CHAPTER EIGHT

Moving Forward: Improving Preparedness Efforts for Responder Safety

The difficult conditions that exist during a major disaster pose serious impediments to protecting the safety of emergency responders. In the high-pressure, complicated environment of a devastating event, safety managers face serious problems in gathering necessary information, assessing hazards and making decisions, and taking action. However, at the same time that the characteristics of disasters challenge safety management, they present clear opportunities to improve responder safety.

In defining the framework for this study of safety management, we focused our analysis on the practical requirements managers face and the activities they carry out as they strive to protect the responders under their command. With this in mind, we specifically examined safety management while response operations are under way and responders are at risk. Our analysis, and this report, started with a model of management actions taken once an incident occurs—a safety management cycle. In addition to producing the recommendations for improving safety managers' capabilities to carry out their critical functions, that analysis also led to the conclusion that better structures are needed to coordinate the safety efforts of response organizations. Effective integration of safety management capabilities across organizations could benefit all components of disaster safety management.

Even though the analysis addressed the actions managers take during response operations, as is clear from the recommendations throughout the report, effective safety management predominantly depends on actions taken before a disaster occurs. Protecting responders during an event depends on the measures, systems, relationships, and capabilities put in place long before, during disaster preparedness activities. Consequently, the majority of the recommendations are aimed at strengthening safety management during preparedness efforts. Even recommendations addressing actions during response operations—such as improved scene control or implementation of sustainability measures—rely on preparedness efforts to make them possible once a disaster occurs.

The recommendations described in this report lead to a range of potential implementation paths for response organizations at all levels of government, nongovernmental organizations, and in the private sector. Some present short-term, more immediate payoff opportunities to improve safety, while others require long-term implementation efforts but could result in broad-reaching and large safety benefits.

Immediate Implementation Opportunities

Based on the lessons of the disasters examined during the study, there is a clear need to integrate responder safety management more effectively into preparedness planning. To carry out all phases of the safety management cycle, responder organizations must define their safety requirements should a disaster occur in their community. In each area this includes determining the following:

- What information and resources will be needed for particular disaster circumstances?
- How can those needs be filled?
- If providing needed resources and information relies on others, what is required to access them and manage their efforts during a response operation?
- When they become available, how can the safety resources be linked to response management?
- Are implementation and decision processes in place to effectively utilize them when they become available?

Such planning concerns are not dissimilar to those that must be addressed to prepare to carry out response operations in general. However, because the requirements for safety management can differ considerably from those for operational response activities, it is critical they be included in planning.

Within this overall framework, a significant number of the recommendations described in the preceding chapters could begin to be implemented immediately by individual response organizations, groups of organizations, or as a component of local or regional preparedness efforts. Such steps can build on relationships and planning processes that are already under way in many jurisdictions and areas for both safety and operational reasons. Efforts can be initiated to do the following:

- *Put Hazard Monitoring Capabilities in Place*—Relevant steps include addressing monitoring needs in plans, procuring needed technologies for high-priority hazards, locating external expertise and capabilities, and determining how information will be collected, coordinated, managed, and used at an incident.

- *Address Personnel Accountability Needs*—While improvements in technology may provide better strategies to maintain personnel accountability in the future, interim steps utilizing scene control and organizational procedures could be implemented to provide more information to Incident Commanders on responder positions, activities, capabilities, and training.
- *Develop Mechanisms to Provide Medical Care to and Monitor the Health Status of Responders*—Coupling better information collection on responder health status with efforts to provide needed care can help address both the health needs of responders and the information needs of Incident Commanders.
- *Put Necessary Procedures in Place to Make Safety Decisions and Implement Safety Policies*—Many measures focused on the operational needs of disaster response can also provide safety benefits. Improved communication, scene control, and personnel management benefit response effectiveness as well as safety. Others, such as procedures to determine what safety equipment is needed and to ensure it is available, are safety specific and must be addressed separately in planning.
- *Begin to Move Toward an Integrated, Multiagency Approach to Safety Management*—To begin to build better safety coordination, responder safety issues should be included in interagency preparedness efforts. Mechanisms should be developed to ensure that organizational roles are well defined and that relationships and agreements are in place to draw on the other organizations' safety assets and capabilities.

Steps taken by individual responder organizations to bolster capabilities in these areas could produce immediate safety management benefits in future response operations.

