

NIEHS WETP

National Clearinghouse for Worker Safety and Health Training

The Nation's Forgotten Responders

Recent Report to NIEHS Finds Significant Training Gap for Skilled Support Personnel

Construction Trade Personnel Are at Risk If Called Upon to Respond to Incidents of Terrorism or the Use of Weapons of Mass Destruction

For Immediate Release
January 3, 2003

Contact: Bruce Lippy, CIH, CSP
Director, National Clearinghouse for
Worker Safety and Health Training
(202) 331-7733
blippy@michaeldbaker.com

Current safety and health training requirements for “skilled support personnel” – a term used by OSHA for the construction trades needed during disaster responses – are insufficient to protect these workers during responses to weapons of mass destruction (WMD) incidents, according to a report released in December by the National Clearinghouse for Worker Safety Health and Training. The report, commissioned by the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP), contains recommendations for improving current federal training requirements for skilled support personnel, and examines the feasibility of a national registry of trained workers that could be used by emergency management organizations during future responses.

Improving the Training of Skilled Support Personnel for Responding to Terrorist Actions: A Review of the Problems and Feasible Solutions focuses on training needs for “skilled support personnel” (SSP) – a worker population that includes heavy equipment operators, truck drivers, iron workers, carpenters, and laborers – many of whom worked at the World Trade Center site for months. The lessons learned from the WTC site, the study suggests, necessitate a review of current OSHA training requirements for these workers and argues against their current status under the OSHA standard as merely “temporary workers” at emergency response sites.

“As a member of a team performing exposure assessments of heavy equipment operators at the World Trade Center site, I saw first-hand the inadequacies of the training for skilled support personnel,” said Bruce Lippy, Director of the National Clearinghouse and co-author of the report. “Subsequent studies by Mount Sinai Medical Center have indicated that over half of the 2,500 workers they have screened as of November 25, 2002 are still suffering respiratory symptoms. This indicates a real need for better training of these worker populations: we can give them more than the three-hour training we provided three months after the attack.”

The report contains significant conclusions, developed as a result of a five-month review conducted by the National Clearinghouse for Worker Safety and Health Training, which involved agency and current NIEHS WETP grant recipients, skilled support personnel populations, and local and state-level emergency management organizations:

- Current training requirements for SSP under OSHA’s hazardous waste worker standard (HAZWOPER) only mandate “awareness training” of unspecified duration, which is not sufficient to protect construction workers during responses to WMD incidents.
- The OSHA HAZWOPER 40-hr general construction worker course should be required for SSP, and should be supplemented with trade-specific training for responding to acts of terrorism.
- Training requirements for SSP must differentiate between pre- and post-incident conditions.
- A national registry of trained SSP should be pursued further, and must include consideration of the communications links between such a registry and local emergency management organizations.
- Greater focus on prevention is needed to minimize the consequences for all worker populations – including SSP, emergency responders, chemical and transportation workers.
- All terrorist incidents start as local events, and it is therefore critical that local incident commanders be aware of safety and health protections for skilled trade workers who respond to an incident. Likewise, SSP need to be trained about the incident command structure (ICS) so that they may work more effectively at a response site.

This report represents the latest in a series of studies undertaken by the federal program to assess training needs for various worker populations involved in response, recovery and cleanup operations to WMD incidents. Representatives of the WETP conducted the first safety and health training assessment on the WTC site. Awardees of the program subsequently developed and delivered the official 3-hour safety and health awareness course on the site, in addition to conducting respirator fit testing. The program then released a report in August of this year, *Learning from Disasters: Weapons of Mass Destruction Preparedness Through Worker Training*, that identified several matters specific to worker training that should be considered in order to improve our nation’s response to actual WMD incidents. Each of these reports can be found on the National Clearinghouse for Worker Safety and Health website, located at <http://www.wetp.org>.

