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Rescue Command

The Oklahoma City Fire Department (OCFD) instituted its incident management system during the initial stages of the incident. The Operations component of OCFD Incident Command (IC) was organized basically on two levels — the procurement of resources (manpower and equipment) and on-site strategic and tactical command, or the Rescue Command (RC), as it came to be known. Resources were handled through the IC post some three blocks away from the incident site. Decisions concerning resources were made based on the requests of the rescue commander. The IC was responsible for supplying resources to the RC and maintaining adequate resources to protect the other 621 square miles of the city. On-duty and mutual-aid personnel were staged in anticipation of RC needs (they were assigned in 15- to 20-member squads). Span of control was maintained through the squad leader and safety officer assigned to each squad.

At the RC, we worked with all agencies at one time or another. All requests or actions dealing with the Murrah Building site were to come through the RC. RC dealt with representatives from all sectors on a daily basis. This was a must if we were to handle the magnitude of work and coordinate operational requirements. All agency representatives came to RC at this level. We melded all the timetables, equipment needs, and personnel requirements.

The on-site rescue commander, in concert with the incident support team (IST) assigned to this incident by FEMA, was responsible for formulating the strategic goals and tactical objectives necessary to bring the incident to completion. Liaisons and face-to-face communication were used to work out problems and make work-site plans. This worked well for FEMA and RC, allowing needed information to flow. Relations between the two agencies were not always perfect. There were some problems with lines of authority and who should be kept informed, but we were always able to work out all issues to meet our primary goal: the saving and removal of our friends and neighbors.

A structured and coordinated working system that would best utilize the skills of firefighters, construction people, medical teams, medical examiners, and

law enforcement personnel and have them perform as a unified team was implemented.

Working with the professional, knowledgeable, and skillful FEMA teams was a great pleasure, even though some adjustments had to be made with each task force change. Once they came to know us and our city, we became one unit and formed a brotherhood. Tactics/procedures were modified as the situation dictated. Because we formed a good working relationship with all the people involved, most of the modifications could be worked out face-to-face in small groups. If a more complex issue arose, we would call a formal meeting with the personnel involved. No issues were left unsettled; consensus was reached, and the operation went forward. Assessments and surveys were ongoing components of the routine. Plans were always updated and revised to meet the demands of the situation.

Rescue Command Components

Rescue Command consisted of three district commanders, each assigned an eight-hour shift seven days a week. Each chief (Rescue Command) had a command staff consisting of the following:

- safety officer: 12 hours, entire site;
- administrative aide: eight hours;
- rescue operations chief: 12 hours, interior of building;
- task force leaders: 12 hours;
- equipment officer: 12 hours;
- manpower officer: 12 hours; and
- search and rescue teams: 2, 4, 8, 12 hours.

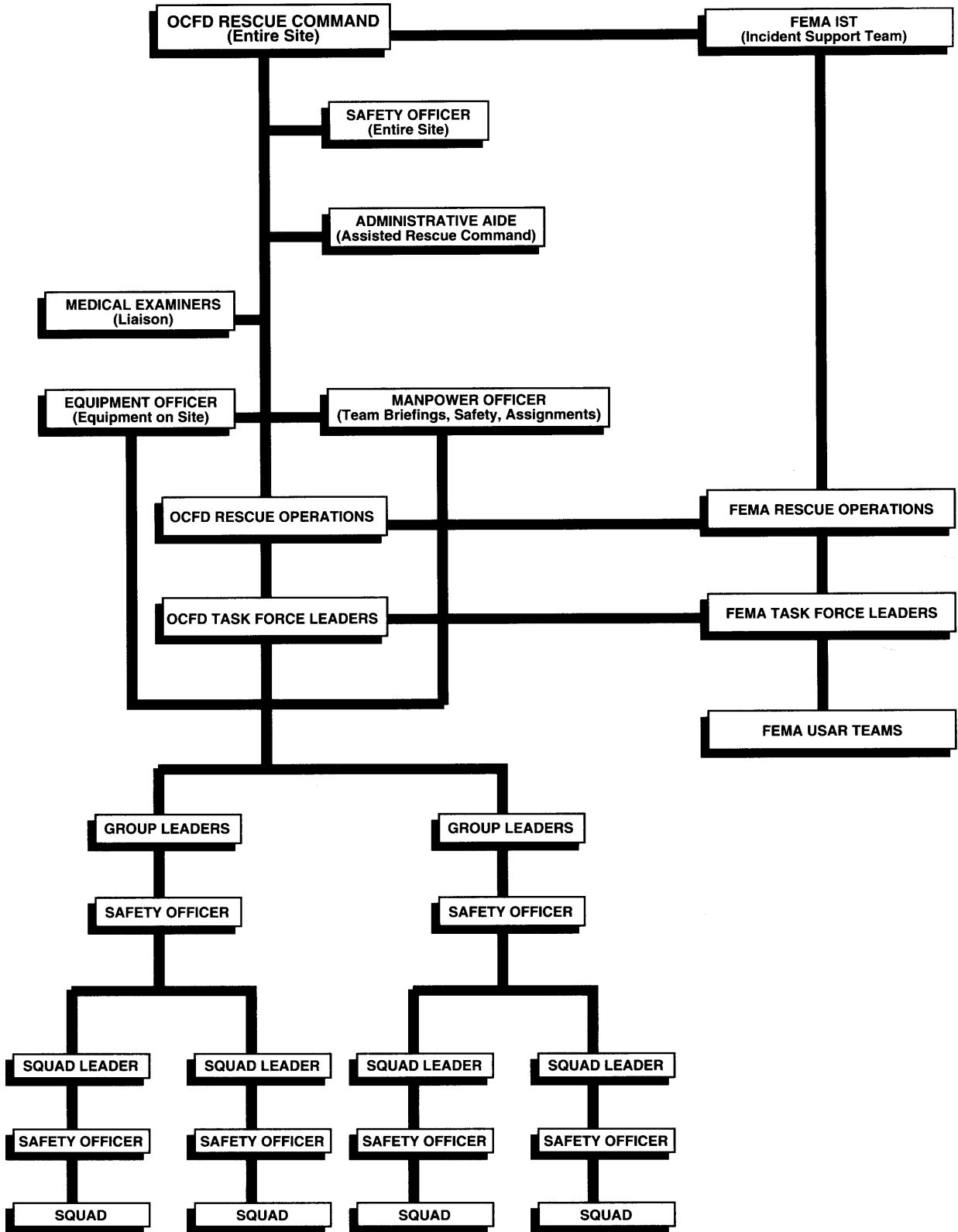
Size-up

We were faced with a nine-story office building, including a day care center, in almost total collapse. Only one-half of the building was standing; the rest was stacked in the rubble piles of a pancake collapse. Upward of 300 people were injured, missing, or dead.

At least five major structures had been severely damaged to the point that they required primary and secondary searches. Many victims in these structures had to be assisted/removed or recovered through extrication.

It was immediately obvious that, because of the size and weight of the collapsed material, we would need heavy equipment and experienced personnel to

Figure Three: Rescue Command Organization



rig and lift the debris. (A local crane contractor provided the equipment and manpower for these tasks.) The entire scene was looked at from the standpoint of the threat of a secondary collapse, which was to become the overriding issue for the duration of the incident.

Specialized rescue equipment was also needed. Several types of search techniques had to be carried out simultaneously: high-angle search procedures on the remaining portions of the upper floors, tunneling and shoring in the lower areas, as well as surface and void searches on the face of the debris pile. The vast amount of equipment needed to support these searches was not readily available. The call for donations of tools and equipment went out to the private sector. Its response for the duration of the incident was absolutely overwhelming.