Long-Term, Potentially High-Payoff Safety Implementation Opportunities

Other courses of action recommended in the previous chapters require long-term efforts to put into practice. In some cases, the recommendations themselves are conceptual, and specific application strategies remain to be developed. As a result, pilot projects and evaluation efforts are also needed to validate the potential for changes in management processes or the application of new technologies to improve responder safety management. For other recommendations, multiagency implementation efforts are necessary. To build a core group of disaster safety managers or to fully integrate responder safety into disaster exercises requires the efforts of multiple response organizations and levels of government. Lastly, some study recommendations require leadership and coordination at the national level to significantly benefit responder safety. While these long-term recommendations may require sustained efforts to be

put into practice, they have the potential for broad and large benefits in improving responder safety management.

Pilot and Validation Efforts

Many of the study recommendations can be implemented in a number of ways. In some cases, several different strategies could accomplish similar safety goals. In others, the recommendations described are conceptual in nature, and there is either no obvious strategy to put them into practice or no consensus in the response community on the most promising approach. In most cases, the study research did not suggest individual strategies to implement recommendations. This is because differences among response organizations, geographic areas, jurisdictions, and risk environments may result in different solutions being more effective. The diversity of responders included within the scope of this study—career and volunteer, traditional and nontraditional, full time and disaster or hazard specific—carries with it a diversity of implementation challenges that need to be addressed in efforts to improve safety management. Further efforts are required to determine the specific needs of particular areas and situations, and how those needs can be addressed in the context of a broad, consistent approach to managing responder safety.

As a result, implementing these recommendations will require significant pilot efforts to determine, under realistic conditions, which strategies are most effective to improve responder safety. Such pilot efforts would be intended to develop prototypes to serve as a model for broader implementation in responder organizations. To ensure that courses of action are applicable to the full range of the response community, pilot efforts should be held in several different locations, from large metropolitan to rural areas.

Pilot and experimental efforts are also critical to evaluate the potential of technological approaches to improving responder safety. Although technology evaluation was not a central aim of this study, a number of management tools and technologies were described in the course of project discussions that could improve safety management for individual responder organizations and as elements of an integrated, incident-wide approach to safety management. As a result, a range of technical opportunities exist that could contribute to improved safety management. They include

- information and planning resources such as guidelines, checklists, and contact lists
- hazard monitoring technologies and assessment aids
- databases to manage safety-relevant information such as hazard data, responder accountability or capability information, and response logistics inventories
- responder identification, credentialing, and accountability technologies
- improvements to protective equipment, addressing interoperability problems, improving functioning in post-disaster situations, or bolstering usability

- communications technologies to aid the effective exchange of information among responders and response organizations
- technologies facilitating responder health status monitoring and collection of injury or exposure information.

In each area, a wide range of technology options exists to implement the desired function. For example, for hazard assessment guidelines and decision aids, the desired functionality could be built into low-technology options such as laminated cards for responders to carry or into much higher-technology systems such as portable computers and decision-support software. In many of these areas, potential solutions exist, but their operational feasibility, affordability, and timely availability must be carefully assessed within the responder community. Some have been developed specifically for the response community; others could come via technology transfer from other organizations such as the military. Because its focus was on management concepts and processes rather than specific management or safety-related technologies, this research did not address the particular advantages or disadvantages of any individual system or solution. However, in the course of the study, the potential of such systems—and the need to continue to improve and adapt them to better meet responders' needs in post-disaster environments—became clear.

Building a Core Group of Major Disaster Safety Managers

Because of the central role that individual safety managers could play in coordinating the efforts of multiple response organizations, building a group of such individuals is an attractive initial goal. Doing so would require defining the body of knowledge needed for safety managers to effectively spearhead an integrated safety management function and developing a curriculum to serve as the basis for training. Development of such a curriculum could be accomplished by a variety of groups within the response community, including professional organizations and standards bodies, or via cooperative national-level planning efforts.

Once the preparation needed for disaster safety managers is defined, implementation mechanisms must be developed to identify individuals from the responder community to fill the roles. The results of this study do not suggest any particular model for implementation. However, it is clear that selection criteria must be defined that ensure that individuals trained to be safety managers are appropriately distributed geographically to ensure that they can rapidly respond to a disaster. Preliminary estimates of the number of such individuals needed to provide national coverage are relatively small; a few safety managers based in each state would allow rapid response to most potential disasters.[1]

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[1] Depending on the specifics of the conditions within particular states, the total number of such safety managers would be in the very low hundreds for the nation overall.