About the NIEHS WETP - The NIEHS WETP was created in 1987 by Congress as part of the Superfund Program to support the development of a network of non-profit organizations that are committed to protecting workers and their communities by creating and delivering high-quality, peer-reviewed safety and health curricula to target populations of hazardous waste workers and emergency responders. Through NIH grants, the WETP awards cooperative agreements to support the development of curricula and training programs throughout the country to help employers meet OSHA requirements under 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

About the National Clearinghouse - The National Clearinghouse for Worker Safety and Health Training is the centralized distribution point through which members of the worker education and training community can access technical documents and workshop reports, safety and health update information, and curricula produced by the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) awardees. <http://www.wetp.org>

Improving the Training of Skilled Support Personnel for Responding to Terrorist Actions: A Review of the Problems and Feasible Solutions



Bruce Lippy, Director
Kerry Murray, Manager of Research

National Clearinghouse for Worker Safety and Health Training
1250 Connecticut Avenue, NW, Suite 610
Washington, DC 20036
202-331-0060
www.wetp.org

Contract #273-FH-013264

December 14, 2002

National Institute of Environmental Health Sciences
Worker Education and Training Program

Foreword

This document is primarily intended to inform the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) and its grantees about similar activities occurring in other governmental organizations. The goal is to facilitate better coordination of limited resources in protecting workers who may be called upon to assist this nation deal with the aftermath of terrorist attacks. This document also provides recommendations to NIEHS about providing the most appropriate training to a particular population of responders called “skilled support personnel,” the construction trades needed to move debris and transport critical supplies during an incident. This document was developed by the National Clearinghouse for Worker Safety and Health, under contract #273-FH-013264.

TABLE OF CONTENTS

Executive Summary	3
Background	7
Findings of the Review	11
Appendix A: WMD Training Activities and Research of NIEHS Grantees	17
Appendix B: Worker Safety and Health Policy and Training in Federal, State, Local, and Non-governmental Organizations involved in WMD Responses	28
Endnotes	37

EXECUTIVE SUMMARY

Purposes of the Review

The four purposes to this review are to:

1. Examine the issue of appropriate training for a distinct population of responders to terrorist actions: construction workers whose skills are needed to facilitate the rescue of survivors, recovery of bodies, and restoration of critical services;
2. Describe what governmental requirements and services affect the training of this population;
3. Explore the feasibility of creating a registry of appropriately trained and equipped construction workers and making it accessible to local responders; and
4. Suggest additional evaluations of other unique populations of workers at risk from terrorist actions.

This review grows out of an ongoing effort by the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) to protect workers responding to terrorist actions. NIEHS began this support at the World Trade Center on Sept 22, 2001, when the program sent a team of experts to Ground Zero to assess the training being provided to workers at the site. This six-day assessment resulted in a report¹ that served as the basis for a WETP National Technical Workshop held on April 25-26, 2002, to define appropriate training to protect workers during responses. The report from the workshop, "Learning from Disasters: Weapons of Mass

Destruction Preparedness Through Worker Training," provided numerous recommendations for improving worker training and preparedness for disaster responses.

The next step, this review, was to examine the feasibility of providing the recommended training and ensuring that emergency management organizations were able to access these trained workers through a national or regional registry. The review officially commenced on August 15th, 2002 with a meeting of an NIEHS focus group of awardees who had received supplemental funding to develop worker training specific to weapons of mass destruction (WMD) incidents. A smaller working group was formed to technically review the draft reports. Members of the working group also facilitated breakout sessions at the October 26-27, 2002 conference, "Worker Training in a New Era: Responding To New Threats," which was sponsored by Johns Hopkins Bloomberg School of Public Health.

Methods

Directed informal interviews were the primary research tool used in this review, coupled with extensive document review by the staff of the National Clearinghouse for Worker Safety and Health Training. Discussions were held with representatives from key federal organizations including the Occupational Safety and Health Administration, the National Institute for Occupational Safety and Health, the Federal Response Team, and the Environmental Protection Agency. Interviews were also conducted with state representatives from Maryland, New Jersey, and Kentucky. The head of the

Occupational Safety and Health State Plan Association (OSHSPA) and representatives of the South Baltimore Industrial Mutual Aid Plan, a local organization that coordinates emergency responses to incidents in heavily industrialized South Baltimore, were interviewed. Union officials from several construction building trades councils were also interviewed to get the perspective of organized labor.

This review is focused primarily on construction workers because they are a population that has not received sufficient attention in WMD training. At emergency responses, these workers are considered “skilled support personnel” by OSHA under its hazardous waste worker standard, 29 CFR 1910.120. They are required to receive only “awareness training” of unspecified length because of their perceived temporary status at the emergency. At the World Trade Center, these “temporary” workers, including heavy equipment operators, truck drivers, iron workers, carpenters, and laborers, toiled daily in the smoke and dust for months. Other populations - such as hospital workers, fire fighters, and chemical plant workers - are also at risk and will be addressed in future NIEHS reviews, but skilled support personnel are a seriously neglected population.