Immediate equipment needs were met by on-scene fire units; our local utility companies were among the best resources. Since they regularly respond to emergency situations, they can provide certain needed tools and equipment on the spot. Other suppliers of tools, equipment, and services were the City's support divisions (Street, Parks, and so on), local construction companies, volunteers, and unknown sources. Logistics was in place and providing items as needed.

In the first one-and-a-half hours of the incident, countless civilians and rescue personnel — many seemingly without direction and not under the control of other authorities or outside entities — were in and around the building. All desperately wanted to help. It was obvious from the start that this would be a long-term incident.

Strategic Goal

The primary objective was to save lives — to locate and remove all ambulatory and non ambulatory victims from the Murrah and other severely damaged buildings — and do it safely. We had to ensure that search and rescue tactics would not cause further collapse of the already unstable Murrah structure. To perform these tasks, we had to take control of the site (the outside perimeter — a two-block area north and south and one block wide around the Murrah Building — and the Murrah Building itself). Ultimate site security responsibility was assumed by the U.S. Marshals. Control of the Murrah Building was accomplished jointly by the Police Department; Fire Department; Drug Enforcement Administration (DEA); Federal Bureau of In-

vestigation (FBI); Bureau of Alcohol, Tobacco, and Firearms (ATF); the Sheriff's Department; and others. The outside perimeter was under the jurisdiction of Oklahoma City law enforcement.

Rescuers' safety was of utmost importance from start to finish — even more so because of the building's extreme instability. A major concern recognized during the incident was that equipment weighing hundreds of tons, including cranes moving tons of debris, was being used above the rescuers. To ensure coordination between construction crews and heavy equipment operators at the scene, we met with all crew and company supervisors to go over safety and organizational guidelines. Through this mechanism, RC was able to address and meet the needs of the construction people and keep them up to date on overall operations and needs.

FEMA structural engineers — whose assistance and advice were invaluable — monitored and assessed the building on a continuing basis 24 hours a day. OCFD and FEMA teams attended two briefings each day — at the start of the operational periods — to discuss strategy and select tactics. Key safety and health issues were identified and their remedies addressed. All this information was outlined in an operational period action plan and distributed to involved personnel. This system allowed the tough risk-benefit decisions to be made with a degree of confidence. We realized, however, that, regardless of how many precautions were taken, the building still would be very hazardous throughout the incident.

Search and Rescue Tactics

Search and rescue operations were not conducted in the "usual" manner. A team/squad was assigned to sections, floors, or areas of the building. They performed all function needs in their areas — whatever they might be.

Nearly every type of search technique known was employed to accomplish the overall strategic goal of finding/saving victims. The structures were searched using canines, cameras, listening and heat-imaging devices, and search cameras. Any voids found (there were few) were physically searched. Several operations were taking place simultaneously, including the following:

- Search and debris stabilization/removal were underway on the upper floors, "the Pit," and east extension, as well as on the north surface de-

bris piles. Search and rescue were being conducted by the OCFD, mutual aid, and FEMA teams.

- Medical examiners' teams were assisting with the identification and removal of victims and transfers to the morgue area.
- The FBI and other law agencies were working the crime scene.
- The FBI was working on cars in the parking lot (dismantling them into small pieces — this work necessitated 6 to 10 people working with tools every day until it was completed).
- Teams were performing decon.
- The Red Cross and other volunteer agencies were on scene.
- Personnel from the State Health Department and our own EMS Division were operating at the scene.
- FEMA teams and representatives were on scene.

At the same time all this was going on, the FBI, ATF, and a mixture of all law agencies were working the Water Resources Board, Athenian, and Journal Record buildings and sifting all the parking lots and streets. These are just a few of the items we had to deal with.

There were impediments. Several times during the incident, operations had to be suspended because of the weather. Crane operations were suspended because of lightning. High winds delayed outside efforts while loose debris was controlled. Though these conditions slowed work in some areas, rescue efforts continued in the sheltered areas of the building.

Much of the debris was moved by hand. In addition, the FBI had to inspect each piece of debris for evidentiary value. The fact that the entire incident area was a crime scene caused some complications and delays, which were rectified by assigning an FBI liaison to the RC post.

By approximately the seventh day of operations, we employed a more efficient technique to assist in the allocation of manpower and identification of victims. The medical examiner's office obtained a list of Murrah Building occupants. The FEMA IST generated a map of each individual's specific work station. This map was used to assist in identifying those areas in which rescuers were most likely to find victims. As each

area was searched and a victim recovered, the specific person was accounted for on the occupant list. This system allowed search resources to be shifted to the areas of the collapse most likely to produce results.

Since this was a crime scene, victims had to be removed in accordance with the following procedure: As each victim was found, a representative of the medical examiner's office was called to the area to assist in the recovery for the purposes of identification and evidence protection. The victims were taken to the temporary morgue just east of the Murrah Building and then transferred to the county morgue for positive identification.

Hazard Assessment/Structural Stability

On the first day, we met with Oklahoma City engineers who had constructed and remodeled the Murrah Building. They provided information and building plans. FEMA engineers met with these people to assess the building's condition. FEMA engineers conducted ongoing assessments of the structure throughout the incident. They lived and worked alongside us, which allowed for first-hand knowledge. Without their knowledge and input, the incident's conclusion may have been very different. With the aid of construction crews, the FEMA engineers and USAR teams were able to address numerous problems associated with the building. Two of the problems were major, however. The first was the overhanging slabs attached at each floor level, including a huge "Mother Slab" hanging from the roof directly over the Bowl. This slab eventually was cabled to the remaining south wall and "diapered" with canvas to protect against any chunks of concrete breaking away and falling. This large piece of concrete was continually monitored by surveying instruments and watched by personnel assigned to that duty.

The other major problem was the condition of two columns in the front center of the building. These columns had suffered severe damage and had heavy debris piled around them on all sides. Rigging and removing the heavy slabs were like playing a deadly game of "pick up sticks." Each movement of debris in effect created a new damaged building that had to be assessed. As the two damaged columns were uncovered, the stored energy created by the leaning slabs was released from them. Heavy pipe shoring had to be installed, and the mass of the columns had to be increased by setting forms and applying grout to the columns' damaged portions. These activities were

accomplished as rescue-recovery operations continued. All work was continually inspected and evaluated by USAR structural engineers. Their advice helped fire officers in making some of the toughest decisions they ever had to make.

Personnel Considerations

There was never a shortage of manpower at this incident. From the start, third, fourth, and general alarms were called in rapid succession, and mutual-aid companies from many Oklahoma fire departments were requested and delivered. After the operational delay caused by the bomb scare at 10:30 a.m., we rotated 75 personnel in and out of the building. These crews initially were assigned for a maximum of two hours, which eventually was increased to four hours. When the time limit was reached, a fresh group of 75 was brought to staging and sent to resources. In addition, hundreds of military and law enforcement personnel responded to the scene. In fact, one of the problems we had was how to eliminate freelancing and maintain control over these non fire service personnel. All workers ultimately were assigned through the RC resource area. As the area to be searched decreased, the number of assigned personnel was decreased. Safety was enhanced by maintaining only the essential number of personnel on scene.

Using OCFD special teams personnel in key positions was an early and correct decision. Trained rope and confined-space personnel were used in the task force and in group-leader positions, increasing the margin of safety for all concerned. The expertise of the USAR teams that responded, beginning on Day Two, was invaluable. They were among the best minds in the search and rescue business in the country. Their knowledge and abilities benefited all who participated in the incident. All USAR teams operated as a unit; OCFD personnel operated in units right alongside these teams.