The managerial demands of major disaster response also indicate that the individuals trained to be disaster safety managers must have significant management skills and leadership capabilities. Taking a central role in coordinating the efforts of many different organizations is challenging and requires skillful leadership to be carried out successfully. As a result, it is critical that the position of disaster safety manager be approached as a high-level appointment, to ensure that the responders filling the role possess the necessary authority and influence.

An effort to build a group of disaster safety managers as a national asset must also ensure that these individuals will be available to fulfill their roles during both disaster operations and preparedness activities. For the safety managers to be effective, they must be able to respond when disasters occur. Such responses may involve participating in operations outside their immediate area, which requires a commitment by both the responders and their home organizations to ensure that they can respond when called on. Beyond disaster operations, many of the potential benefits of such a group of trained safety managers involve their participation in preparedness activities throughout their regions, helping bolster preparation for safety management and laying the groundwork for effective coordination during response efforts. Implementation efforts must also include developing mechanisms to support a portion of these individuals' time to make that participation possible.

Integration of Safety into Disaster Exercises

Because of the importance of disaster exercises as a route for building both interorganizational relationships and testing capabilities, integration of responder safety issues into disaster exercises is a particularly attractive early step for improving safety management. To do so, safety information and scenarios must be developed that facilitate the inclusion of these issues in exercises at all levels of government and in large-scale multiagency, multilevel disaster drills. In addition to exercises involving both operational and safety-related organizations, exercises focusing primarily on safety issues and organizations could be valuable to improving coordination among safety specialists within responder organizations. Because of the diversity of disaster exercises, implementation of this recommendation could also benefit from pilot efforts to test different mechanisms for including safety in these activities.

Areas Requiring National Coordination and Leadership

For some recommendations, the majority of the benefits to safety management will occur only if common practices are developed and adopted by a large percentage of the responder community. Implementation of a number of the recommendations described in this report would require coordination and leadership at the national level. These areas include

- consistent organizational structures for safety management
- common terminologies
- standards for equipment and other technologies
- hazard and risk assessment guidelines
- responder credentials
- training curricula.

Such national-level leadership could come from a range of sources, including the federal government, responder community and governance organizations, multidisciplinary standards organizations, or partnerships built among multiple agencies or organizations. In some cases, these efforts are already under way. For example, the ongoing federal effort to implement a National Incident Management System initiated by HSPD-5, 2003, represents a major opportunity for ensuring the use of common organizational structures during disaster response. Similarly, standards and policy efforts already in place are considering or could consider many of the equipment, training, and other issues relevant to these safety concerns. Just as this study often highlighted safety needs without identifying particular implementation routes, the research was not focused on where national coordination of these issues should originate. However, the need for such leadership, both to heighten focus on these safety concerns and to bridge the significant diversity that exists within the response community, is clear.

Concluding Remarks

In the wake of the September 11, 2001, terrorist attacks, the risk of terrorism and the demands of homeland security must be a central component of any discussion of protecting emergency responders. Although the information developed over the course of this study does indeed indicate that some things have changed in this post-September 11 era, many things have remained the same. The nation still faces the risk of hurricanes, earthquakes, large industrial incidents, and other natural disasters. Often striking without warning, such events can overwhelm local response capabilities as effectively as intentional acts of our nation's adversaries. In responding to their effects, responders face the risk of physical injury, traumatic stress, and hazardous exposures. Effectively addressing such risks requires bringing together the capabilities of a range of response organizations from agencies at all levels of government, nongovernmental organizations, and the private sector.

In the context of such an all-hazards approach, bolstering preparedness efforts aimed at protecting emergency responders can therefore benefit national preparedness against both terrorism and the inevitable consequences of natural or technological disasters. Doing so requires putting the capabilities in place so safety managers

have access to the information, the resources necessary to protect responders, and the management structures necessary to address safety during multiagency response operations. While the demanding circumstances that exist during disasters will likely present unforeseen challenges to responder safety, the recommendations described here represent promising opportunities to improve safety in future response operations. It is our hope that this research, by bringing together safety management concerns relevant to both natural disasters and the potential effects of terrorism, can contribute to efforts in all parts of the response and homeland security communities to strengthen protection of the nation's emergency responders.

