



# WORKER TRAINING IN A NEW ERA: RESPONDING TO NEW THREATS



Report of a Conference in Baltimore, Maryland  
October 26-27, 2002  
Johns Hopkins Education and Research Center  
for Occupational Health and Safety

Johns Hopkins Bloomberg School of Public Health



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## **ABBREVIATIONS**

<b>APR</b>	<b>Air Purifying Respirator</b>
<b>CBRNE</b>	<b>Chemical, Biological, Radiologic, Nuclear and Explosive</b>
<b>CDC</b>	<b>Centers for Disease Control and Prevention</b>
<b>DOT</b>	<b>Department of Transportation</b>
<b>EMS</b>	<b>Emergency Management System</b>
<b>EPA</b>	<b>Environmental Protection Agency</b>
<b>ERG</b>	<b>Emergency Response Guidebook</b>
<b>ERS</b>	<b>Emergency Response System</b>
<b>FEMA</b>	<b>Federal Emergency Management Agency</b>
<b>HAZMAT</b>	<b>Hazardous Materials Management</b>
<b>ICS</b>	<b>Incident Command System</b>
<b>LEPC</b>	<b>Local Emergency Planning Committees</b>
<b>NFPA</b>	<b>National Fire Protection Association</b>
<b>NIEHS</b>	<b>National Institute of Environmental Health Sciences</b>
<b>NIOSH</b>	<b>National Institute for Occupational Safety and Health</b>
<b>OSHA</b>	<b>Occupational Safety and Health Administration</b>
<b>PEMS</b>	<b>Postal Emergency Management System</b>
<b>UICC</b>	<b>Unified incident command center</b>
<b>WMD</b>	<b>Weapons of Mass Destruction</b>
<b>WTC</b>	<b>World Trade Center</b>

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# EXECUTIVE SUMMARY

On October 26 and 27, 2002 the Johns Hopkins Education and Research Center for Occupational Health and Safety held a conference on worker health and safety training in Baltimore, Maryland. The goal of the conference was to identify worker health and safety training needs for various industrial sectors related to weapons of mass destruction, including chemical, biological, radiological, and nuclear weapons and explosives (CBRNE). More than 200 attendees, many of them experts in worker training, CBRNE, public policy, or emergency response, participated in the conference.

Speakers and participants were asked to address the following two central questions: (1) What skills and knowledge are common to all workers who might be exposed to terrorist threats from CBRNE? (2) What skills and knowledge are relevant to these threats specific to workers in different sectors? In addition, participants were also asked about the kinds of training methods that would be useful to impart these skills and knowledge. Conference participants identified several elements of training common to a wide range of workers at all organizational levels in different industries that could form the basis of a core curriculum. The following 13 recommended core components address pre-event and post-event training. Pre-event training would be for all workers, whereas post-event training (for both the immediate post-emergency response and clean-up operations) would be for selected personnel, including first responders, skilled support personnel, and other workers involved in these operations.

## Recommended Pre-Event Training for All Workers

1. Basic health and safety training (exposure-health relationships, legal, regulatory, and hazard communication).
2. Basic knowledge and recognition of industry-specific hazards and threats.
3. Ability to access emergency notification systems and notify appropriate parties.
4. Knowledge of the Incident Command System (ICS).
5. Knowledge of the worker's specific functional role in an emergency, the limitations of that role, and the roles of others.

6. Emergency evacuation and egress.
7. Ability to use personal protective equipment (PPE).

### Recommended Post-Event Training

8. Site-specific and event-specific hazards and threats
9. Site-specific and event-specific safety and health plan requirements
10. Ability to use PPE
11. Site-specific command and communication
12. Training as outlined in the Hazardous Waste Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120 and 1926.65)
13. Critical incident debriefing and stress management

Other findings from the conference can be summarized as follows. First, there are significant differences among different workforce sectors in the degree to which they are prepared to respond to the threat of CBRNE attacks. Some workers, particularly emergency responders, may receive considerable training while many others receive little or no applicable training. Second, training for new CBRNE threats should be integrated into basic safety and health training, in a unified training plan that builds on and supplements other current training requirements. Third, the many Federal agencies involved in regulating or guiding the activities of certain industries must also coordinate their guidance and regulations regarding worker training. This would help in the creation of a core recommended or required training curriculum, which many participants at the conference felt would be very helpful. Fourth, at all levels of response, training should reflect a high degree of coordination between the emergency response and public health communities. Finally, regular “real-life” rehearsals must be an essential element of all training plans. Based on these findings, the recommended next steps are summarized in the following section.

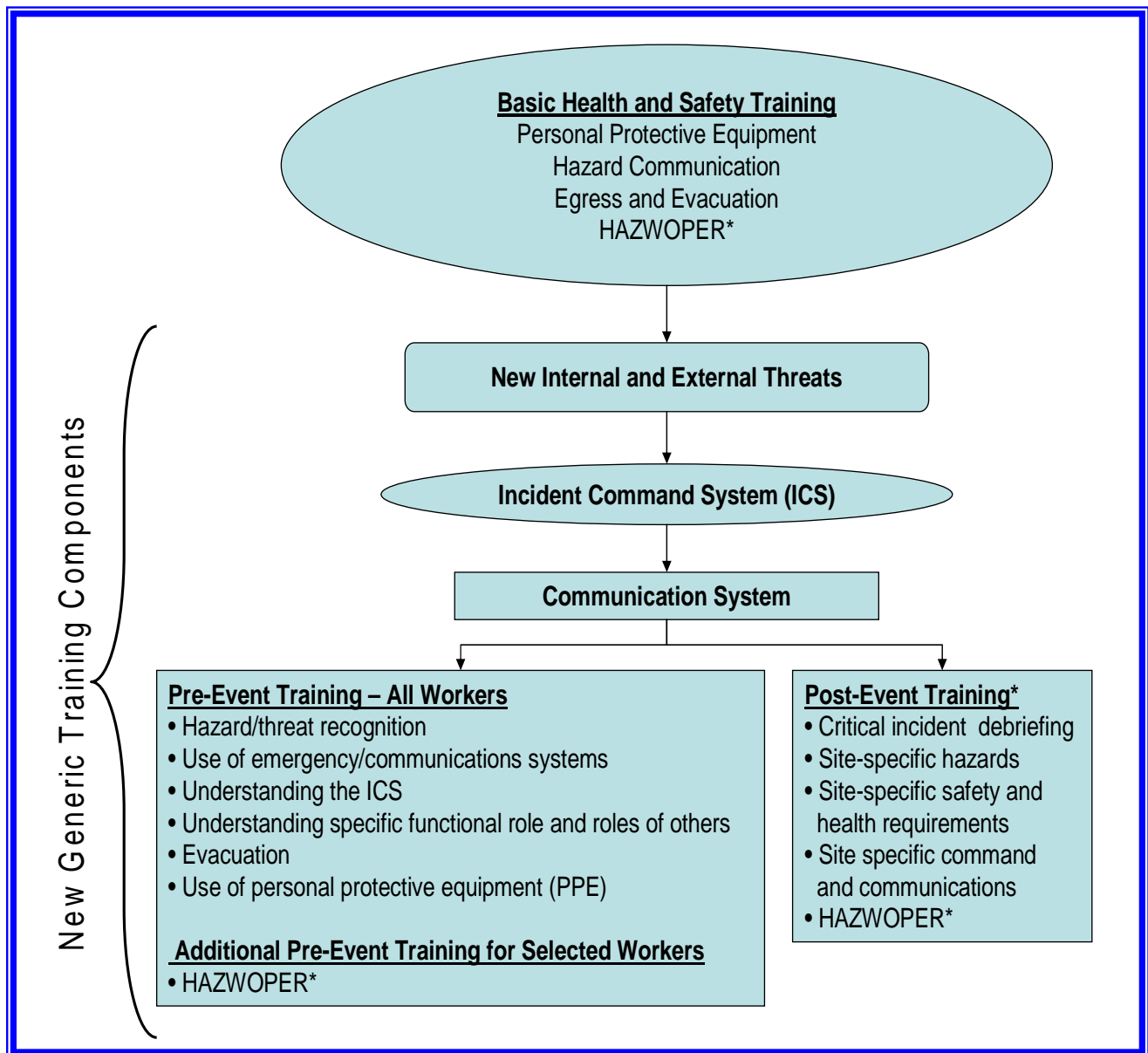


Figure 1. Recommended generic training elements for all workers with a risk of exposure to new CBRNE threats. All workers would receive pre-event training. Asterisk (\*) indicates training that applies to specific workers, such as first responders, skilled support personnel and others involved in emergency response, and post-emergency response operations. This framework does not include trade-specific knowledge and skills. HAZWOPER is the hazardous waste operations and emergency response standard (29 CFR 1910.120 and 1926.65).