The medical personnel (hospital and so on) were on standby and used inside the building during the first hours of the incident. After this time frame, the only medical personnel used with the RC structure were from the medical examiners' staffs, FEMA teams, and our own OCFD EMS personnel.

Lessons Learned and Reinforced

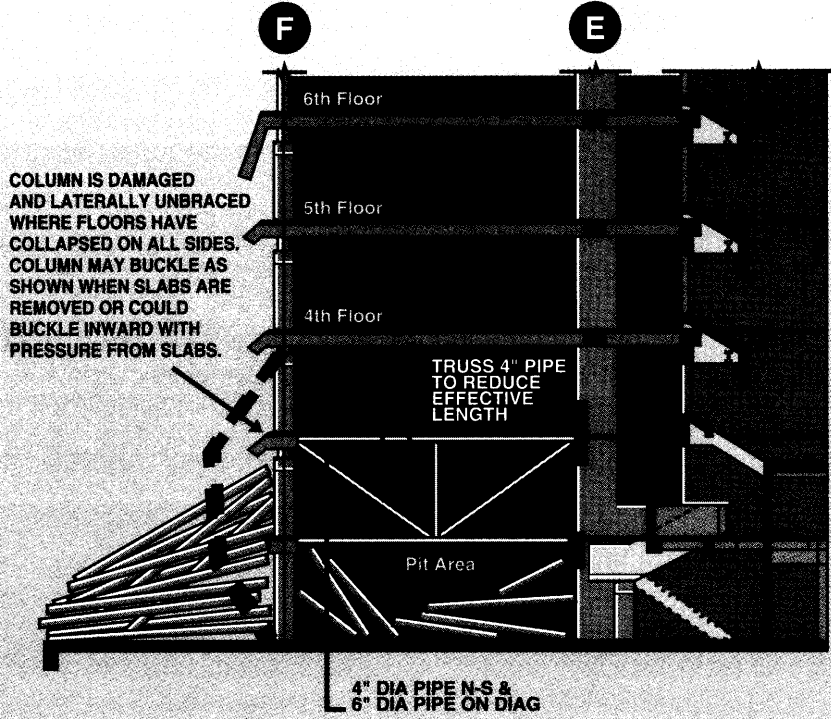
- Establish Rescue Command or forward operations command in addition to overall incident command. This component of the ICS will serve

as a crucial link between the overall incident commander and rescue operations/strategy and tactics.

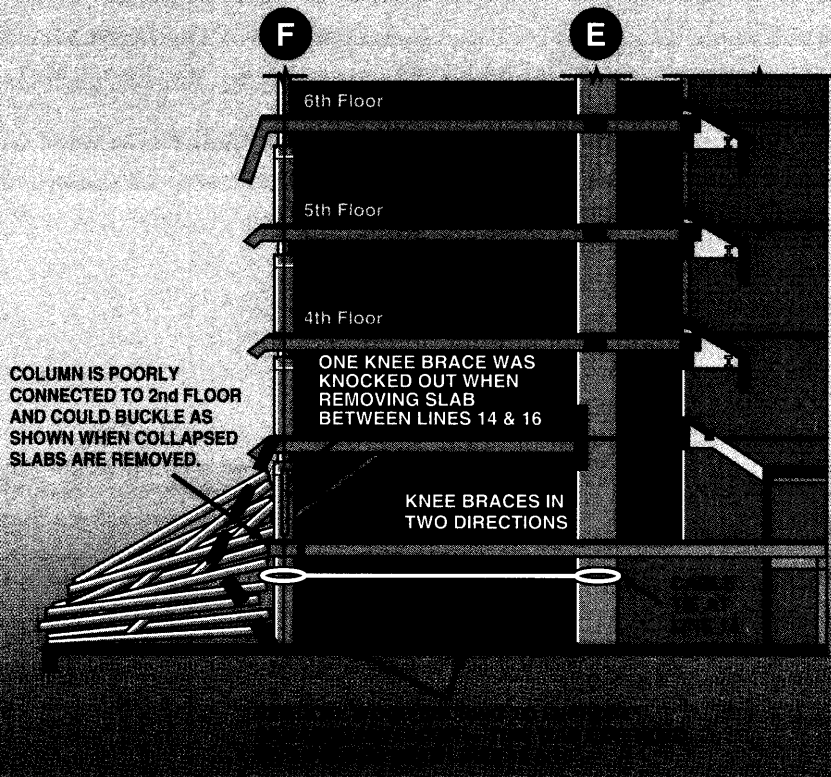
- Streamline the lines of authority. The tendency early in an incident of this magnitude is to have too many levels of command.
- Ensure that no actions at a large-scale incident search and rescue operation are taken without first going through Rescue Command.
- Include representatives from other agencies at the Rescue Command level as well as the overall incident command level. Create a unified team.
- Use a fluid command structure to adjust to changing demands.
- Update operational plans regularly.
- Set work teams and hours early on to fit a long-term need.
- Maintain written site plans; make sure all personnel on-site are kept updated (not just rescuers but construction people, support personnel, logistics, planning, and so on).
- Take great caution so that rescue operations do not cause a secondary collapse of the remaining structure — take control of the site.
- Work closely with heavy equipment operators and establish safety and organizational guidelines.
- Build safety into the chain of Rescue Command — have safety officers at each operational level. Incorporate safety officer training for all personnel starting with company officers.
- Identify critical safety and health issues — and their remedies — throughout the incident. Distribute this information to all operations personnel.
- Establish a documentation mechanism (log, notes, recorder, and so on) at primary operational locations.
- Seek equipment resources from outside agencies, if necessary, to better meet tactical objectives.
- At a crime scene, work closely with law enforcement personnel to ensure that all potential evidence can be inspected.

Figure Nine: Collapse Hazards And Mitigation

SECTION AT COLUMN LINES 20 & 22



SECTION AT COLUMN LINES 14, 16, & 18



- Seek innovative ways/technologies to assist with victim identification.
- Work closely with structural engineers to reduce the possibility of secondary collapse.
- Realize that effective collapse search and rescue operations hinge on a coordinated multi-agency effort.
- For safety and effectiveness, keep the number of personnel operating in the collapse zone consistent with the overall size of the area to be searched.

Rescue Operations: Doing Battle with the Building

For me, the incident began five blocks away in my boss's office. We were discussing budgets for rescue units when the blast occurred. I immediately left the office to drive to the incident site. Smoke, visible from the alley behind Fire Headquarters, indicated the general direction. I stopped at the corner of 5th and Hudson, approximately in front of the Regency Tower Apartments, and walked to the Alfred P. Murrah Federal Building.

On entering the building, I noted several problems in addition to the injured and the overall extent of the damage. As OCFD special operations chief, I knew my involvement here would take me in several directions. Two stood out immediately: securing the building — that is, maintaining structural integrity for rescuer safety — and rescuing and recovering the building occupants who were trapped in the collapse. Like the “chicken-or-the-egg” dilemma, it was difficult to say at that point which would come first, rescuing victims or looking for secondary-collapse possibilities. One cannot be separated from the other, which may sound basic; but actually doing both was extremely difficult. I forced myself to fight against my first instinct, which was to deal with the people, and began to survey the structure. I began scribbling on a pad the most hazardous locations as I observed them.

As a hazardous-materials instructor, I try to keep to a basic concept of problem solving. As I see it, there are three elements of problem solving in mounting an emergency response with the greatest margin of safety: hazard, a danger or perceived danger; risk, the exposure to that danger or perceived danger; and protec-

tion, the insulation to the hazard to affect the risk. My exposure to that known or perceived danger poses a risk for me. The questions to be asked and answered are, What results might my exposure have? Does my exposure to that hazard present an acceptable risk? If it does not, then I must place one or multiple layers of protection between the hazard and me. The protection may be distance, time, clothing, or barriers — whatever must be done. In a nutshell, standing there in the Murrah Building, I employed this method to identify the hazards in front of me, assess the risk they posed, and then develop some form of protection methods.

