 9/11. It was clear that the lead response agency was the FDNY, and that the other responding local, federal, bistate, and state agencies acted in a supporting role. There was a tacit understanding that FDNY personnel would have primary responsibility for evacuating civilians who were above the ground floors of the Twin Towers, while NYPD and PAPD personnel would be in charge of evacuating civilians from the WTC complex once they reached ground level. The NYPD also greatly assisted responding FDNY units by clearing emergency lanes to the WTC.²⁰⁴

In addition, coordination occurred at high levels of command. For example, the Mayor and Police Commissioner consulted with the Chief of the Department of the FDNY at approximately 9:20. There were other instances of coordination at operational levels, and information was shared on an ad hoc basis. For example, an NYPD ESU team passed the news of their evacuation order to firefighters in the North Tower.²⁰⁵

It is also clear, however, that the response operations lacked the kind of integrated communications and unified command contemplated in the directive. These problems existed both within and among individual responding agencies.

Command and Control within First Responder Agencies. For a unified incident management system to succeed, each participant must have command and control of its own units and adequate internal communications. This was not always the case at the WTC on 9/11.

Understandably lacking experience in responding to events of the magnitude of the World Trade Center attacks, the FDNY as an institution proved incapable of coordinating the numbers of units dispatched to different points within the 16-acre complex. As a result, numerous units were congregating in the undamaged Marriott Hotel and at the overall command post on West Street by 9:30, while chiefs in charge of the South Tower still were in desperate need of units. With better understanding of the resources already available, additional units might not have been dispatched to the South Tower at 9:37.

The task of accounting for and coordinating the units was rendered difficult, if not impossible, by internal communications breakdowns resulting from

the limited capabilities of radios in the high-rise environment of the WTC and from confusion over which personnel were assigned to which frequency. Furthermore, when the South Tower collapsed the overall FDNY command post ceased to operate, which compromised the FDNY's ability to understand the situation; an FDNY marine unit's immediate radio communication to FDNY dispatch that the South Tower had fully collapsed was not conveyed to chiefs at the scene. The FDNY's inability to coordinate and account for the different radio channels that would be used in an emergency of this scale contributed to the early lack of units in the South Tower, whose lobby chief initially could not communicate with anyone outside that tower.²⁰⁶

Though almost no one at 9:50 on September 11 was contemplating an imminent total collapse of the Twin Towers, many first responders and civilians were contemplating the possibility of imminent additional terrorist attacks throughout New York City. Had any such attacks occurred, the FDNY's response would have been severely compromised by the concentration of so many of its off-duty personnel, particularly its elite personnel, at the WTC.

The Port Authority's response was hampered by the lack of both standard operating procedures and radios capable of enabling multiple commands to respond in unified fashion to an incident at the WTC. Many officers reporting from the tunnel and airport commands could not hear instructions being issued over the WTC Command frequency. In addition, command and control was complicated by senior Port Authority Police officials becoming directly involved in frontline rescue operations.

The NYPD experienced comparatively fewer internal command and control and communications issues. Because the department has a history of mobilizing thousands of officers for major events requiring crowd control, its technical radio capability and major incident protocols were more easily adapted to an incident of the magnitude of 9/11. In addition, its mission that day lay largely outside the towers themselves. Although there were ESU teams and a few individual police officers climbing in the towers, the vast majority of NYPD personnel were staged outside, assisting with crowd control and evacuation and securing other sites in the city. The NYPD ESU division had firm command and control over its units, in part because there were so few of them (in comparison to the number of FDNY companies) and all reported to the same ESU command post. It is unclear, however, whether non-ESU NYPD officers operating on the ground floors, and in a few cases on upper floors, of the WTC were as well coordinated.

Significant shortcomings within the FDNY's command and control capabilities were painfully exposed on September 11. To its great credit, the department has made a substantial effort in the past three years to address these. While significant problems in the command and control of the PAPD also were exposed on September 11, it is less clear that the Port Authority has adopted new training exercises or major incident protocols to address these shortcomings.²⁰⁷

Lack of Coordination among First Responder Agencies. Any attempt to establish a unified command on 9/11 would have been further frustrated by the lack of communication and coordination among responding agencies. Certainly, the FDNY was not “responsible for the management of the City’s response to the emergency,” as the Mayor’s directive would have required. The command posts were in different locations, and OEM headquarters, which could have served as a focal point for information sharing, did not play an integrating role in ensuring that information was shared among agencies on 9/11, even prior to its evacuation. There was a lack of comprehensive coordination between FDNY, NYPD, and PAPD personnel climbing above the ground floors in the Twin Towers.

Information that was critical to informed decisionmaking was not shared among agencies. FDNY chiefs in leadership roles that morning have told us that their decision making capability was hampered by a lack of information from NYPD aviation. At 9:51 A.M., a helicopter pilot cautioned that “large pieces” of the South Tower appeared to be about to fall and could pose a danger to those below. Immediately after the tower’s collapse, a helicopter pilot radioed that news. This transmission was followed by communications at 10:08, 10:15, and 10:22 that called into question the condition of the North Tower. The FDNY chiefs would have benefited greatly had they been able to communicate with personnel in a helicopter.