**Worker Training Recommendations**

1. Develop specific competencies for pre-event and post-event worker training, based on the general recommendations presented above.
2. Coordinate Federal policy on worker training for CBRNE threats, through a mechanism that includes the many agencies with jurisdiction over worker safety and health.
3. Adopt and promulgate federal guidelines or standards on worker training for new CBRNE threats, based on the competencies and coordinated Federal policy described above.
4. Conduct an inventory of existing training programs that could be used or adapted for new CBRNE threats.
5. Based on specific competencies, develop and validate new modules for pre-event and post-event worker training.

## **INTRODUCTION**

On October 26 and 27, 2002, the Johns Hopkins Education and Research Center for Occupational Health and Safety held a conference on worker health and safety training in Baltimore, Maryland. The goal of the conference was to identify worker health and safety training needs for various industrial sectors related to new threats, including chemical, biological, radiological, nuclear, and explosive (CBRNE) weapons. Conference planners wanted to:

1. Review previous findings relevant to worker safety training for new threats;
2. Examine how various private and public sector organizations were incorporating training for new CBRNE threats into existing health and safety training; and
3. Identify the general skills and knowledge that would be required for all workers, versus the specific skills and knowledge that would be required for unique groups of workers in the pre-event, event, and post-event phases of a CBRNE event.

More than 200 attendees, many of them experts in worker training, CBRNE, public policy, or emergency response, participated in the conference.

## **BACKGROUND**

Following the events of September 11, 2001, and the subsequent use of anthrax in the mail as a weapon, much attention has focused on bolstering the security and preparedness of various public and private systems in the country. This includes public infrastructure, such as the public health system and public safety sectors, and many private sector enterprises, such as the postal and transportation industries. Many of these organizations had already engaged in considerable activity even prior to this time, but these events spurred even greater efforts.

The hazards associated with weapons of mass destruction are already part of the landscape of the American workplace, although they are typically used in a controlled fashion and are not intentionally introduced to cause harm. Workers in many industries work with or are potentially exposed to chemical, biological, radiological, nuclear, and explosive (CBRNE) hazards on a regular basis. Agents or conditions capable of causing fire and explosions are routinely found in many workplaces (although not typically on the scale of the attacks on the World Trade Center (WTC) or the Pentagon on September 11, 2001). Highly toxic and reactive chemicals are manufactured, transported, stored, and used every day in large quantities. Nuclear materials are used in the nuclear energy industry, as well as in the defense industry. Radiological agents are used widely in industrial non-destructive testing, medicine, research, and in many other industries.

Because of the hazardous nature of certain types of work, worker training is an essential aspect of occupational safety and health programs. Many U.S. Occupational Safety and Health Administration (OSHA) standards include a component of worker training. One example of a training requirement already in place that applies specifically to potential terrorism incidents is the HAZWOPER standard (29 CFR 1910.120 and 40 CFR 311).<sup>1</sup> This standard requires health and safety

Worker Training Requirements under the OSHA HAZWOPER Standard (29 CFR 1910.120 and 1926.65)

Required training elements:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on the site
- Use of personal protective equipment (PPE)
- Work practices by which the employee can minimize risks from hazards
- Safe use of engineering controls and equipment on the site
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards
- Specific contents of the site safety and health plan:
  - ◆ Decontamination procedures
  - ◆ The emergency response plan, including necessary PPE and other equipment
  - ◆ Confined space entry procedures
  - ◆ Spill containment program

**Figure 2. The HAZWOPER standard**

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<sup>1</sup> The HAZWOPER standard (29 CFR 1910.120 and 1926.65) describes requirements for employers and workers engaged in five different types of activities: (1) clean-up operations at uncontrolled hazardous waste sites; (2) clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA); (3) voluntary clean-up operations at uncontrolled hazardous waste sites; (4) operations involving hazardous wastes at treatment, storage, or disposal facilities covered by RCRA; and (5) emergency response operations involving the release or potential release of hazardous substances, which includes chemical, biological, and nuclear agents.

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training for employees involved in the emergency operations on a site, who are or could be exposed to hazardous substances and health hazards (see Figure 2). It also includes provisions for both emergency response operations (§1910.120(q)) and for post-emergency response operations, such as cleanup or decontamination (§1910.120(e)). Other Federal agencies with worker safety and health standards also require specific training for emergency conditions or operations.

Recognizing that worker training is an essential element of preparedness for terrorist incidents involving CBRNE threats, this conference was convened to identify core knowledge and skill requirements common to workers in many different industries who might be the targets of these types of attacks.

Conference participants included union members, private-sector employers, government agency officials, and members of the academic and professional public health communities. The themes of the conference were: (1) a review of previous lessons learned about how different types of training worked in the recent events involving acts of terrorism and workplace violence; (2) how these lessons are being applied in various occupational sectors; and (3) what conference participants considered the most important general and occupation-specific training objectives for workers who might be exposed to CBRNE events in the future.

## THEME 1: LESSONS LEARNED ABOUT WORKER TRAINING FROM RECENT EVENTS

### *Lessons Learned: World Trade Center and the Pentagon (September 11, 2001)*

The first panel focused on lessons learned from the WTC and Pentagon events about the training of workers for major disasters. Several reports have already examined various aspects of these disasters, including a report by the Worker Education and Training Program of the National Institute for Environmental Health Sciences (NIEHS)<sup>2</sup> and a report by the RAND Corporation<sup>3</sup> on the adequacy of PPE. Members of the panel emphasized the need for training on incident command, as well as for cross-functional training (Figure 3).

Other findings from the analysis of the WTC and Pentagon events included both the identification of the problem areas and the opportunities for improved emergency response training. One of the central issues identified by the panel concerned the challenges of transitioning from the emergency response to the post-emergency response clean-up operations, which involved decontamination and remediation. The HAZWOPER standard distinguishes between operations during and immediately after the emergency, and the post emergency response operations which take place some time after the initial response. In particular, there are detailed training requirements for emergency responders and for workers involved in post-emergency response clean-up operations, but the requirements for training of skilled support personnel during emergency response are far less stringent. Skilled support personnel are required to have only an “initial briefing at the site prior to their participation in any emergency response. The initial briefing shall include instruction in the

**Figure 3. Lessons from the World Trade Center and Pentagon (September 11, 2001)**

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<sup>2</sup> NIEHS. “Learning from Disasters: Weapons of Mass Destruction Preparedness through Worker Training. Report of a National Technical Workshop.” Washington, DC: The National Clearinghouse for Worker Safety and Health Training. 2002. pp. 1-45.