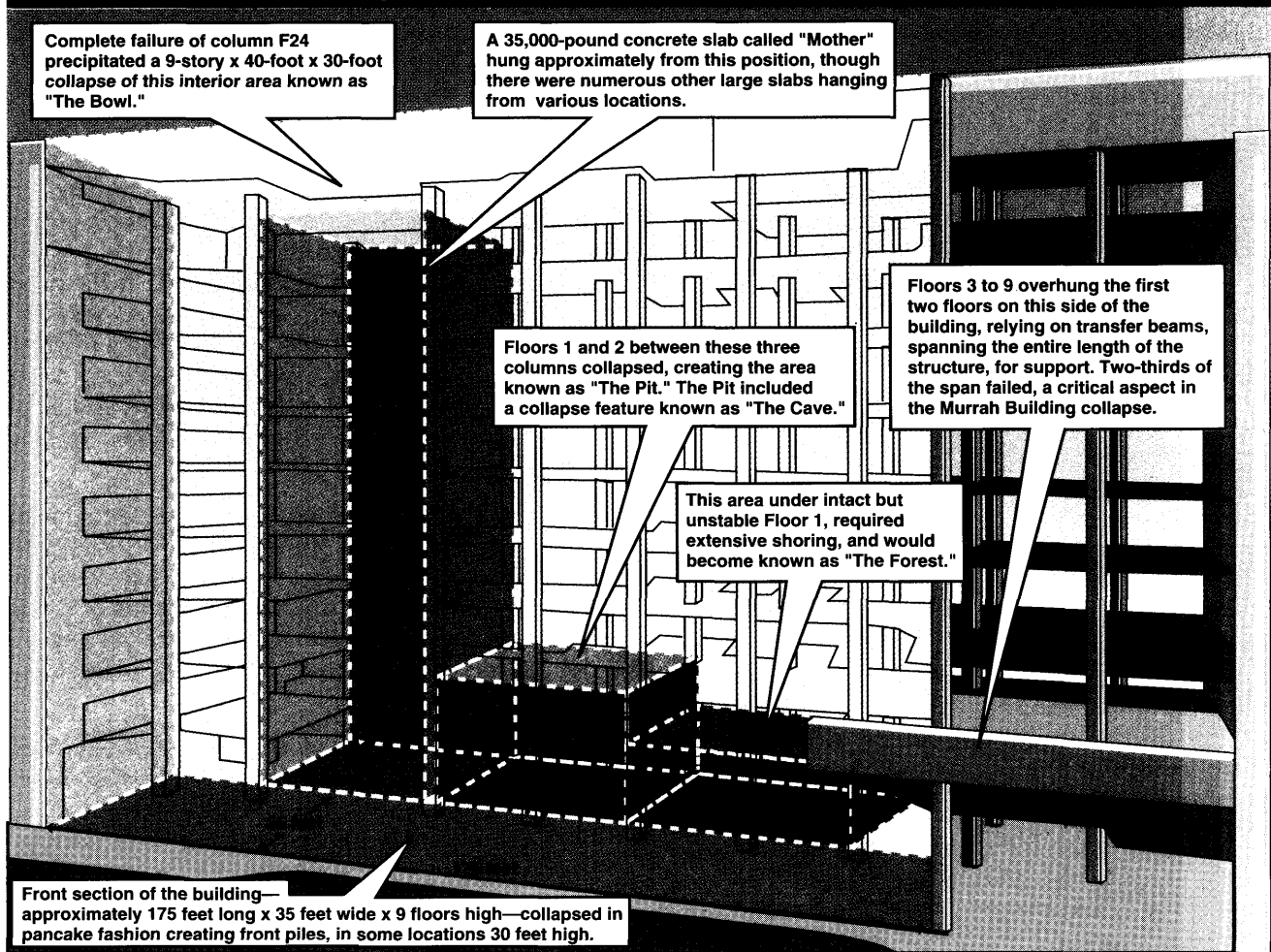
Size-up and Reconnaissance

Smoke from the car fires across the street was coming into the building. It was hampering vision more than creating breathing problems — it made the building dark. Darkness probably was the greatest hazard for the first 45 minutes or so of the incident because you couldn't see and easily could trip and fall in the glass, concrete, office furnishings, and rebar piled high everywhere. I spoke with people who were still inside the building — but able to help themselves — and learned that a day-care center with some 25 children had occupied part of the second floor. My children were in a day-care center at that very moment, so learning this was a distraction. One thought was for the children, the other for the welfare of the rescuers and the condition of the building.

The first thought drove me to the second floor. I looked for the elevators, believing the stairs to the second floor would be close by. When I got there, I began to conduct a primary search and inspection. Before I could do much searching, debris from the bottom of a third-floor beam fell on me, staggering me, almost knocking me down. I looked up and could see severe damage to this beam, running north-to-south along what I would later identify as Column Line 20, between E and F. I became concerned about a secondary collapse. My responsibility was now skyrocketing; would-be rescuers were entering the building on their own. It seemed to me that everyone in the country was coming to the building.

When I first entered the building, I found signs of shrapnel in all but the shielded areas, which led me to believe that much of the lower levels were affected by the blast and that damage on the upper levels came from the destruction and loss of the lower columns. The building quit collapsing because it “stabilized” itself.

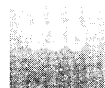
Figure Four: North Side of Murrah Building



My consuming thought in the first 24 hours was to accomplish whatever rescues were possible while shoring the lower beams, especially the area across Columns F20 and F22 in the first- to second-floor area, and to avoid disturbing the structure while removing only as much debris as possible to meet our rescue objectives. Columns F20 and F22 were a critical concern because the adjacent Column F24 had completely collapsed and F20-22 had no lateral support at least up to the third floor.

During the first phase of operations, it was essential to keep the structure in its current position. Again, the building had stabilized itself when it stopped collapsing, and we had to make sure no major structure elements were moved and the building's load did not change. A load change easily could happen by introducing a new load of rescuers who would be moving

abruptly from point to point while vigorously looking for more live victims. Just the thought of the potential consequences of this live shock load sent a chill down my back. We had to get the unorganized would-be rescuers — hundreds of them — out of the building, which was difficult because they all had an extreme desire to help. They wanted to help their neighbors. The fire service wanted to do its job. The civilian rescuers were willing to accept a risk they really didn't know but which the fire department found unacceptable. During the first moments, I witnessed more chaos and confusion than I had ever witnessed — none of my many previous deployments even came close to this one. Absolute unrestrained panic was rampant in the building during the first hour to hour-and-a-half of the incident. The building had so many access points that it was very difficult to keep anyone from entering. I realized



this and consulted District Chief Jim Conners, the first rescue commander and my immediate superior, and told him we needed to get control of the building, which was being subjected to a substantial shock load. He understood and was trying, but it was like trying to stop an ocean tide. The Oklahoma City Police Department (OCPD) early on implemented site-control measures; its officers had established perimeter control around a four-block area, but securing the Murrah Building itself was an entirely different matter. Many OCPD officers themselves were engaged in the search and rescue activities.