The Role of NIEHS in WMD Training

Under extraordinarily difficult circumstances, instructors participating in the Worker Education and Training Program developed and delivered the curriculum used to train all workers at the World Trade Center (WTC) cleanup site. These instructors are part of an extensive,

national network that represents not only one of the largest pool of workers trained to handle hazardous waste, but also the most viable mechanism for providing training to workers who must respond to terrorist actions. The current WETP awardee infrastructure “provides a rapid, effective, and proven means through which to provide terrorist incidence response training to this national cadre of response personnel.”²

Since the initiation of the WETP Hazardous Waste Worker Training Program (HWWTTP) in 1987, the NIEHS has developed this network of non-profit organizations to deliver high-quality, peer-reviewed, safety and health curricula to target populations of hazardous waste workers and emergency responders across the country. Throughout the past fifteen years, the NIEHS has successfully supported over ninety different institutions that have trained over one million workers across the country and presented nearly 56,000 classroom and hands-on training courses.

This network - as detailed in Appendix A of this report - has already created and delivered many specialized training programs on WMD responses to those workers who are most likely to be called upon by this nation to respond. The number of individuals requiring this training has recently been described as “staggering” in a Federation of American Scientists report that pointed out that there are over 1 million firefighters, more than 800,000 full-time employees in local police departments and sheriffs’ offices, 700,000 physicians, and 2.7 million nurses in this country.³ These estimates do not include the 6.5 million skilled construction workers who could be called upon to help cleanup a disaster.⁴

Conclusions

The following conclusions represent the consensus of the NIEHS working group and the results of the numerous interviews and document reviews.

1. The OSHA requirement found in the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation, 29 CFR 1910.120 (q)(4), requiring that skilled support personnel be trained with an awareness program is not sufficient to protect construction workers during responses involving weapons of mass destruction. No other federal or state governmental organization provides sufficient protection for skilled support personnel, as detailed in Appendix B.
2. The OSHA HAZWOPER 40-hour general site worker course should be the required course for skilled support personnel, and should be supplemented with trade-specific training for responding to acts of terrorism.
3. Plans for training skilled support personnel must acknowledge the difference between pre-incident and post-incident conditions. Shorter, more specific awareness training, focused on critical survival skills and capable of being delivered just prior to entry into a response action will undoubtedly be

necessary. The OSHA certified construction safety training could prove to be a more valuable model for post-incident training than OSHA HAZWOPER.

4. The concept of a registry should be pursued further. It was unclear whether the registry should be established for trained individuals, for firms or unions with appropriately trained members, or some other arrangement. It was clear, however, that the communication link between a registry and the emergency management organizations that would use it will be of paramount importance and will most likely occur at a local or regional level.
5. Greater focus on prevention is needed. OSHA's Process Safety Management standard (29 CFR 1910.119) can serve as an excellent vehicle for reducing risks at chemical plants, for instance. Preventing or minimizing the consequences of terrorist actions with toxic, reactive, flammable, or explosive chemicals protects not only chemical workers, but also transport workers, emergency responders, and skilled support personnel needed to contain the damage.
6. All terrorist incidents start as local events and local incident commanders are, therefore, key agents for assuring the protection of skilled trades who arrive to support the response. Interviews indicated that these incident commanders need to be better informed about the importance of construction safety and health during a response. Funding needs to be provided to ensure they can adequately protect the

workers they direct during any incident.

Additionally, skilled support personnel need to be trained about the incident command structure so they can work more effectively – and safely – assist with the response action.

Recommendations

1. NIEHS should develop guidance for the trade-specific training that skilled support personnel need to respond to disasters.
2. NIEHS should work closely with other governmental organizations pursuing similar goals to ensure a coordinated effort. Developing a more appropriate definition of skilled support personnel would be an excellent goal.
3. NIEHS should conduct further research on the form and implementation of a registry of trained skilled support personnel.
4. NIEHS should examine the worker safety and health training issues associated with populations in the industrial sector who may be victims of terrorist attacks.

BACKGROUND

WETP Training Programs for WMD

The Superfund Amendments and Reauthorization Act of 1986 (SARA) authorized an assistance program for the training and education of workers engaged in activities related to hazardous waste removal, containment and emergency response. The NIEHS Hazardous Waste Worker Training Program (HWWTP) enters into cooperative agreements with qualified domestic non-profit organizations with demonstrated access to appropriate worker populations and experience in operating model programs for worker health and safety training. Through the encouragement of multi-state, university-based consortiums and the development of national non-profit organizations which have focused on specific workforce sectors, the HWWTP has established technically-proficient curriculum materials and quality-controlled course presentations. These courses have been delivered to hazardous waste workers and emergency responders in every region of the country and have established new national benchmarks for quality in worker safety and health training. The program has also represented a major prevention education activity for NIEHS as technical, scientific, and basic research information is delivered to target populations with high-risk toxic exposures.