<sup>3</sup> Jackson BA, Peterson DJ, Bartis JT, LaTourrette T, Brahmakulam I, Houser A, Sollinger J. “Protecting Emergency Responders: Lessons Learned from Terrorist Attacks.” Santa Monica, CA: RAND. 2002. pp 1-89.

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wearing of appropriate personal protective equipment (PPE), what chemical hazards are involved, and what duties are to be performed.”<sup>4</sup> Because the transition to post-emergency response was not clearly delineated, training requirements for skilled support personnel under HAZWOPER were not as clearly defined as they might have been. Other problem areas included the following:

- There was a need for critical incident stress debriefing during and after the event.
- First responders were overwhelmed by the enormity of the event.
- No one was “in-charge of or clearly responsible for enforcing” safety and health guidelines.
- Data collection did not always get transmitted to the field. There was very good collection of injury and illness data, but it was not always utilized effectively. Similarly, monitoring of personal exposures, even where it occurred, did not always get transmitted or used effectively.
- A presumptive protection standard (e.g., the HAZWOPER standard) was not used.
- Site-specific safety and health training did not begin until nearly three months into the response.
- Workers who are not traditionally seen as first responders, such as utility workers, sanitation workers, and skilled support personnel, also had significant and unforeseen exposures.
- There were multiple threats present at the site, particularly for those workers associated with demolition (e.g., risk of structural collapse and falls).

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<sup>4</sup> 29 CFR 1910.120(q)(4)

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- There was concern about the unknown potential for secondary CBRNE attacks in addition to the hazards associated with clean up of the destruction of the WTC and the Pentagon structures.

The panel also noted important lessons for future responses:

- There is a need to coordinate any future responses with local emergency planning committees (LEPCs).
- The OSHA 10-hour construction safety course was used extensively, and may be appropriate for pre-incident training, particularly for skilled support personnel who may be involved in CBRNE incidents.
- Leaflet-style safety bulletins were used extensively at the site to supplement other forms of communication.
- Training curricula needs to concentrate on hazards beyond normal responder training, such as CBRNE hazards, the risks associated with demolition, and the use of air purifying respirators (APRs).
- There is a need for redundancy/backup plans.

### *Lessons Learned: Anthrax in the Mail*

The second panel reviewed the events surrounding the U.S. Postal Service (USPS) and postal employees' response to anthrax in the mail. There has already been extensive training for "traditional" emergencies in the USPS. After the introduction of anthrax, the USPS used "just-in-time" training based on recommendations from the Unified Task Force, which consisted of labor, management, and other involved parties. The USPS also had an important role in communicating with the public. Training emphasized emergency management fundamentals. Some of the key findings from this panel included:

- Working through the Unified Task Force and a unified incident command center (UICC) made communications and decision-making between various groups much easier.
- Standard formats and expectations for information need to be established at the outset.
- Internal conflicts of authority and responsibility need to be worked out.
- Union involvement was critical to the success of the response.
- Contingency planning included the following features:
  - Existing plans were augmented to address terrorist acts;
  - Simple goals and objectives worked best;
  - Interagency commitments were needed; and
  - The UICC structure was critical to success.

Several issues related to contract administration. The panel felt that contracts for services related to testing and decontamination need to be in place before a crisis occurs; and that resource requirements for items such as personal protective equipment (PPE) or laboratory services need to be in place before a crisis occurs. Finally, in some cases contractors did not



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have the training required to perform the assigned work. Panelists noted that interagency coordination was required to assure that agencies that prescribe the workers' training requirements understand the needs of the agencies employing the contractors.

Some of the factors essential for the success of the teams that responded to the reports of anthrax contamination included: round-the-clock support and response; incident commanders with broad authority; and staffing from all of the participating agencies. In addition, the UICC was fully empowered to make key decisions, which was critical in a timely response. Panelists felt that the existing Postal Emergency Management System (PEMS) allowed for the integration of the emergency response to anthrax by the use of an existing structure. The use of the Homeland Security Alert System enabled protective measures to be outlined for each response level.

As a result of this coordinated effort, the panel pointed to the following accomplishments in managing the consequences of anthrax contamination:

- 284 buildings were surveyed in less than one month.
- A coordinated nationwide policy on sampling and laboratory strategies was established within days.
- Medical support for contaminated sites was excellent, owing to contract support.
- A bioterrorism training program was established for safety staff members.
- “Agents of concern” training, focused on biological threats, was provided to employees, emergency responders, and medical staff.

One challenge noted by the panel was that limited communication between military and civilian agencies slowed the learning curve.

*Emergency Response Plans: Lessons Learned and Applied*

This panel looked at how lessons learned from these recent events have been or need to be translated into emergency response planning. For a community emergency response, panelists emphasized that there should be a single, unified plan, regardless of the specific agent or threat. Also, the definition of “first responder” has to be broadened. First responders traditionally have been thought of as fire personnel, hazardous materials (HazMat) teams, police, and emergency medical service (EMS) personnel. As has been previously emphasized in several reports, first responders should also include what are termed “skilled support personnel.” These workers bring specialized skills to a disaster, and also need training. Planners need to understand how each responder fits into the response as a whole, and realistic “real-world” training is essential. Planners also need to consider the roles of the volunteers and their families.

The panel discussed findings from the RAND report on protecting emergency responders, noting the factors that had hindered the response: a loss of command staff; inadequate resources; logistical difficulties; jurisdictional and political issues; the treatment of the sites as crime scenes; and the need to deal with citizens at the site. Panelists also discussed the following challenges that confronted the WTC and Pentagon responders that were different from traditional disasters: the nature of the hazards; the major loss of emergency response personnel; the duration of the response; the fact that job requirements and equipment requirements were atypical; and the presence of many skilled support personnel on-site. The implications of these factors for training are shown in figure 4.

<p><b><u>Key Lessons for Training for Emergency Response Planning</u></b></p> <ul style="list-style-type: none"><li>• Training must be site-specific and incident-specific, because the response is (initially) local</li><li>• Unified command must be part of all training</li><li>• Logistical hurdles and the possibility of conflicting standards or infrastructure must be recognized (flexibility required)</li><li>• There is a need to address site security/volunteers/visitors</li><li>• Conduct inter-agency coordination (how is classified information shared, and with whom, pre-designated authority?)</li><li>• Real-world training is needed</li></ul>
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**Figure 4. Training for emergency response**

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Audience members raised several additional issues regarding worker training and protection. Some of the critical questions concerned the appropriate role of the volunteer civil response teams and the potential legal liability of those engaged in training volunteers for disaster response. There were also questions about the psychological and emotional consequences of responding to a disaster, and whether it was possible to train people to recognize and/or respond appropriately if and when such reactions occur. From the ensuing discussion it appeared that there is still a great deal of evolving policy, law, and science related to worker training for CBRNE events. Panelists and the audience identified several of these, including the potential liability for volunteer training, as issues that could use additional clarification.

## **THEME 2: NEW DEVELOPMENTS IN WORKER SAFETY TRAINING BY WORKFORCE SECTOR**

### *Transportation Sector*

The transportation industry is highly integrated and highly interdependent. However, there are many small and independent operators in some transportation modes, which can be a challenge when thinking about worker safety training. In addition, there are many government agencies that regulate or influence the industry. This panel dealt primarily with surface transportation, although all modes were discussed to some extent. Panelists noted that the transportation system incorporates a wide variety of jobs. The system transports a large quantity of hazardous materials on a constant basis. The U.S. Department of Transportation (DOT) has general training requirements for transportation workers, including<sup>5</sup>:

- Familiarity with the general provisions.
- Ability to recognize and identify hazardous materials.
- Knowledge of specific requirements for the transport of hazardous materials.
- Specific functions performed by the employee during normal and abnormal operating conditions.
- Familiarity with emergency response information such as the Emergency Response Guide (ERG).
- Ability to perform self protection safety measures.
- Understanding of accident prevention methods and procedures.