I was struck by more concrete pieces while on the second floor by the edge of what would later be called "the Pit." I continued with my assessment of the building's condition and witnessed the floor's vibrating in response to rescuers' activities on the third floor. I turned again to try to access the west stairs — it was, contrary to my initial belief, stable and passable — and saw Firefighter Danny Atchley (OCFD's photographer) searching the day-care area and removing children. You couldn't help but notice him. He was throwing debris so fiercely you couldn't even get close. Atchley removed three babies that day. None survived. At this point, we were not able to organize our personnel, scattered over and under the rubble in many locations, working desperately.

I went up to the third floor. I found two women, Patti Hall and Nancy Ingram, both entrapped. Hall appeared to be hurt more seriously, but the extent of her entrapment was less and she would be removed relatively quickly (she would survive the incident). I worked with some of the civilian rescuers to try to keep them from moving Ingram while trying to extricate her; soon firefighters arrived to handle this extrication.

I walked over to where the floor was missing, where it fell away to form the Pit. I again tried to get civilian volunteers to leave the building and to stop running and jumping into the Pit. From my location on the third floor behind Column F18, I spotted a man at the third-floor level, at the very top of the "Christmas Tree." He was severely hurt; just under him was a deceased victim. I climbed out on the pile with the man and started removing the debris entrapping him. I needed help.

The radio traffic was so heavy I couldn't get out, so I resorted to yelling to some firefighters on the ground. It was then that I noticed the crater at ground level. It was evident to me, from my military experience, that

such a violent depression could only have been caused by a bomb. I saw Conners below and hand-signaled that I needed an aerial ladder. (We had placed three aerial apparatus in operation very quickly: a 100-foot aerial ladder flanked to the west by a 95-foot tower ladder and to the east by a 135-foot aerial ladder.) I turned around and went back to the man, not knowing if Conners had understood me. A few minutes later, an aerial ladder tip brushed my left arm. A truck company crew came up, placed the man in a stokes basket, and moved him down to the street. I descended to the street in the ladder and reentered the building. I vowed never to get stuck in a spot like that again — a spot in which I couldn't do my job. While I was stuck up there, I could only focus on one man. I wasn't performing size-up or looking after the safety of the building occupants and rescuers.

I was now on the ground floor that led to the Pit area. I found Nichols Hills (OK) Fire Chief Keith Byrant and some of his people working on a live trapped victim, Daina Bradley. He explained to me the seriousness of her entrapment: Her leg was under a massive beam that had collapsed between Columns E20 and F20.

It was just past 10 a.m. As far as I could determine from my building reconnaissance and from speaking with firefighters working the area, we had three live victims still trapped in the building: Nancy on the third floor; Daina on the first floor; and Amy just north of Daina, also on the first floor. All three were being attended to by personnel.

I was aware that we had removed many live victims from the building by this time, despite the lack of organization and danger to all involved. Generally, these were accomplished without sophisticated rescue technology — hand tools, muscle, and grit were in most cases the tools of necessity. Victims were pulled out of the lowest areas of the building and picked off the highest by aerial devices. Water was a concern down low, where water from broken plumbing began to dam up in the debris around some of the victims; generally, this was quickly addressed by moving the debris so the water would drain out, and, despite reports to the contrary, no victim was in real danger of drowning. One woman from the eighth floor had been blown backward across her office and, as the rest of the office collapsed around her, she remained perched on a tiny ledge — one step forward would have resulted in her demise, but she stayed and was recovered via aerial ladder.

The force of the explosion manifested itself many, many times over the course of the incident: People were blown 50 feet through as many as six masonry block partition walls; body parts were strewn throughout the debris; victims were impaled on file cabinets and by flying rebar; bodies literally were shredded — horrible effects of an outrageous cowardly act. But it was our duty to find the living and reclaim the dead — and ensure to the best of our ability that our personnel did not make the ultimate sacrifice doing it. And it would take 16 days to do it.

Bomb Scare

As if there wasn't enough to think about, an order came over the radio: "Everyone out! There's another bomb!"

I was on the stairs returning to the first floor when I heard the warning. I immediately returned to the crews on the third floor — very close to the north face above the Christmas Tree — to see how close they were to extricating Nancy. A nurse was with them trying to start an IV. She had no protective clothing, such as a helmet or the like. I removed my helmet and held it on her head. I looked over to another firefighter who was doing the same for another civilian rescuer. The crews said they were very close to getting the victim out. I stressed the need for them to move as quickly as possible.

I left them and went to the first floor, remembering my friend Bryant and his Nichols Hills people. It appeared that extricating Daina would require an extended operation, but Bryant and his crew did not want to leave the victim alone. Although moved by their professionalism and willingness to stay, we were not going to take such a risk. I told him to gather his people and move to safety.

As they reluctantly vacated the hole and withdrew, his words haunted me: "The lady is going to be by herself." If she were my wife, I would not have wanted her to be left alone. So I did what any firefighter would have done. I climbed into the hole and got her attention. She was begging us not to leave. My third-generation firefighter instincts surfaced: I wanted to stay, but I also knew my duty. I took off my helmet and asked the Lord to be there, for He knew infinitely better than anyone here what to do. I couldn't help but wonder, "Would any of us be allowed to meet Him today?"

What was a supervisor to do? Can you allow your people to stay and be subjected to the risk of a sec-

ondary collapse that would occur if another bomb went off in an already-bombed-out building? Or, do you make them leave? I looked up through the very heavy debris to my right. It was Bryant reminding me in his best fire chief voice the exact words I had used on him just minutes earlier. I looked up and saw Atchley, whom I had not seen since he was working in the day-care area earlier. He said to me, "You have to go; you can't tell everyone to leave and then you stay." I told Daina we had to go and promised that we would be back with some better tools and equipment. I climbed out of the Pit and was walking shoulder to shoulder with Atchley down the dark hall when he said, "We need to stay in fellowship today with God because it could be over very quickly." He meant for us working in the building. You really tried not to hear the cries for help, begging us not to leave, coming from behind us.

People were running everywhere. Atchley and I stayed a little longer, trying to make sure everyone was out. It then was reported to me that "the third-floor lady [Nancy Ingram] is out." I recount these few stories here to try to convey the condition of the Murrah Building and the spirit that permeated it. Some of the things I witnessed during the first hours of the incident were predicated on the duty we felt toward the people we serve — not on what we were being prompted to do in our hearts. Duty had to override emotion in an operation such as this.

The first bomb scare, at approximately 10:30 a.m., gave us an opportunity to get control of the incident, and we did.

Gaining Control

By the time of the personnel evacuation, we had accomplished the following:

- extinguished the car fires;
- completed a primary search of the Oklahoma Water Resources Board, Athenian, and Journal Record buildings;
- surveyed the Murrah Building and assisted/removed/treated all the walking wounded;
- extricated all known live victims except two;
- established triage and treatment areas; and
- completed transporting all known victims (except the two still known to be in the Murrah Building) to area hospitals.

The Command Post was moved to 8th and Harvey and fire department vehicles moved to a staging area established on 11th and Harvey. At the Command Post area, I was contacted by Assistant Chief Jon Hansen, my workday boss. He had not yet taken over the position of public information officer. He assigned me as rescue operations chief in the Murrah Building and instructed me to prepare my people to reenter the building as soon as the bomb scare was declared to be concluded.

I started to collect all the special operations people from the OCFD and mutual-aid departments and placed them in three groups, or task forces: High Angle, Haz-Mat, and Confined Space/Trench Rescue. Rope people would work in the areas above the third floor, the Haz-Mat group would be placed on the second and third floors, and Confined Space/Trench personnel would work in voids and under slabs from ground level. I later wished that I had kept these skilled people together, for during the second day, operational assignments changed. The Confined Space/Trench teams in particular proved very effective in the voids and cove areas, which required members who were not claustrophobic and who understood the principles of shoring.