The consequence of the lack of real-time intelligence from NYPD aviation should not be overstated. Contrary to a widely held misperception, no NYPD helicopter predicted the fall of either tower before the South Tower collapsed, and no NYPD personnel began to evacuate the WTC complex prior to that time. Furthermore, the FDNY, as an institution, was in possession of the knowledge that the South Tower had collapsed as early as the NYPD, as its fall had been immediately reported by an FDNY boat on a dispatch channel. Because of internal breakdowns within the department, however, this information was not disseminated to FDNY personnel on the scene.

The FDNY, PAPD, and NYPD did not coordinate their units that were searching the WTC complex for civilians. In many cases, redundant searches of specific floors and areas were conducted. It is unclear whether fewer first responders in the aggregate would have been in the Twin Towers if there had been an integrated response, or what impact, if any, redundant searches had on the total number of first responder fatalities.

Whether the lack of coordination between the FDNY and NYPD on September 11 had a catastrophic effect has been the subject of controversy. We believe that there are too many variables for us to responsibly quantify those consequences. It is clear that the lack of coordination did not affect adversely the evacuation of civilians. It is equally clear, however, that the Incident Command System did not function to integrate awareness among agencies or to facilitate interagency response.²⁰⁸

If New York and other major cities are to be prepared for future terrorist

attacks, different first responder agencies within each city must be fully coordinated, just as different branches of the U.S. military are. Coordination entails a unified command that comprehensively deploys all dispatched police, fire, and other first responder resources.

In May 2004, New York City adopted an emergency response plan that expressly contemplates two or more agencies jointly being lead agency when responding to a terrorist attack but does not mandate a comprehensive and unified incident command that can deploy and monitor all first responder resources from one overall command post. In our judgment, this falls short of an optimal response plan, which requires clear command and control, common training, and the trust that such training creates. The experience of the military suggests that integrated into such a coordinated response should be a unified field intelligence unit, which should receive and combine information from all first responders—including 911 operators. Such a field intelligence unit could be valuable in large and complex incidents.

Radio Communication Challenges: The Effectiveness and Urgency of Evacuation Instructions. As discussed above, the location of the NYPD ESU command post was crucial in making possible an urgent evacuation order explaining the South Tower's full collapse. Firefighters most certainly would have benefited from that information.

A separate matter is the varied success at conveying evacuation instructions to personnel in the North Tower after the South Tower's collapse. The success of NYPD ESU instruction is attributable to a combination of (1) the strength of the radios, (2) the relatively small numbers of individuals using them, and (3) use of the correct channel by all.

The same three factors worked against successful communication among FDNY personnel. First, the radios' effectiveness was drastically reduced in the high-rise environment. Second, tactical channel 1 was simply overwhelmed by the number of units attempting to communicate on it at 10:00. Third, some firefighters were on the wrong channel or simply lacked radios altogether.

It is impossible to know what difference it made that units in the North Tower were not using the repeater channel after 10:00. While the repeater channel was at least partially operational before the South Tower collapsed, we do not know whether it continued to be operational after 9:59.

Even without the repeater channel, *at least 24* of the *at most 32* companies who were dispatched to and actually in the North Tower received the evacuation instruction—either via radio or directly from other first responders. Nevertheless, many of these firefighters died, either because they delayed their evacuation to assist civilians, attempted to regroup their units, lacked urgency, or some combination of these factors. In addition, many other firefighters not dispatched to the North Tower also died in its collapse. Some had their radios on the wrong channel. Others were off-duty and lacked radios. In view of these

considerations, we conclude that the technical failure of FDNY radios, while a contributing factor, was not the primary cause of the many firefighter fatalities in the North Tower.²⁰⁹

The FDNY has worked hard in the past several years to address its radio deficiencies. To improve radio capability in high-rises, the FDNY has internally developed a “post radio” that is small enough for a battalion chief to carry to the upper floors and that greatly repeats and enhances radio signal strength.²¹⁰

The story with respect to Port Authority police officers in the North Tower is less complicated; most of them lacked access to the radio channel on which the Port Authority police evacuation order was given. Since September 11, the Port Authority has worked hard to integrate the radio systems of their different commands.

. . .

THE LESSON OF 9/11 for civilians and first responders can be stated simply: in the new age of terror, they—we—are the primary targets. The losses America suffered that day demonstrated both the gravity of the terrorist threat and the commensurate need to prepare ourselves to meet it.

The first responders of today live in a world transformed by the attacks on 9/11. Because no one believes that every conceivable form of attack can be prevented, civilians and first responders will again find themselves on the front lines. We must plan for that eventuality. A rededication to preparedness is perhaps the best way to honor the memories of those we lost that day.