APPENDIX A

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APPENDIX B

Workshop Agenda

Protecting Emergency Responders:
Safety Management in Major Disaster & Terrorism Response
Arlington, Virginia
February 27, 2003

MEETING AGENDA

7:30–9:00 a.m.	Registration
7:30–8:15	Continental Breakfast
8:15–9:30	Introduction, Overview, and Instructions to Panels
9:30–9:45	Break
9:45–11:45	Breakout Session I (Concurrent Sessions)
11:45–12:15 p.m.	Break
12:15–2:00	Breakout Session II (Concurrent Sessions—Working Lunch)
2:00–2:15	Break
2:15–4:15	Breakout Session III (Concurrent Sessions)
4:15–4:30	Break
4:30–5:30	Presentation of Breakout Highlights, Open Discussion, and Conference Closing

Concurrent Breakout Session Titles and Potential Discussion Areas:

1. Integration of Safety Management in Disaster Incident Management/Command Systems
   - Placement and structure for safety management within incident management systems
   - Inter-agency safety management versus intra-agency safety management
   - Integration of multiagency safety resources into incident management

- Interaction of different command levels and interagency commands
- Sectoring of response into manageable commands

2. Improving Coordination and Control of Personnel and Resources During Disaster Response
   - Coordination of responders and resources in major incidents
   - Resource assignment and allocation
   - Personnel accountability
   - Scene control, credentialing, and security
   - Role of regulations, guidance, and enforcement activity in response

3. Hazard Information, Intelligence, and Risk Assessment
   - Responsibility and methods for hazard monitoring during response
   - Collection and sharing of intelligence and threat information
   - Evolution of information needs through response
   - Increasing speed of information acquisition and sharing
   - Coordination of information from different agencies and sources
   - Risk assessment and communication during major incident response

4. Improving Training for Disaster Response
   - Pre-incident training—needs, participants, methods, and topics
   - On-site training—mechanisms, topics, and interaction with incident command
   - Improved training methods

5. Responder Health Care
   - Delivery of medical care to responders during incident response
   - Capture and use of injury and exposure data in safety management
   - Responder health maintenance activities during response
     - Fatigue
     - Decontamination
     - Health monitoring
   - Traumatic stress issues

Selected Bibliography

ALSAC (Air Land Sea Application Center) [2001]. Risk management. Washington, DC: ALSAC, FM 33-100.12, MCRP 5-12.1C, NTTP 5-03.5, AFTTP(I) 3-2.34.

Anderson L [2002]. Using technology to manage the information overflow. Fire Engineering May [http://fe.pennnet.com]. Date accessed: May 2003.

Arlington County, Virginia [2002]. Arlington County after-action report on the response to September 11 terrorist attack on the Pentagon. [http://www.co.arlington.va.us/fire/edu/about/pdf/after_report.pdf]. Date accessed: May 2003.

Auf der Heide E [1989]. Disaster response: Principles of preparation and coordination. St. Louis, MO: CV Mosby.

Barry D [2002]. Where Twin Towers stood, a silent goodbye. The New York Times, May 31; sect. A:1.

Brainard J, Behrendt B [1993]. The storm: Six months later: Next storm, county plans to be ready. Citrus Times, Sept 12; sect. A:1.

Brunacini AV [2002]. Fire command. Quincy, MA: National Fire Protection Association.

Budd C [not dated]. Information gathering and technology use during disaster deployments. [http://mediccom.org/public/tadmat/training/NDMS/Information_Technology.pdf]. Date accessed: April 2003.

Bunch KP, Wilson TG [2002]. Counselors on call. Fire Chief, June 1. [http://www.firechief.com]. Date accessed: June 2003.

Burkell CJ, Wood H [1999]. Make the right call. Fire Chief, March 1. [http://www.firechief.com]. Date accessed: May 2003.

California Office of Emergency Services [1993]. The Southern California wildfire siege: October–November 1993—After action report. [http://www.ucfpl.ucop.edu/UWI%20Documents/068.PDF]. Date accessed: May 2003.

California Task Force 3, National Urban Search and Rescue Response System, Federal Emergency Management Agency [2001]. World Trade Center after action report: September 18–30, 2001. [http://www.menlofire.org/pdf_file/WTC%20FEMA%20After%20Action%20Report.pdf]. Date accessed: April 2003.

Cardwell MD, Cooney PT [2000]. Nationwide application of the Incident Command System: Standardization is the key. FBI Law Enforcement Bulletin Oct:10 15.