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<sup>5</sup> 49 CFR 172.704

While much attention has been focused on the vulnerability of the transportation infrastructure, the vehicles, and the cargo, panelists emphasized that less attention has been focused on the need to train vehicle operators or those who support the industry.

### *Manufacturing Sector*

The panel discussing the manufacturing sector workers noted that many manufacturing companies are now looking at new threats and their potential risk. Panelists emphasized the need to apply basic principles of public health and prevention to the problem, including the hierarchy of controls, which specifies that preventive strategies, such as substitution of less dangerous products, use of engineering controls, or isolation of hazardous processes, are preferable to measures such as personal protective equipment (PPE). Some industries (such as the chemical industry) have been interested in this issue for years and have developed relatively sophisticated plans, while other companies are just beginning to address the problem.

It was noted that existing standards have already influenced the planning in this area. Applicable standards include the HAZWOPER, Egress and Evacuation, and Process Safety Management standards.<sup>6</sup> The need for real-world drills was emphasized by the panel. The panelists stressed the need to err on the side of safety, by following basic public health principles of preparedness and prevention. The threat assessment should include all threats, including chemical, biological, radiological, nuclear, and high explosives (CBRNE). In assessing the threats to an individual company, among the most significant are those manufacturing facilities with chemical storage.

Pre-event planning should include consideration of the root causes of the problems and potential corrections and prevention measures. The hierarchy of controls applies to new threats,

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<sup>6</sup> OSHA standard 29 CFR 1910 Subpart E covers egress and evacuation. The Process Safety Management Standard (29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals) requires employers to analyze

as much as to traditional hazards. Thus, the design of industrial processes, including redundancy of controls, needs to be considered. Detailed emergency response plans, which include knowledge, skills, and constant practice, should also be prepared. In making plans for emergency response, some employees such as the local emergency responders or volunteer fire fighters, may have dual responsibilities. Panelists also mentioned that health care providers who treat workers who are potentially exposed to CBRNE agents should have a heightened index of suspicion and should not wait for “proof” of exposure.

It was also noted that OSHA has some existing training requirements for emergency response planning:

- 29 CFR 1910.38 Employee emergency plans
  - ◆ (a)(5) Training
- 29 CFR 1910.120(q) Emergency response to hazardous substance releases
  - ◆ (6) Training
- 29CFR 1910.1200 Hazard Communication
  - ◆ (h) “Employee information and training”
- 29 CFR 1910.1450 Occupational exposure to hazardous chemicals in laboratories
  - ◆ (f) Information and training

The National Fire Protection Association (NFPA) also has training requirements in NFPA 1600, Disaster/Emergency Management and Business Continuity Programs, and a number of other

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their manufacturing processes to minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals.

resources. Other organizations have also prepared plans and guidance on emergency response, chemical process safety, and emergency management.<sup>7</sup>

### *Health Care Sector*

The health care panel addressed several critical issues in training health care workers who may need to respond to CBRNE events and treat those affected by CBRNE weapons. One critical issue of immediate importance is the smallpox vaccination. The panel addressed some issues related to training and vaccination, particularly towards the communication related to the risks of vaccination. Using smallpox as an example of an airborne pathogen, one panelist posed the possibility of developing a standard for airborne pathogens analogous to the OSHA

bloodborne pathogens standard (29 CFR 1910.1030).

**CDC Core Competencies for Public Health Workers**

Every Public Health Worker Should Be Able To:

- IDENTIFY & LOCATE the emergency plan
- DESCRIBE **the role** of Public Health
- DESCRIBE the Chain of Command
- DESCRIBE & DEMONSTRATE functional role
- RECOGNIZE deviations from the norm
- IDENTIFY limits to own authority
- DESCRIBE communication roles
- DEMONSTRATE use of communication equipment
- APPLY creative problem solving skills

(Source: Gebbie KM. Emergency Preparedness Core Competencies for All Public Health Workers. New York: Centers for Disease Control and Prevention and Columbia School of Nursing; 2001.)

Training the health care workforce is complicated, in part, because it is a large, diverse workforce with many different professions and types of workers. Research at the Columbia University Mailman School of Public Health Center for Public Health Preparedness has focused on the training needs of health care workers. Pilot studies suggest that training is effective, but that the availability of health care workers in

**Figure 5. CDC Core competencies for public health workers**

an emergency may be influenced by many external factors including the availability of childcare and/or eldercare, personal health problems, or concerns about compensation.

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<sup>7</sup>Although not reviewed in this report, a number of government, professional, and trade organizations have published guidelines and recommendations on preparedness. Most, however, do not address worker training in detail.

The diversity of the health care system is such that there are both core and specific training competencies for health care workers. Public health agencies, for example, must continue to deliver essential services even while they may be responding to an emergency. Dr. Kristine Gebbie of the Columbia University School of Nursing described the training needs of the public health workforce. These needs include: communication systems; emergency management or command systems; specific technical knowledge; and mental health skills. Core competencies for emergency preparedness for public health workers have been promulgated by the Centers for Disease Control and Prevention (CDC) (See Figure 5). Newer competencies, based largely on the core competencies, are being developed for specific types of emergencies (e.g., bioterrorism events) and specific types of workers (e.g., administrators, clinicians, laboratory workers, public information officers, technical and support staff, etc.) across all phases of an event.<sup>8</sup> Competencies in additional areas, such as informatics and legal issues, also need attention and are in development.

### *Emergency Response Personnel*

First responders include fire fighters, emergency medical technicians (EMTs) and paramedics, and police. Based on the focus groups, first responders expect they will be at risk in any future events involving CBRNE weapons. This has led to some changes in risk perception, as well as a recognized need for more and improved equipment and training for hazard detection, health surveillance, communications, personnel tracking, and personal protective equipment (PPE). In addition, having immediate digital references available in the field will improve hazard recognition and threat management. There is a need to augment basic skills training, particularly with respect to hazardous materials and CBRNE weapons, personal scene safety, risk management, and cross-training with federal responders and skilled support personnel. All new

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<sup>8</sup> Gebbie KM. Bioterrorism and Emergency Readiness: Competencies for All Public Health Workers. New York: Centers for Disease Control and Prevention and Columbia University School of Nursing; 2002.



recruits identified as first responders should be trained to the operations level. There is a new increased focus on detection, protection, and decontamination.

The first responder community has long been aware that, in any event involving CBRNE weapons, they will (by definition) be the first on scene and are among those with the greatest potential for exposure. Panelists noted that the training for CBRNE threats had much overlap with existing training for management of hazardous materials incidents. Some of the elements of this training include:

- Maintaining personal safety at the scene.
- Assuring that all recruits receive training.
- Improving access of first responders to “real-time” expertise and detection equipment.
- Improving coordination of emergency responders with other responders, support personnel, and clean-up personnel.

Challenges at the state and local level for emergency responders include new threats, more requirements for planning and meeting, as well as the increase in the core mission of the fire service and first responders. First responder health and safety is still the priority, and basic training needs should address these issues. The hazardous materials-level training that should be provided to every first responder includes: (1) use and limitations of personal protective equipment (PPE) (especially respiratory protection); (2) vaccination against bloodborne pathogens; (3) communications; (4) command structure; and (5) basic operations. Partnerships are key in developing effective training, especially given the magnitude of the need and the limited resources.

***Skilled Support Personnel***

Skilled support personnel are those workers temporarily on a site for specific purposes, defined in the HAZWOPER standard.<sup>9</sup> Although skilled support personnel are thought of as temporary workers, in the case of the World Trade Center and Pentagon, they remained on-site for many months. With these factors in mind, their estimates of exposure potential need to be considered carefully.