The people who had been with Daina prior to the bomb-scare evacuation reported that it looked as if her leg would have to be amputated so she could be removed from her entrapment. They searched for a surgeon to perform the amputation. A surgeon, Dr. Andrew Sullivan, arrived at the Command Post. We discussed the objectives with him and determined the equipment and supplies he would need. He was presented to me in the following manner: "Here's the doctor who is going to get the lady with the trapped leg out. He needs some equipment." I gave him a rescue helmet with a light affixed to it and briefed him on some of the dangers to which he would be exposed. He then informed us that he was "good luck." Several firefighters escorted him and his medical tools to Daina.

We returned to the Murrah Building shortly after 11 a.m. At this time law enforcement personnel established building security measures — a critical issue if we were to continue this operation in an organized, controllable fashion.

Organization was key. The Murrah Building complex — including the main building, extension areas, parking areas, etc. — presented 320,000 square feet to be searched. More than 260,000 square feet were left

standing. About 55,000 square feet of building had collapsed into a relatively tiny 7,000-square-foot area — this would have to be a well-coordinated effort if we were to be effective.

The search and rescue task forces consisted of between 12 and 20 firefighters, split up into four-member crews and assigned to specific locations as directed by the task force leaders. We had a large manpower pool (75 firefighters on standby) even at these early stages of the incident and could assemble additional or backup teams within seconds if required.

The Confined Space/Trench group entered at ground level and worked its way to the Pit — the two-story collapse approximately half the building deep and three columns across. They found an access point at which they could begin digging, removing debris, and tunneling in their search for live victims.

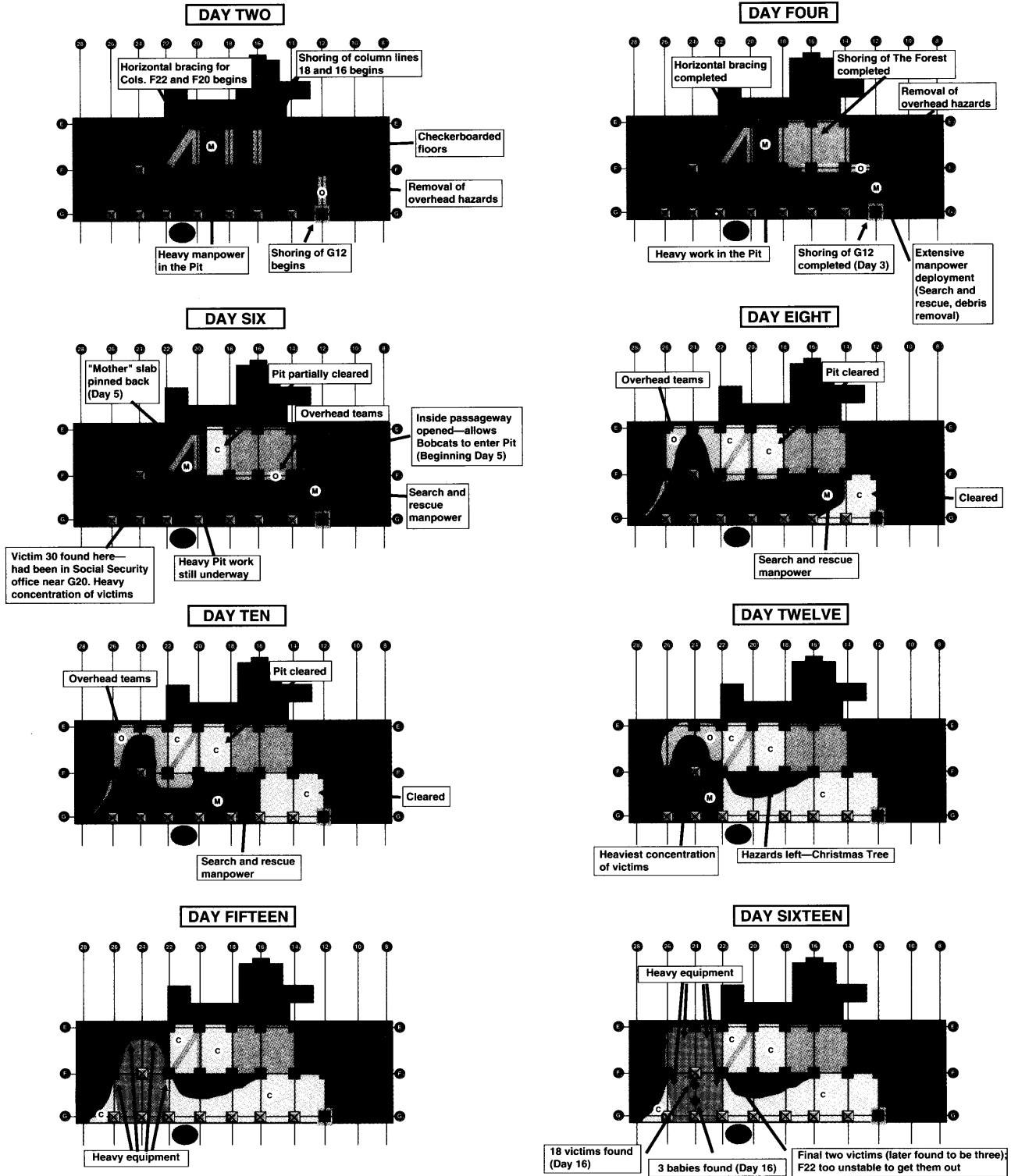
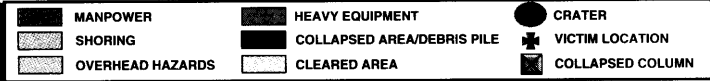
Second- and third-floor teams moved to their positions via the interior stairs and searched through the vast rubble of broken furniture, concrete and steel, and personal belongings. On the second floor, this rubble included remnants of what had been the day-care center. These crews also performed limited searches in voids at the edge of the Christmas Tree across Columns F12, 14, 16, and 18.

Upper-floor teams also reached their destinations via interior stairs, moving from floor to floor in their primary searches. Any work at fractured edges of the building required that these firefighters tie off to a substantial object.

Meanwhile, teams were successful in extricating Amy. She was quickly loaded into an ambulance at the scene and transported to a hospital. Daina was the only identified live victim known to be in the building at this time.

We had not been back to work very long when another bomb threat evacuation was ordered. We were getting a little tired of this start-stop routine. So we went over to look at the "bomb," which turned out to be a shoulder-carried missile that was still in its wooden box, as shipped. (With federal law enforcement agencies occupying parts of the building, it was not unusual to find weapons, etc. in the debris.) There wasn't much to it. Most personnel vacated the building and went only across the street to the post office, awaiting the all-clear. We were out of the building for only a few minutes. The crew working on Daina remained in operation — they were not about to leave her.

Figure Six: Daily Progress





This second evacuation, though brief, gave us another opportunity at refining site control and operational organization. We did an even better job of it this time. We realized, in our discussions outside the building, that we had to reevaluate the structure and assess the risks to the many authorized personnel within the building should a secondary collapse occur. Our hazard-reduction plan in part called for controlling the movement of personnel within the building so that one team would not accidentally jeopardize the position of another — for example, so that search on an upper floor would not rain debris on firefighters working below. We rebriefed all operations personnel on the hazards inside the building as we knew them. We directed personnel to wear Latex gloves under their leather firefighter gloves and use respirator masks. Concrete dust was a known hazard; bloodborne pathogens and other biohazards were question marks that demanded precautionary measures. Gross decon stations were set up. Body removers wore Tyvek® suits.