Center for Army Lessons Learned [1993]. Operations other than war, Vol. II: Disaster assistance. Newsletter 93-6, October.

Chatfield M, Robertson A [1997]. Safety: An essential component of emergency management. Australian Journal of Emergency Management *12*(3):36 38.

Christen H, Maniscalco P, Vickery A, Winslow F [2001]. An overview of incident management systems. Perspectives on Preparedness *4* (Sept.) [http://bcsia.ksg.harvard.edu/BCSIA_content/documents/An_Overview_of_Incident_Management_Systems.pdf]. Date accessed: May 2003.

Cole D [2000]. The Incident Command System: A 25-year evaluation by California practitioners. March 28. [http://www.usfa.fema.gov/pdf/efop/efo31023.pdf]. Date accessed: May 2003.

Coleman J [2001]. Managing major fires. Tulsa, OK: PennWell Corporation.

Collins L [1999]. Lessons learned from the Northridge and Kobe earthquakes. [http://imagecatinc.com/reportspubs/epedatpp.pdf]. Date accessed: May 2003.

——— [2003]. Collapse rescue operations at the Pentagon 9-11 attack: A case study on urban search and rescue disaster response. [http://www.ukfssart.org.uk/files/pentagon%20report.PDF]. Date accessed: April 2003.

Cone DC, Weir SD, Bogucki S [2003]. Convergent volunteerism. Annals of Emergency Medicine *41*(4):457 462.

Davis LM, Blanchard JC [2002]. Are local health responders ready for biological and chemical terrorism? Santa Monica, CA: RAND Corporation, IP-221-OSD.

Department of the Army [1997]. Field manual 101-5: Staff organization and operations. [http://www.adtdl.army.mil/cgi-bin/atdl.dll/query/download/FM+101-5]. Date accessed: April 2003.

——— [2001]. Field manual 3-0: Operations. [http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/3-0/fm3-0.exe]. Date accessed: May 2003.

DHHS et al. (Departments of Health and Human Services, Defense, Veterans Affairs, and Justice; and American Red Cross) [2001]. Mental health and mass violence: Evidence-based early psychological intervention for victims/survivors of mass violence: A workshop to reach consensus on best practices. Airlie Conference Center, Warrenton, VA, October 29–November 1, 2001.

EPA (Environmental Protection Agency) [2002]. Lessons learned in the aftermath of September 11, 2001. February 1. Washington, DC: EPA. [http://www.greenpeaceusa.org/toxics/lessonslearned.pdf]. Date accessed: May 2003.

Faranda C [1992]. Lauderhill Fire Department memorandum: Hurricane Andrew, submitted to the Florida Governor's Disaster Planning and Response Committee, November 23.

FEMA (Federal Emergency Management Agency) [1987]. Exemplary practices in emergency management: The California FIRESCOPE program. Emmitsburg, MD: FEMA, National Emergency Training Center, Emergency Management Institute.

——— [1992]. Urban search and rescue in the Santa Cruz area following the Loma Prieta earthquake. Emmitsburg, MD: FEMA, United States Fire Administration. [http://www.usfa.fema.gov/downloads/pdf/publications/fa-124.pdf]. Date accessed: September 2003.

——— [1993]. FEMA's disaster management program: A performance audit after Hurricane Andrew. Washington, DC: FEMA, Office of the Inspector General.

——— [1994a]. Search and rescue operations following the Northridge earthquake. Emmitsburg, MD: FEMA, United States Fire Administration. [http://www.usfa.fema.gov/downloads/pdf/publications/fa-163c.pdf]. Date accessed: August 2003.

——— [1994b]. Search and rescue operations in California after flooding—January to March 1995. Emmitsburg, MD: FEMA, United States Fire Administration. [http://www.usfa.fema.gov/downloads/pdf/publications/fa-163e.pdf]. Date accessed: May 2003.

——— [1994c]. Report of the joint fire/police task force on civil unrest. Emmitsburg, MD: FEMA, United States Fire Administration. [http://www.usfa.fema.gov/downloads/pdf/publications/fa-142.pdf]. Date accessed: May 2003.

——— [1998]. ICS: Incident Command System—independent study course. Emmitsburg, MD: FEMA, Emergency Management Institute [http://transit-safety.volpe.dot.gov/training/EPSSeminarReg/CD/documents/EmerPrep/IS195comp.pdf]. Date accessed: April 2003.