Training for skilled support personnel has been recognized as a critical issue in the wake of the events of September 11, 2001. Among the issues that affect training for skilled support personnel are:

- Construction procedures are defined by contracts, and in these events there were no established contracts and no planning for the project.
- The strict structure governing contractors, supervisors, and workers was absent, compared with normal construction operations.
- There was both formal and informal training, with less formal training at the outset, followed by more formal training after several months.

What kind of training is needed, based on the lessons from September 11, 2001 and afterwards? First, an identification of the hazards and the exposed population is basic and critical. Second, supervisors need to know the capabilities of their workers, and they need to do as much advanced training as possible. Issues such as confined space training, fall protection, night operations, HAZWOPER, and respirator training need to be incorporated into the basic training plans of the contractors, employers, and unions. Pre-incident and post-incident training

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<sup>9</sup> 29 CFR 1910.120(q)(4) defines skilled support personnel as: “personnel, not necessarily an employer’s own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer’s own employees, and who will be or may be exposed to the hazards at an emergency response scene.”

should also be considered. A recent report by the National Clearinghouse for Worker Safety and Health Training highlights the importance of supplementing HAZWOPER training for skilled support workers, with more specific training that depends on whether the training is occurring pre-event or post-event.<sup>10</sup>

### *Post-Emergency Response Clean-Up Operations*

The challenges of post-emergency response clean-up operations were discussed in a number of other conference panels, although they were not the subject of a separate panel. As noted earlier: at the WTC, there was no clear delineation between the emergency response and the post-emergency response cleanup. The HAZWOPER standard currently distinguishes between these phases, although in large-scale disasters the line between the two may often be blurred. The challenges of post-emergency clean-up operations, which could involve decontamination of biological or radioactive materials, involve: (1) clearly defining when a site (or portion thereof) or response has moved from the emergency response to the clean-up phase; and (2) deciding what level of training is appropriate for those involved in clean-up as opposed to emergency response. These issues have been thoroughly discussed in several recent reports.<sup>2,10</sup> Clean-up operations (decontamination and remediation) frequently involve exposures, not only to the original hazards, but to an entirely new set of potential hazards. These hazards include: chemicals used in neutralization; combustion by-products; mold growth, as a result of water; and physical hazards associated with demolition can all be classified as potential hazards.

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<sup>10</sup> Lippy B, Murray K. “Improving the Training of Skilled Support Personnel for Responding to Terrorist Actions: A Review of the Problems and Feasible Solutions”. Washington, DC: National Clearinghouse for Worker Safety and Health Training. December 14, 2002. pp 1 – 38.

## THEME 3: RECOMMENDATIONS FOR A NEW TRAINING AGENDA

### *General Recommendations: Knowledge and Skill Recommendations for All Workers*

During the second day of the conference, breakout sessions were held to develop recommendations around the following two questions:

1. What are the common knowledge and skills that workers in different workforce sectors need, in order to safely respond to an event involving CBRNE hazards?
2. What are the specific knowledge and skills that workers in different workforce sectors need, in order to safely respond to an event involving CBRNE hazards?

The breakout sessions involved workers from six different sectors.

- Transportation
- Manufacturing
- Emergency response
- Health care
- Skilled support
- Remediation/decontamination.

Participants were asked to consider training needs during the pre-event, event, and post-event periods. They were also asked to assume that workers were skilled and trained in their individual jobs.

There was a high degree of consensus from the participants that all workers, regardless of job title or industry, should know and be able to do the following (figure 1, table 1).

- Essential knowledge identified by conference participants includes:

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- A basic understanding of the hazards involved, including concepts of contamination and decontamination.
- An understanding of each employee's specific role in an emergency, the roles of other potential participants and responders, and the limitations of individual roles (what each worker should and should not do).
- An understanding of the ICS and the role it plays.
- Knowledge of how communications systems work in the response to an emergency.

Essential skills that all workers should have (in addition to their specific occupational skills) include:

- The ability to recognize a threat or an abnormal condition.
- The ability to access the emergency notification system.
- The ability to use PPE safely and appropriately.
- The ability to use specific information resources and tools.
- The ability to evacuate the workplace safely.

These generic training components were identified by all of the groups as knowledge and skills that all workers should have when confronting CBRNE threats regardless of the workforce sector involved. The participants also recommended specific knowledge and skills for different types of workers, but there was general recognition that work remained to develop these worker-specific competencies more completely.

Based on the groups' recommendations, a framework of recommendations for new generic training components has been constructed. Figure 1 illustrates how these generic

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training components would fit into the current training scheme. All workers should receive basic training to be able to recognize hazards and threats. All workers should know whom to notify and how to activate the notification system in the event of an emergency or threat. They should all understand how the ICS works, and should understand what their role is in the event of an emergency. Additionally, all workers should understand the role of other personnel, and should know the limitations of their own functional roles (it is as important to know what one should not be doing as it is to know what one should be doing, in an emergency). It should be stressed that the skills component of these suggested requirements (activation of the emergency notification system, use of personal protective equipment, and evacuation) must be practiced in “real-world” simulations. Another point emphasized by every group was the importance of including all workers in training, not just those who were deemed likely to be “at risk.” The conference participants stressed that workers involved in communications (dispatchers) were an especially important group to train because of their central role in recognizing and responding appropriately to an emergency situation.

Table 1 shows the recommended generic training components, side by side with current training requirements for workers covered under HAZWOPER. Two points should be emphasized here. First, it should be noted that these generic training requirements would be supplemented by trade-specific knowledge and skills recommendations. In a number of cases, such as emergency responders and health care workers, these competencies have been defined in some detail. In other cases (for example, for transportation workers) there have been some efforts to define specific skills and knowledge requirements, while some still need a great deal of development in this area in order to define the correct knowledge and skill sets. Secondly, the pool of workers eligible for pre-event HAZWOPER training may be larger than it is currently being conceived, because they are likely to be involved in any emergency response or post-emergency response clean-up operations.

Table 1. Side-by-side comparison of current training requirements and proposed new generic training recommendations for workers at risk of CBRNE exposure.

<u>Current Worker Training Requirements under the OSHA HAZWOPER Standard (29 CFR 1910.120)</u>	<u>Proposed New Generic Training Requirements for All Workers Potentially Exposed to Chemical, Biological, Nuclear, Radiological, and Other Weapons of Mass Destruction</u>	
	<u>Pre-Event Training for All Workers</u>	<u>Post-Event Training*</u>
<ul style="list-style-type: none"> <li>• Names of personnel and alternates responsible for site safety and health</li> <li>• Safety, health and other hazards present on the site</li> <li>• Use of personal protective equipment (PPE)</li> <li>• Work practices by which the employee can minimize risks from hazards</li> <li>• Safe use of engineering controls and equipment on the site</li> <li>• Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards</li> <li>• Specific contents of the site safety and health plan:               <ul style="list-style-type: none"> <li>◆ Decontamination procedures</li> <li>◆ The emergency response plan, including necessary PPE and other equipment</li> <li>◆ Confined space entry procedures</li> <li>◆ Spill containment program</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Basic health and safety training (legal, regulatory, hazard communication)</li> <li>• Basic knowledge and recognition of industry-specific potential hazards and threats</li> <li>• Ability to access emergency notification system and notify appropriate parties</li> <li>• Knowledge of Incident Command System</li> <li>• Knowledge of the worker’s specific functional role in an emergency, the limitations of that role, and the roles of others</li> <li>• Emergency evacuation and egress</li> <li>• Ability to use personal protective equipment (PPE)</li> </ul>	<ul style="list-style-type: none"> <li>• Site (event)-specific hazards and threats</li> <li>• Site (event)-specific safety and health plan requirements</li> <li>• Ability to use personal protective equipment (PPE)</li> <li>• Site-specific command and communications</li> <li>• HAZWOPER requirements</li> <li>• Critical incident stress debriefing</li> </ul>
	<u>Pre-Event Training for Selected Workers*</u> <ul style="list-style-type: none"> <li>• HAZWOPER</li> </ul>	

\*Training requirements for first responders, skilled support personnel, and other workers involved in post-emergency response operations.