Day One, Afternoon and Evening

After the second bomb scare evacuation, we resumed our primary searches unimpeded throughout the afternoon and into the night. In addition to focusing on the main structure, we searched the other areas of the building. The parking garage yielded no victims. In fact, there was very little damage in this area — the vehicles in the lot, except for a cover of concrete dust, were as they had been before the explosion. The one-story office area attached to the main building (called by some the “east side basement,” as sections of the first floor in some areas were belowgrade) had sustained massive destruction. Crews identified several dead bodies and recovered some from that location. Throughout this operation, firefighters were able to see and even touch the dead but were unable to recover them until much later.

By 2 p.m., Daina’s leg had been amputated, and she was transported to the hospital. She would survive. All the dead on the third to the ninth floors were removed by the afternoon. No live victims were found on the upper floors. Meanwhile, primary search on the second and third floors was producing only dead victim finds.

On the first floor, crews were hard at work tunneling through the Pit. They cleared debris, passing it out by hand or in five-gallon buckets. They shored quickly as they went. Hydraulic power spreaders and cutters were called in, but they proved ineffective in moving

heavy structural debris in tight conditions. Sledgehammers, pry bars, and brute force were used to clear what needed to be cleared. Eventually, these crews cleared an area that would be called “the Cave,” a roughly 25-foot-long by 15-foot-wide area under the Pit, with a height in many locations of three feet or less. Firefighters found many dead victims in this location — the Cave and the Pit would give up some 70 victims over the course of the incident.

People on the second and third floors often moved to the eastern fringes of the collapse to look at the Pit, causing debris to fall. I ordered that no one was to pass Column Line 18. We would change this to Column Line 16 the following day.

After a few hours in the building on Day One, we realized, from the state of the building and the entrapped victims, that chances for live rescues would be slim. Opportunities for making live rescues were slipping away as the hours passed. All but one of the victims found alive was discovered by 10 a.m. We who had been in the building since the inception of the incident and had seen the destruction faced a reality in our heart of hearts that we wouldn’t find any more live ones. Still, we hoped: We were committed to rescue mode; this was a search for live victims. So we were surprised and cheered when we found Brandi Liggons in the Cave that evening. Her rescue team(s) worked for more than three hours to extricate her.

After more than 12 hours of assessing and reassessing the building, I was not overly concerned with a secondary collapse because we were trying not to move heavy debris, particularly around the columns. We also had reduced the number of rescuers under and over the debris. This decreased the amount of falling debris and the potential for someone being struck by it. That night we began shoring the third-floor beam across Columns E20 and F20, midway through the Pit. We constructed approximately 20 vertical pipe shores in this location. But the hazards were still there. Bad cracks were everywhere. I felt we were working and walking around in a glass house. It seemed to start to settle down about 8 p.m. We may have just been getting used to our new home. By 10 p.m., we had conducted primary, secondary, and canine searches.

As the night went on, teams were rotated in and out of the Murrah Building. Finding teams that could and would work in such a confined, risky, dark, odor-rich, visually stimulating space became a challenge. It was not for everyone — and, in truth, some

firefighters refused. The few teams that worked in the Cave and void areas were made up of some of the most impressive people I have ever met. Working in these small areas was difficult, yet these teams worked hour after hour. They would remove a body, take a break, and then come back to work; some became very good at their newly acquired skills. The learning curve was moving up fast now. These rescuers were assigned in teams of four and got breaks every two hours. I designated these teams on my roster by the name of the team leader. The teams distinguished themselves under most difficult circumstances. They felt they could find another live victim, and that kept them doing their duty. The night passed with team after team passing through. The shoring during this initial period may not have been the classic jobs that would follow in the days to come, but rescuers did not mind working under these shores.

Members of FEMA's USAR Incident Support Team (IST) arrived during the night and made preparations for a joint rescue effort. Two USAR Task Forces were on the way. Work with them began early the next morning.

Day Two

By about 6 a.m. on Day Two, we could say with 99 percent accuracy that the objectives of controlling the site, sizing up the building, removing the walking wounded and surface victims, and conducting a good primary search of the upper floors and surrounding buildings had been accomplished. We knew the only victims left were in the piles of collapse rubble.

The weather was becoming a factor. The forecast called for rain. The weather was another load factor we took very seriously, given the condition of the building. In Oklahoma, the weather can change rapidly. Corporal Clint Greenwood, OCFD science officer and HazMat team member, set up the equipment he needed to stay on top of approaching weather patterns. This equipment included Doppler technology from which, for example, he could pinpoint the location of any rotation (early stages of tornado) from miles away with an accuracy of three feet. During the first four days of the operation, we had plenty of weather problems (mostly at night). Rotation did in fact hit the ground three miles away — the closest it would come. We also had some lightning close by, but none struck the building or equipment. The nights on those first days brought winds up to 50 mph, heavy rains, wind chill factors as low as 32°F, and even some horizontal hail. Operations received weather up-

dates every 15 minutes and a full report every hour, for the duration of the incident.

Day Two was filled with concerns about the building's stability. Names were being formulated for different parts of the building, those that had the greatest potential for structural failure and secondary collapses. These areas received names like "Christmas Tree," "the Bowl," "East Area Floors," "the Pile," the "Mother Slab" (or simply "Mother"), and "Australia" because they were under constant observation. We began to scrutinize these areas in detail, beginning on Day Two. I took Ray Downey, rescue operations chief of the City of New York (NY) Fire Department and FEMA IST operations chief, through the building. I showed him what had been done, offering my interpretation of the building collapse, as I had been in contact with it now for a day.

Our primary goal was to move every rock in the building that would not cause a structural problem and to look for victims. We "checkerboarded" the 266,000 square feet of floors that hadn't collapsed, creating a grid pattern from which we could make a final search of these areas, to make absolutely certain no one had been overlooked.

Our operational plan was simple:

1. Stabilize an area.
2. Remove overhead hazards.
3. Remove light surface debris by hand, using limited manpower.
4. Move the cranes in to make picks of heavy debris.
5. Bring in heavy manpower for intensive rubble, void search.

These basic steps carried through the entire operation. It allowed us to move systematically and with the greatest margin of personnel safety.

Stabilization began at Column G12, which basically was the anchor to the whole west side of the remaining structure. Debris in this area went from street level to the third floor. This column revealed several structural cracks. It had to be secured before we could allow additional searching in the day care area. The structural engineers worked with on-site private contractors and heavy equipment operators to place two large pipe supports on both sides of the column. Stabilization would continue west to east — from most secure to least secure.

With the help of the city's electric utility transport (OG&E's Gary Gardner, in particular), we restored power to one of the building's elevators, which were on the south side of the building and not totally damaged. We carefully determined — by placing engineers at key locations with measuring instruments and running the elevator up and down several times — that its vibrations would not affect stability. We used this elevator to transport manpower. We also asked a private contractor to assemble an outside elevator car (manlift) to move personnel to and from upper floors. It would also be used to transport light debris to the street.

The morning of Day Two was spent working extensively with engineers on "triaging" the building — looking for all indications of structural problems. In the afternoon, we concentrated on five areas/objectives:

1. Shore Column G12.
2. Remove fall hazards on upper floors between Columns G12 and F12. Many, many pieces or slabs of concrete hung down on rebar threads. Personnel would give them the endearing name "widow makers." (If the widow makers were on a slab being moved by heavy equipment, they were called "hitchhikers.")
3. Begin shoring the first floor between Columns F18 and E18 and between Columns F16 and E16 (the start of "The Forest"). A large supply of lumber was brought to the site for this purpose.
4. Begin large horizontal shoring for the unstable Columns F22 and F20. This would be done with steel pipes, several inches in diameter; they would be cut on-site to the proper length (some more than 35 feet), carried in by firefighters, and secured to the columns by contractors, under the direct supervision of engineers.
5. Remove the debris from and search the Pit. This operation was commanded by Santa Monica (CA) Fire Department Battalion Chief Jim Hone, a member of the IST, who was designated interior operations chief.