NIEHS began its efforts to protect workers during terrorist actions by sending a team of experts to the World Trade Center on Sept 22, 2001 to evaluate the training needs, as well as funding the

development of the initial course given at the site.

These initiatives led to a workshop on April 25-26, 2002 at which the participants arrived at a consensus on the following recommendations for key national decision-makers:

1. Occupational Safety and Health Administration (OSHA) guidance should be enhanced.
2. OSHA needs to update the policy under which the agency operates in declared disasters and OSHA must become an active participant in the National Terrorism Preparedness Program.
3. Response should be conducted in full compliance with the Hazardous Waste Cleanup and Emergency Response standard at 29 CFR 1910.120 and 40 CFR 311.
4. Transition should be timely from search and rescue to recovery, demolition, cleanup, and removal.
5. Appropriate protection must be planned for and provided to the rescue personnel.
6. Applicable worker protection standards must be enforced.
7. Command, control, communications, and coordination should be improved.
8. An effective injury/illness surveillance system should be established.
9. Skilled Support Personnel need better protection.
10. Training input needs to be continuous.
11. Rigorous peer review process should be applied.

The Report also recommended the following specific actions to the NIEHS Worker Education and Training Program:

1. Schedule periodic WMD initiative updates and coordination workshops.
2. Commission the development of a core pre-incident stress management training module.
3. Develop a specific action plan for WMD response Skilled Support Personnel training and availability.
4. Schedule monthly conference calls with all awardees engaged in the WMD preparedness initiative.
5. Undertake a dedicated effort to establish and maintain contact and coordination with other appropriate federal entities.
6. Establish a dedicated workgroup to develop criteria for an “information resource center” supporting the WMD initiative.

Relevance of the HAZWOPER standard to terrorist actions

OSHA’s HAZWOPER standard is the most applicable – and proactive – federal standard for protecting workers who respond to terrorist destruction. The standard applies to “emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.”⁵ Even though the standard was not applied at the cleanup of the World Trade Center disaster, experts representing NIEHS argued that it was appropriate because it provides a “comprehensive basis for the training of workers, medical surveillance, exposure monitoring, and worker protection levels.”⁶

Several key misunderstandings appear to have guided the decision at the World Trade Center to ignore the OSHA HAZWOPER standard. New York City officials appear to have believed that lower Manhattan would have inevitably been declared a Superfund site if the HAZWOPER standard were enforced. The truth is that many actions - such as underground storage tank cleanup – are covered under HAZWOPER but not under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). OSHA considered the recent cleanup of anthrax contamination as covered by HAZWOPER even though no one would reasonably call the Brentwood Post Office a Superfund site. Another concern expressed at the site was that HAZWOPER would force workers into overly protective garments and respirators, slowing down the work and jacking up the price. The truth is that HAZWOPER only requires that the level of protection be commensurate with the level of hazard, as determined by an assessment of the risks. Most of these key practices of HAZWOPER – such as creating a site-specific health and safety plan, establishing zones of control, training workers, and decontaminating personnel and equipment – eventually became part of the procedures at Ground Zero. But they arrived slowly and unevenly. Unlike the HAZWOPER requirements, personal decontamination was never mandatory at Ground Zero and medical screening was not widely performed during the entire rescue, recovery, and cleanup.

There is, however, no ambiguity about whether HAZWOPER is applicable to acts of bioterrorism. OSHA’s official policy is that, “the release of anthrax spores into a workplace as an act of terrorism is an emergency

situation. Compliance with Hazardous Waste Operations and Emergency Response, 29 CFR 1910.120, is required for emergency response personnel responding to a possible anthrax release.”⁷ Additionally, the training subcommittee for the National Response Team (NRT) has endorsed HAZWOPER first responder operations level as the core competency for response to terrorism.⁸

Importance of addressing training of “skilled support personnel” for WMD

OSHA has specific requirements under 1910.120(q)(4) for what the agency refers to as “skilled support personnel.” The agency defines this group 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.