## ***Recommendations for Development and Implementation of New Training Components***

In addition to recommending the components described above, participants discussed how the training should be implemented and integrated into the existing health and safety training. Their recommendations can be summarized as follows:

1. *Training plans should recognize the significant differences among different workforce sectors, in the degree to which they are prepared to respond to the threat of CBRNE attacks.* Some workers, particularly emergency responders, may receive considerable training, while many others receive little or no applicable training. For example, workers who, in their daily work activities, are further removed from emergency response activities (manufacturing workers, service sector employees not involved in emergency response, food and agricultural workers) receive little or no applicable training.
2. *Training for new CBRNE threats should be integrated into basic safety and health training, in a unified training plan that builds on and supplements other current training requirements.* Many speakers and participants emphasized the notion that training for different types of hazards should be based on a single emergency response plan. First, it simplifies training and increases the likelihood of successful implementation. Second, it will not always be clear exactly what the threat is, or whether there is only one threat. A single emergency response plan would not rely solely on the nature of the threat.
3. *The many Federal agencies involved in regulating or guiding activities of certain industries must coordinate their guidance and regulations regarding worker training.* Because there are many agencies involved in the regulation of different occupational sectors, there are a number of different and often-conflicting regulations that need to be reconciled regarding different aspects of worker training. Chemical manufacture and transportation, for example, involves DOT, OSHA, and the U.S. Environmental Protection Agency (EPA), to name just three. One speaker pointed out that the



- placarding of chemical transport vehicles might be discouraged by one agency, while it was being required by another. Creating uniform requirements will facilitate the development and adoption of training programs across multiple agencies.
4. *At a minimum, the Federal government should issue recommendations on worker safety training for new threats, including chemical, biological, radiological, nuclear, and explosive weapons.* While participants were divided on whether there should be only guidelines for training as opposed to standards, there was agreement that guidance on training from the Federal government is needed. Many participants felt that some workers do not receive even basic safety and health training now, so to expect any increase in training in the absence of a strong Federal initiative or requirement was unlikely. In addition, some participants raised questions about liability, which they felt would be an additional deterrent to training unless the issue is specifically addressed by the government.
  5. *At all levels of response, training should reflect a high degree of coordination between the emergency response and public health communities.* Conference participants heard repeatedly that the key to effective emergency response is coordination between the emergency response community, public health agencies, and the employer and employees. Communication between the public health and emergency response organizations is especially critical. In some cases, these links are well developed and smooth. However, many public health organizations are not accustomed to the top-down incident command structure widely used by emergency responders. The greater the coordination between these entities in the pre-event phase, the better the response will be in the event of an actual attack.
  6. *Regardless of which training plan is involved, an essential element must be frequent and regular “real-life” rehearsals.* Conference participants unanimously agreed on this point. Participants stressed that this would require a commitment of resources on the part of employers, employees, and the government. This is essential if the

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training is going to accomplish its goal of preparing workers to respond effectively in the event of any future events.

## RECOMMENDATIONS FOR NEXT STEPS

Several unresolved issues were identified at the conference's Plenary Session that could form the basis of future work by individual conference participants, agencies, and academic institutions. These include:

1. ***Development of Competencies for Worker Training.*** The purpose of the conference was to start to identify common and specific training requirements, that is, knowledge and skills that workers should possess if they are to be adequately prepared to meet the challenge of a potential exposure to CBRNE threats in the workplace. Although the conference participants did identify several such requirements, these requirements only partially define the specific competencies that would form the basis of a training program. Additional work is needed to generate and validate the specific competencies, with input from many different parties representing the spectrum of stakeholders involved in worker training (employee groups, employers, government agencies, academic institutions, experts in specific content areas, and others).
2. ***Coordination of Federal Policy on Worker Training.*** There was a consensus among conference participants that there should be a coordinated Federal policy on worker training. OSHA, DOT, EPA, Centers for Disease Control and Prevention/ National Institute for Occupational Safety and Health (NIOSH), National Institute of Environmental Health Sciences (NIEHS), the Federal Emergency Management Agency (FEMA), the Department of Homeland Security, and other agencies all affect policies on worker training. Other agencies at the state and local levels, as well as private and quasi-public agencies and advisory panels, take cues from the Federal government when devising their own training recommendations or requirements. Thus, it is critical that Federal agencies develop a mechanism to coordinate recommendations and requirements for worker training for new threats.
3. ***Adoption of Federal Guidelines or Standards on Worker Training for New Threats.*** Conference participants were divided on whether there should be guidelines or

requirements for worker training, but there was a consensus that the Federal government should not remain silent on the topic and should, at the least, provide guidelines for worker training. Many participants pointed out that there is evidence to suggest that those worker training requirements that are already in place are not universally adhered to. In this respect, the proposed new training represents an opportunity to enlarge the sphere of workers who receive basic health and safety training as part of the training for new threats. At the same time, some employers may be reluctant to provide additional training (because of concerns about costs or liability) without specific guidance or direction from the Federal government.

4. ***Development and/or Inventory of Training Modules.*** Many industries and employee groups have already developed and refined their emergency plans and are already executing these training modules/programs. Several participants inquired about an inventory of training programs or modules that could be used “off-the-shelf.” For example, modules in incident command could be fashioned so that they can be broadly applicable to many different sectors with only minor modifications. In other areas, however, additional research or development may be needed to determine what should be the specific content of training and how it can best be delivered. Partnerships between the private and public sector, in cooperation with academic institutions, will help to facilitate the rapid development and distribution of these new training modules.

## APPENDIX 1. CONFERENCE PROGRAM AND SPEAKERS

### October 26, 2002

Welcome

Clifford S. Mitchell, Johns Hopkins Bloomberg School of Public Health

Introduction to Keynote Speaker

Alfred Sommer, Dean, Johns Hopkins Bloomberg School of Public Health

Keynote Address

John Howard, Director, National Institute for Occupational Safety and Health

### **Theme 1: Review of Lessons Learned**

Panel 1: Lessons from the World Trade Center and Pentagon

Joseph "Chip" Hughes, National Institute of Environmental Health Sciences - Moderator

Jeff Borkowski, Fire Department of New York

Don Carson, International Union of Operating Engineers

John Moran, Consultant, Clearinghouse on Worker Training

Gil Gillen, U.S. Department of Labor, Occupational Safety and Health Administration

Major Tony Intrepido, U.S. Army, Center for Health Promotion and Preventive Medicine

Panel 2: Lessons from Anthrax in the Mail

Clifford Mitchell - Moderator

Corey Thompson, American Postal Workers Union

Samuel M. Pulcrano, U.S. Postal Service

Panel 3: Emergency Response Plans: Lessons Learned and Applied

Rosemary Sokas, National Institute for Occupational Safety and Health - Moderator

Bonnie Butler, Federal Emergency Management Agency

Carol Merry Stephenson, National Institute for Occupational Safety and Health

Luncheon Keynote Address

John Henshaw, Assistant Secretary for Occupational Safety and Health, U.S. Department of Labor

### **Theme 2: Worker Safety Training Needs by Sector: New Developments**

Transportation

Brenda Cantrell, George Meany Center for Labor Studies - Moderator

Bill Rogers, Motor Freight Carriers Association

Anthony Murray, U.S. Department of Transportation

Richard Inclima, Brotherhood of Maintenance of Way Employees

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### Manufacturing

Bernie Kuchinski, National Institute for Occupational Safety and Health - Moderator  
Michael Fagel, Consultant  
John Morawtz, ICWUC Center for Worker Health and Safety Training  
Joseph Howicz, U.S. Department of Labor, Occupational Safety and Health Administration