These operations on Days Two and Three were performed predominantly by USAR task force personnel. On Day Two, the second floor fell three inches. Editor's note: Several outside reports tell of extensive floor sagging, crack widening, and floors pulling away from floors throughout the incident. This is not true. It is true that debris at times fell from upper to lower portions of the structure/collapse, that the second floor

fell three inches, that debris shifted due to firefighter activity, and that slight building deflection occurred from overnight winds. It is also true that secondary collapse was a safety issue throughout the incident. Extraordinary measures were taken to increase stability. Critical structural elements were monitored constantly with Smart Levels and theodolites and by visual observation by experienced personnel. We cordoned off all floors at Column 16, north to south; access was denied to all points east of that line. No heavy debris removal would be conducted this day — not until the street could be cleared and our shoring efforts were well underway.

Day Three

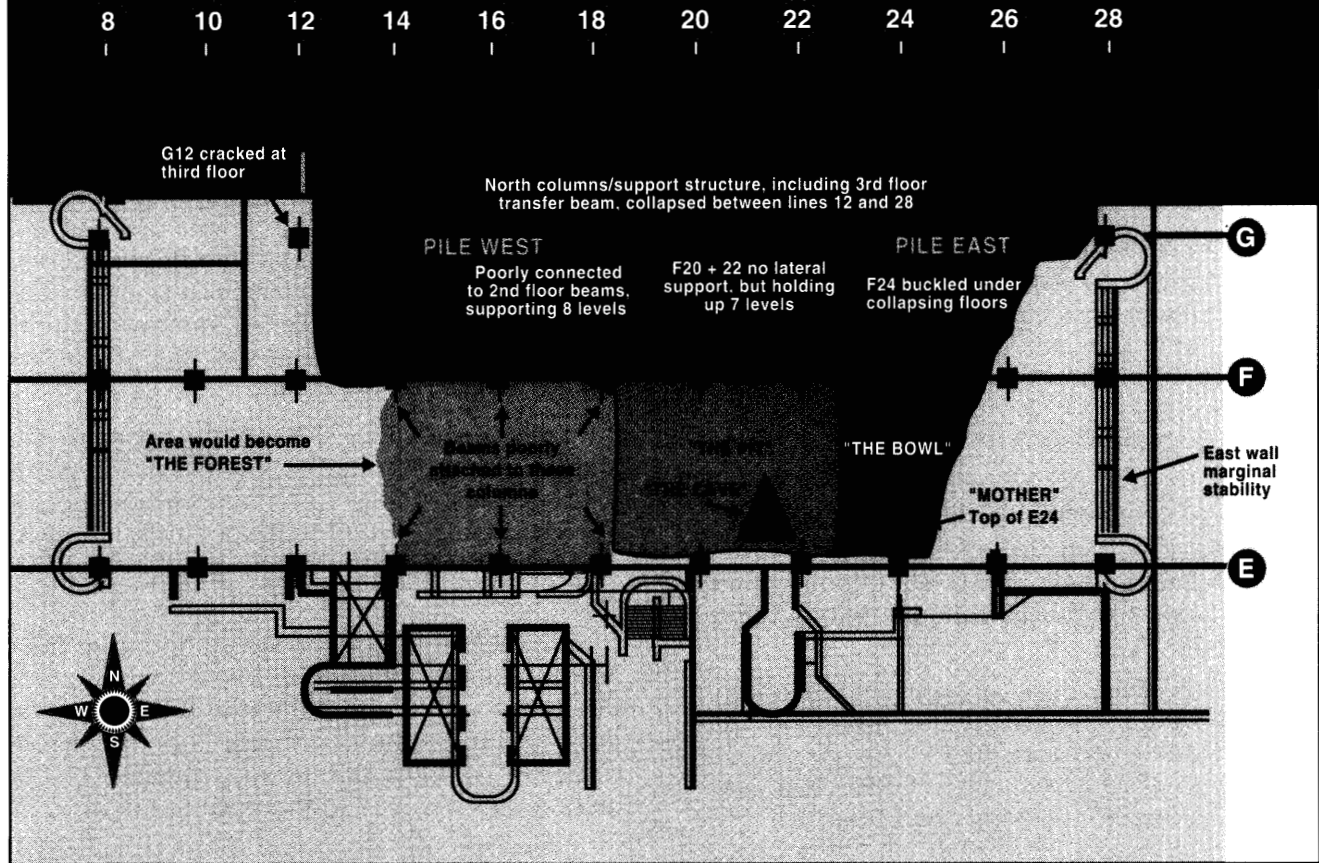
We continued with the five objectives/ areas we had established on Day Two. Hone continued his debris removal and search in the Pit and was uncovering bodies. Horizontal bracing in that area was well on its way to completion. These would be constantly monitored and measured throughout the incident. Shoring of Column Lines 18 and 16 was moving along and extended to the second and third floors. Most of the fall hazards and floor cleaning along and west of G12 and F12 were completed, and teams were undertaking this same function along the north edge of the collapse, between F18 and F12. (Removal of overhead hazards constituted a major operational undertaking; we estimate that approximately three days were spent removing these hazards.) The shoring on G12 was completed by 3 p.m. Construction of the manlift began at that time.

Downey and I made trips to these locations continually and did so until the hazards of each area had been addressed. Even then, we readdressed those same points and checked on their stability in a continual watch.

Two problems began to surface at this stage of the incident. First was the issue of manpower. Between OCFD and FEMA Task Forces, we had a sizable force to attack the building. However, given the relatively small collapse area and the even smaller area in which we could safely operate at this time, we could devote only a minimal number of available firefighters to the search function. Trying to find work for personnel became a challenge and a point of frustration for many.

The second issue was safety. As different engineers came together to discuss structural stability and the methods being used to achieve it, opinion would change. One engineer would declare a certain area safe or unsafe and pass that information from USAR to IST,

Figure Seven: Post Explosion — Second Floor Plan



which would then give the opposite opinion. An engineer fearing for the team's safety would drive the teams in and out and try to change the operational methods. The teams began to get frustrated. This problem was compounded as shifts changed (a safe area became unsafe and vice versa). It seemed as if we were taking five steps forward and two or three backward. Some progress was being made, but it was very frustrating nevertheless.

An example was the "Mother Slab." The constant trouble it presented resulted in its name being changed to "the Slab from Hell." Downey and I, after inspecting it on Day Two, believed it had plenty of steel for support. Since we couldn't reach it by crane, we thought about possibly strapping it to the south wall column of 22. The engineers opposed this action.

Mother came up again on Day Three. Conners, the rescue commander, requested further inspection of the problem. Hone and I got to the ninth floor and sur-

veyed the slab. We moved some office debris (it felt good to do some physical work) to get a better look. Downey and Mark Ghilarducci, IST team leader, arrived, and we all gave it a very close look. The meeting went on for some time, and we all made suggestions.

This was by no means the end of Mother. As each task force saw the building, each engineer noted the Slab from Hell as a hazard. But the engineers could not come to a consensus as to what should be done. But I do know the men from Allied Construction were not uncomfortable with it, and they're well experienced in this area. Many hours were spent on this slab: discussing, rehashing, reexamining; we were becoming experts in the matter. Others saw it for a few days and went away; we became intimate with it. At any rate, we had planted the seeds for the engineering process of strapping it.

We made a "tactical" error very early in this incident — one of those lessons learned. We were run-