——— [1999a]. Incident Safety Officer: Student manual. Emmitsburg, MD: FEMA, United States Fire Administration, National Fire Academy.

———. [1999b]. Wanton violence at Columbine High School. Emmitsburg, MD: FEMA, United States Fire Administration. [http://www.usfa.fema.gov/applications/publications/tr128.cfm]. Date accessed: May 2003.

FEMA US&R Program Staff [2002]. FEMA US&R Program Staff after action executive summary—1391-DR-NY, 1392-DR-VA. Washington, DC: FEMA, National Urban Search & Rescue Response System.

Fischer R [1997]. Emergency in the Everglades: The recovery of ValuJet Flight 592. FBI Law Enforcement Bulletin Sept:8 13.

Florida Commission on Community Service [2003]. Unaffiliated volunteers in response and recovery. [http://www.fccs.org/disaster%20relief/downloads/UNAFFIL1.ATE.pdf]. Date accessed: April 2003.

Francis AA [1997]. Mutual aid: Not just any duck will do. The ASPEP Journal:31 33.

Ghilarducci M [1995]. Earthquake response: Lessons learned from Kobe, Japan. Street Skills, May/June; 26 30.

Grant NK, Hoover DH [2002]. Terrorism in Shanksville: A study in preparedness and response. Boulder, CO: Natural Hazards Research and Applications Information Center,

University of Colorado, Quick Response Report #157. [http://www.colorado.edu/hazards/qr/qr157/qr157.html]. Date accessed: May 2003.

Greene RW [2002]. Confronting catastrophe: A GIS handbook. Redlands, CA: ESRI Press.

Harrald JR [2002]. Observing and documenting the inter-organizational response to the September 11 attacks. Presentation at Countering Terrorism: Lessons Learned from Natural and Technological Disasters, The National Academies, Washington, DC, February 28–March 1. [http://www7.nationalacademies.org/ndr/1Harrald_Presentation.pdf]. Date accessed: August 2003.

Haughney C [2003]. Ground zero workers afflicted, study finds: Tests show physical, psychological ills persist nearly a year after rescue efforts. The Washington Post, January 28; sect. A:6.

Hawley C [2000]. Hazardous materials response and operations. Albany, NY: Delmar Publishing.

Haynes T, Charney C [1993]. After action report Hurricane Andrew—Florida—Donations. Washington, DC: FEMA.

Heath P [1992]. Personal letter to the Florida Governor's Disaster Planning and Response Committee, not publicly available, November 23.

Higham S, Donnelly J [1992]. "It's time to go home," military says. Miami Herald, Oct 14; sect. A:1.

Hill J [2002]. High-speed police pursuits: Dangers, dynamics, and risk reduction. FBI Law Enforcement Bulletin July:15.

Holsenbeck CLS [1994]. Joint force Andrew: The 44th medical brigade mental health staff officer's after action report. Military Medicine *159*(3):186.

Homeland Security Presidential Directive (HSPD)-5 [2003]. 39 Weekly Comp. Pres. Doc. 280, February 28.

Institute for Crisis Disaster and Risk Management, George Washington University [2002]. Observing and documenting the inter-organizational response to the September 11th attack on the Pentagon. July 15. [http://www.gwu.edu/~icdrm/nsf_9_11.htm]. Date accessed: May 2003.

International Association of Fire Chiefs (IAFC) [2002]. Crew resource management: A positive change for the fire service. Washington, DC: IAFC.

Irving C, ed. [1995]. In their name: Oklahoma City: The official commemorative volume. New York, NY: Random House.

Jackson BA, Peterson DJ, Bartis JT, LaTourrette T, Brahmakulam I, Houser A, Sollinger J [2002]. Protecting emergency responders: Lessons learned from terrorist attacks. Santa Monica, CA: RAND Corporation, CF-176-OSTP.

Johnson B [2002]. Hurricane Andrew: 10 years later. Presentation at 16th Annual Governor's Hurricane Conference, May 20-24, Tampa, FL. [http://ghc.digiscript.com/]. Date accessed: June 2003.

Kane J [2001]. The Incident Command System and the concept of Unified Command at a terrorist incident. Proceedings of the Public Entity Risk Institute, Community Response to the Threat of Terrorism Internet Symposium. [http://www.riskinstitute.org/ptrdocs/CommunityResponse-Terrorism.pdf]. Date accessed: May 2003.