### Health Care

William Borwegen, Service Employees International Union - Moderator  
Robyn Gershon, Columbia University  
Kristine Gebbie, Columbia University

### Emergency Response

Paul Hoffman, International Association of Fire Fighters - Moderator  
Scott Solomon, International Association of Fire Fighters  
Adam Thiel, Virginia State Training Coordinator  
Tom Moffett, Harrisonburg, Virginia Fire and Rescue Department

### Skilled Support Personnel

Bruce Lippy, Michael Baker and Associates - Moderator  
Ray Master, Bovis LendLease  
Louis Ricca, U.S. Department of Labor, Occupational Safety and Health Administration

### Concluding Remarks

Bruce Lippy, Michael Baker and Associates - Moderator  
Clifford Mitchell

### **October 27, 2002**

#### Overview of Day 2

Clifford S. Mitchell  
John B. Moran

#### Breakout Groups

#### Plenary Session

## APPENDIX 2. DETAILED SUMMARY OF BREAKOUT SESSIONS

### *Transportation*

The transportation breakout group concentrated on identifying the specific knowledge requirements of highway and railroad workers. Within this category are many diverse workers, including drivers, loaders/unloaders, vehicle maintenance workers, warehouse workers, truck stop personnel, dispatchers, and security personnel. The railroad personnel specialized in a variety of crafts, including engineers, conductors, car men, track and signal workers, in-plant rail workers, loaders/unloaders, dispatchers, and yardmasters. Participants stressed that in the transportation industry many workers may not have received basic health and safety training.

Pipeline, maritime, and airway workers were generally not considered by the workshop participants, because each group had a specific operating environment and legal/regulatory environment that would affect the knowledge and skill requirements of the workers. For highway and railroad workers, specific knowledge and skills that were identified as desirable by the group included:

- Knowledge Requirements for Transportation Workers:
  - ◆ Familiarity with current Federal laws/policy
  - ◆ Knowledge about chemicals that could be used as weapons of mass destruction (WMD), and general knowledge about chemical toxicity, reactivity, and compatibility
  - ◆ Knowledge of hijacking avoidance
  - ◆ Communication in the event of an emergency
  - ◆ Knowledge of the Emergency Response Guidebook (ERG)
  - ◆ Knowledge of ICS

- ◆ Skills in First aid/Cardio-Pulmonary Resuscitation (CPR) specific to CBRNE
- ◆ Awareness of potential targets
- Skills for Transportation Workers:
  - ◆ Emergency action plan awareness and training
  - ◆ Knowledge of hazard avoidance
  - ◆ Awareness of appropriate initial response (SWIM: Secure area, Warn others away, Isolate, Move upwind)
  - ◆ Knowledge of personal worker limitations (how far to go, or not to go, in CBRNE events)

The participants emphasized that the use of case studies, such as those at the National Transportation Safety Board, could be very helpful in training and creating awareness of past incidents. The participants also suggested a number of specific requirements for different types of workers (below).

- Knowledge Requirements for Highway Workers:
  - ◆ Nuclear/radiological knowledge (suggestion to seek Nuclear Regulatory Commission (NRC) resources and information, as well as from the U.S. Department of Energy (DOE) or the Health Physics Society)
  - ◆ Anti-terrorism, security, and situational awareness (routes, loads, etc.)
  - ◆ Target hardening
  - ◆ Specific training for dispatchers in emergency situations (terrorist acts, CBRNE). Global Positioning Satellite Technology is becoming more prevalent, along with the ability to control or disable a train from a remote location



- Specific Skills Recommended for Highway Workers:
  - ◆ Management training: basic security training
  - ◆ Need for labor-management cooperation
  - ◆ There is a need for worker input and feedback on training components
  - ◆ Basic awareness of ICS
  - ◆ Knowledge and awareness of training opportunities
  
- Specific Skills for Railway Workers:
  - ◆ Awareness of situational terror targets, such as bridges, tunnels, and crossings
  - ◆ Training to resist profiling of public and coworkers (based on activities)
  - ◆ Awareness of signs and symptoms for workers on commuter rail and bus lines (smallpox, anthrax release)
  - ◆ Awareness training for workers at transfer points

### *Manufacturing*

The breakout session on training manufacturing workers for CBRNE weapons discussed a wide range of manufacturing enterprises. The group started with some basic premises: (1) While many workers were focused on biological threats, there was a need to focus on the vulnerability of the particular manufacturing enterprise as well, which in many cases might be chemical or physical hazards, rather than biological. (2) Not all workers have basic health and safety skills, but these are essential for addressing new threats. (3) The risk of chemical hazards in the workplace is always present. (4) Prevention should be emphasized, including facility design, plant access, and other engineering and systems controls. (5) There is a need for

guidelines and recommendations to remain up to date, particularly because standards are always moving; and (6) There is a need to “authenticate” training, to ensure that it is effective and that the training results in changes in behavior. The importance of effective communication at all levels of the organization was stressed. Several participants noted the OSHA Process Safety Management standard, particularly in its application to general manufacturing enterprises. It was noted that there is likely to be a need for updated safety equipment, based on the needs assessment and training recommendations. Because manufacturers are using a significant number of temporary employees and contractors, the training of these individuals was raised as a specific concern.

Several additional points were raised in the discussion. The HAZWOPER and Process Safety Management standards are very important parts of worker training for the first and second wave of responders, yet few companies have the Process Safety Management standard in place. The emergency response plan has to be integrated with community emergency plans and other appropriate organizations.

### *Emergency Response*

Emergency responders include firefighters, police, emergency medical service (EMS) personnel, and hazardous materials (HazMat) responders. They have applicable standards and guidelines, and there are also numerous training programs available (though not universally). Participants identified the following as specific knowledge and skills that different emergency responders might need in responding to CBRNE events:

- Law Enforcement
  - ◆ Awareness level HazMat /CBRNE training
  - ◆ Hazard recognition
  - ◆ Initiating the Emergency Response system

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The knowledge and skills that were identified as unique to particular emergency responders included:

- Law Enforcement Personnel
  - ◆ Isolation, quarantine, lockdown, and crowd control
  - ◆ Transportation corridors
  - ◆ Evidence collection and retention
- EMS
  - ◆ Patient symptoms
  - ◆ Call patterns
  - ◆ Self protection (PPE use and limitations)
  - ◆ Decontamination
  - ◆ CBRNE treatment protocols
- Fire Service
  - ◆ Extensive Incident Command System (ICS) training
    - Defining the chain of command
  - ◆ Hazardous Materials/CBRNE *Operations* level training
    - Defensive actions
  - ◆ Monitoring/detection devices
    - Recognition and identification of different threat agents

- ◆ Isolation zones and perimeters
- ◆ Communications
  - Functional across response and support groups
- ◆ Refresher training
  - Need to refresh basic hazardous materials (HazMat) skills, in order to effectively employ CBRNE skills
- HazMat
  - ◆ Should include all of the competencies from the fire service
  - ◆ Needs to include technician and specialist level skills that combine HazMat and law enforcement techniques
- Emergency (911) Dispatchers

The last category, emergency dispatchers, was singled out for discussion because of the central role these workers play in coordinating response among various services. This was a common theme sounded by several groups—that workers involved in communication had a particularly important role to play, yet they were not often included in the training for emergency response incidents.