Kelly K, Prezant D [2002]. WTC medical monitoring results. WNYF (With New York Firefighters) *3*:2 4.

Kendra J, Wachtendorf T [2001]. Rebel Food . . . Renegade supplies: Convergence after the World Trade Center attack. [http://www.udel.edu/DRC/pp316.pdf]. Date accessed: April 2003.

Kipp JD, Loflin ME [1996]. Emergency incident risk management. New York, NY: John Wiley & Sons, Inc.

Klein G [1998]. Sources of power: How people make decisions. Cambridge, MA: The MIT Press.

LaTourrette T, Peterson DJ, Bartis JT, Jackson BA, Houser A [2003]. Protecting emergency responders, Vol. 2: Community views of safety and health risks and personal protection needs, Santa Monica, CA: RAND Corporation, MR-1646-NIOSH.

Leonard RB, Stringer LW, Alson R [1995]. Patient-data collection system used during medical operations after the 1994 San Fernando Valley–Northridge earthquake. Prehospital and Disaster Medicine *10*(3):178 183.

Lewis P. [1993]. The governor's disaster planning and response committee final report. January 15. [http://www.floridadisaster.org/dem/files/lewisr.pdf]. Date accessed: June 2003.

Lioy PJ, Gochfeld M [2002]. Lessons learned on environmental, occupational, and residential exposures from the attack on the World Trade Center. American Journal of Industrial Medicine *42*:560 565.

Lippy B [2002]. Safety and health of heavy equipment operators at Ground Zero. American Journal of Industrial Medicine *42*:539 542.

Lippy B, Murray K [2002]. Improving the training of skilled support personnel for responding to terrorist actions: A review of the problems and feasible solutions. [http://www.wetp.org/front/NIEHS_rev_010303.pdf]. Date accessed: May 2003.

Los Angeles Fire Department [not dated]. Northridge earthquake January 17, 1994. [http://www.lafd.org/eq.htm]. Date accessed: June 2003.

Los Angeles Fire Department and Los Angeles County Fire Department [1994]. Historical overview report of the January 17, 1994 Northridge earthquake. Los Angeles, CA: Los Angeles Fire Department and Los Angeles County Fire Department.

Lubnau TE II, Okray R [2002]. Crew resource management for the fire service. Fire Engineering Aug. [http://fe.pennnet.com]. Date accessed: April 2003.

Maniscalco PM, Christen HT [2001]. Understanding terrorism and managing its consequences. Upper Saddle River, NJ: Prentice Hall.

U.S. National Response Team, NRT Response Committee, U.S. Environmental Protection Agency [not dated]. Incident Command System/Unified Command (ICS/UC): Technical assistance document. [http://nrt.org/production/nrt/home.nsf/resources/Publications1/$File/ICS_UC_Technical_Assistance_Document.pdf]. Date accessed: May 2003.

van Emmerik AA, Kamphuis JH, Hulsbosch AM, Emmelkamp PM [2002]. Single session debriefing after psychological trauma: A meta-analysis. Lancet *360*:766 771.

Vincoli JW, Black NH, Burkhammer SC [2002]. SH&E at Ground Zero. Professional Safety *47*(5):21 28.

Weber R, McEntire D, Robinson R [2002]. Public/private collaboration in disaster: Implications from the World Trade Center terrorist attacks. Boulder, CO: Natural Hazards Research and Applications Information Center, University of Colorado, Quick Response Report #155.

West K [2003]. Scene safety vs. duty to care. Emergency Medical Services May:84 89.

Williams MS [1992]. Personal letter to the Florida Governor's Disaster Planning and Response Committee, not publicly available, November 23.

Williamson RA, Baker JC [2002]. Lending a helping hand: Using remote sensing to support the response and recovery operations at the World Trade Center. Photogrammetric Engineering and Remote Sensing *68*(9): 870 875.

Worker Education and Training Program, National Institute of Environmental Health Sciences. [2002]. Learning from Disasters: Weapons of Mass Destruction Preparedness Through Worker Training, report of technical workshop, Washington, DC: Worker Education and Training Program, National Institute of Environmental Health Sciences, April 25–26. [http://wetp.org/oldchfiles/awardee_mtgs/spring02/WMDreport.pdf]. Date accessed: May 2003.