### *Health Care*

The health care session focused primarily on defining health care training needs in hospitals. Even within the hospital setting, there are many different types of workers, in many different settings, whose specific training requirements need to be addressed. The core knowledge and skill requirements for preparedness identified by the participants included:

- General knowledge requirements for health care workers
  - ◆ Knowing both who to notify if a threat is identified and the person responsible for making the notification
  - ◆ Functional role in the health care setting
  - ◆ Role in the Emergency Response System
  - ◆ Awareness of the national and local “mutual aid” groups
  - ◆ Incident command structure
- General skills required of all health care workers
  - ◆ Computer and internet skills and electronic communications
  - ◆ Skills required for the worker’s functional role
  - ◆ Problem-solving skills

In addition to the general knowledge and skills related to preparedness that are listed above, there are specific knowledge and skills required for different health care workers confronting CBRNE threats:

- Specific knowledge requirements for all health care workers confronting CBRNE threats
  - ◆ Knowledge about the specific CBRNE hazards

- ◆ Communication to appropriate authorities
- ◆ The contents of the eight-hour HAZWOPER course
- ◆ Training on the recognition of post-traumatic stress disorder
- ◆ Full training for emergency room personnel on CBRNE hazards
- Specific skill requirements for health care workers responding to CBRNE threats
  - ◆ Cross-training
  - ◆ Experience with pre-planned CBRNE disaster response (exercises)
  - ◆ Integrated training of a “medical reserve corps”
  - ◆ Treatment of post-traumatic stress disorder

Participants emphasized the importance of resolving liability issues around training for CBRNE threats, and the need for rehearsal of disaster plans, and training on decontamination. The opportunities for learning from international partners were also stressed, and there was discussion of the need for multilingual training of this particular workforce. Finally, participants stressed that a culture change in hospitals is required; because emergency response is local, there is a need to train and empower workers at the lowest level of the hospital, and to have the leaders of health care institutions appreciate the importance and the need for training. Some participants noted that, in the drive for quality in health care, this could be a major issue, and that there would be a need for evaluation and practice following the training activities.

### *Skilled Support Personnel*

The skilled support breakout group identified a number of critical issues, in addition to the specific knowledge and skill requirements for skilled support workers: (1) Is there a role for certification or licensure of skilled support workers? and (2) Who should do the training, and should there be licensure of trainers? A number of participants felt strongly that workers must have specific training before commencing work, and that they must be certified to do their job if the potential exists for them to be exposed to hazards. Others felt that this is essentially impossible under the current lack of mandatory, enforceable, certified training standards across jurisdictions. This same thought was echoed across the concept of emergency response/rescue (with site-specific instructions) and long term response (where only contractors with appropriate qualifications are employed for this phase). The question raised was: at what point in the response is it appropriate for OSHA or another regulatory body to enforce standards? There was agreement that enforcement of training requirements on the site was necessary.

- Recommended Knowledge/Skill Requirements for Supervisors/Foremen/Stewards:
  - ◆ A minimum of the OSHA 10-hour course in terms of basic skills
  - ◆ HAZWOPER, PPE (especially respiratory protection), hazard communication, and decontamination procedures
  - ◆ ICS
  - ◆ Local/community emergency plans
  - ◆ Critical incident stress—a response to events
  - ◆ Emergency preparedness: site security, what skills or equipment may be needed, and where to get them
  - ◆ CBRNE awareness and risk communication. Supervisors should be able to communicate risk to workers

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- ◆ Personal health protection—not just regarding CBRNE agents, but other factors that could be dangerous, such as heat stress

It was suggested that training should include a description of the consequences of failure to adhere to proper procedures, perhaps through case histories. The need for refresher training was stressed, as was the need for site-specific training as soon as workers arrived on-site. The need for multilingual training was also stressed.

- Recommended Requirements for Skilled Support Workers:

- ◆ OSHA 10-hour course
- ◆ Respiratory protection and PPE training and fit-testing
- ◆ ICS
- ◆ Critical incident stress awareness/management
- ◆ Decontamination
- ◆ Personal health protection
- ◆ Site-specific training can come later

Participants also noted that, although computer-based instruction for the non-hands-on (knowledge) component of the work was suitable, it was not sufficient for the hands-on (skills) component of the workers' activities.



### *Decontamination/Remediation*

The decontamination/remediation group focused on workers who would be involved in decontamination or remediation of sites that had been exposed to biological, chemical, radiological, nuclear, or other weapons of mass destruction. It is important to note that all of the decontamination/remediation activities would be covered under the HAZWOPER standard, as mentioned earlier in this report. It was the goal of the group to go beyond the general requirements of the HAZWOPER standard to consider additional skills or knowledge that might be required of specific trades in specific circumstances. The group also discussed issues related to credentialing, a topic that has also been addressed in reports by the National Clearinghouse for Worker Safety and Health Training (see footnote 10). The group spent considerable time defining different categories of workers and exposures, and was able to draw some general conclusions about the types of training that would be involved for the workers. A large number of different personnel were considered likely to become involved, at some level, in remediation activities, including: line workers, supervisors, project managers, health and safety personnel, security, union representatives, medical/emergency response, transportation workers and employers, regulatory agencies, owners, public relations workers, insurers, volunteer agencies, engineers, and vendors.

- Knowledge Requirements for Remediation/Clean-Up Workers:
  - ◆ Transportation/disposal handling
  - ◆ Security at the remediation site
  - ◆ Familiarity with technology and equipment used in remediation activities
  - ◆ Regulations/best information/best management practices for remediation and safety
  - ◆ Stop-work knowledge
- Skills Applicable to Remediation/Clean-Up Workers:

- ◆ How to recognize and prevent cold/heat stress
- ◆ Decontamination practices—equipment/supplies, site, and workers
- ◆ Remediation methods
- ◆ Waste handling
- ◆ Engineering controls
- ◆ Evidence collection
- ◆ Practicing chain of command—stop work
- ◆ Monitoring—health, environment, and safety

Participants emphasized the need to address certain critical issues, including: training and pre-qualification of workers who would be eligible to go on-site; liability; and the “fear factor” present in dealing with contaminated sites. They also discussed the importance of daily safety briefings and regular safety inspections.

- Specific knowledge and skills for workers involved in chemical remediation (remediation of sites exposed to chemical weapons):
  - ◆ Process safety management (PSM)—reactive hazards
  - ◆ Compatibility
  - ◆ Remediation techniques
  - ◆ Hazard communication
  - ◆ Specialized personal protection equipment
  - ◆ Structural integrity changes

- ◆ Specialized environmental monitoring equipment
  - Long-term medical monitoring
- Specific knowledge and skills for workers involved in sites contaminated by radiation:
  - ◆ Monitoring—specific
  - ◆ Different PPE—based on dose “as low as reasonably achievable” (ALARA)
  - ◆ Remediation practices for heating, ventilation, and air conditioning equipment
  - ◆ Use of robotics
  - ◆ Broad area of remediation—indoor vs. outdoors
  - ◆ Knowing if there are pre-qualifying doses for workers who have previous exposures and how much prior exposure should be allowed before they are unable to work on a decontamination project
  - ◆ Disposal/transportation
  - ◆ Long-term security issues
  - ◆ Specific decontamination procedures
- Specific knowledge and skills for workers involved in sites contaminated by biological agents:
  - ◆ Infectious vs. non-infectious agents
  - ◆ Lack of knowledge of agents
  - ◆ Vaccines/antibiotics
  - ◆ Long-term monitoring/diagnoses

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- ◆ Pre-qualification—medical—eliminating the work force
  
- ◆ Hazards of remediation

The critical issue raised by the breakout session participants for this area concerned training and pre-qualification of workers who might be called upon to respond in the event of a CBRNE event. Questions included the following: (1) Is there a need for comprehensive training requirements across groups of workers at the remediation stage? (2) Who provides the training? (3) Who develops the substantive content of the training? A related question involving the medical pre-qualification requirements of trainers was discussed but was not explored in depth by the group.

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