OSHA further indicates that while these workers are *not* required to meet the training required for the employer’s regular employees, they must be given an initial briefing at the site prior to their participation in any emergency response. This briefing must include instruction in the wearing of appropriate personal protective equipment

(PPE), what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer’s own employees must be used to assure the safety and health of these personnel.

These workers provided the overwhelming majority of labor hours at the cleanup of Ground Zero and the Pentagon. The actions of heavy equipment operators, iron workers, truck drivers, laborers, and carpenters who were responsible for moving the smoking, twisted debris out of the pile at Ground Zero directly affected the safety and health of all workers at the pile, including thousands of uniformed services personnel. They only received a three-hour briefing as a part of the official training, however, NIEHS trainers provided a series of courses in addition to the 3-hour training.

The common assumption prior to September 11th was that skilled support personnel would not be needed as quickly as the first responders – firefighters, EMTs, police – nor would their efforts require as much time. This has proven incorrect. Skilled support personnel showed up shortly after the first responders and stayed for months. At the one-year anniversary of the disaster, skilled support personnel were just beginning to be medically screened in significant numbers by the Mt. Sinai Medical School and Hospital. An informal report as of November 25, 2002 of the first 2,200 screenings indicated that over half are “still suffering from respiratory symptoms.”⁹ Preliminary results from a February 2002 pilot study of 97 ironworkers that had been at Ground Zero within 3 days of the disaster revealed that 64% had persistent cough and 52% had persistent rhinitis/sinusitis.¹⁰

The findings for the firefighters are quite sobering, as well. Approximately 90 percent of rescue workers experienced cough symptoms within 48 hours after the WTC attack. During the months after the attack, over 1,876 members required medical leave for significant cough and respiratory symptoms. Although some of these members were treated and returned to duty, over 332 firefighters had cough and other respiratory symptoms severe enough to require four or more consecutive weeks of medical leave. The majority of these individuals showed significant changes in their pulmonary function tests as well as cough complaints. Despite treatment, 52 percent of these individuals have not recovered sufficiently to return to full duty firefighting duties. It is estimated that nearly 500 members may have persistent respiratory disability.¹¹

There are a number of response-specific parameters that need to be considered in attempting to better define SSP:

1. SSP are *not* First Responders, generally considered to be Fire/HazMat, EMS, and Police.
2. The tasks required of SSP employed at an emergency response site will generally be different for each emergency response action.
3. The number of SSP employed at an emergency response site will be different for each emergency response action.
4. The Incident Commanders for emergency responses broadly assume that those SSP who aid in the response are skilled at their trade or craft.

5. SSP will generally be employed at an emergency response site for a relatively short period of time as “SSP.” Once the emergency phase has ended and transition to “cleanup” occurs, HAZWOPER training and operations in accordance with 29 CFR 1910.120 (b)-(o) is required.

1910.120(q)(4) is very general with respect to defining SSP and the extent to which they must be “briefed” prior to commencing work at an emergency response site. To better define SSP, it is useful to consider the tasks that SSP might be expected to perform in supporting an emergency response action. The response at the World Trade Center disaster provided a good perspective with regard to the range of tasks that would meet the OSHA definition of SSP. From that perspective, the following SSP “tasks” (as expressed in craft or trade terms) might be considered, although not necessarily all might be needed in a specific response:

1. Heavy equipment operators (Mobile wheeled or rail-mounted)
2. Crane operators (wheeled or rail mounted)
3. Heavy equipment/crane maintenance workers
4. Truck loaders/drivers
5. Riggers
6. Torch cutters
7. Carpenters
8. Laborers
9. Utility workers
10. Subway workers

11. Sanitation workers
12. Communication workers
13. Sheet metal workers
14. Asbestos abatement workers
15. Lead abatement workers
16. Decontamination workers.
17. Structural engineers who may be classified by OSHA as Specialist Personnel per 1910.120(q)(5), which are equally poorly defined by the Standard.

the knowledge that there is already a workforce of hundreds of thousands of workers trained to this level and current on the required annual refresher training – trained not just through the NIEHS but through hundreds of providers in the private sector. The recommendation is also made with the understanding that funding has been available from the federal government to provide this training at no direct cost to the individual or firm. The issue of lost labor hours is important, however. So, too, is the issue of additional funding, if this training is to be provided on a greater scale.

FINDINGS OF THE REVIEW

Appropriate training for skilled support personnel

The working group for this study came to the consensus that although the OSHA standard, 1910.120 only requires awareness training for skilled support personnel, the most appropriate level of training should be the 40-hour, General Site Worker training, found at 1910.120(e)(3)(i). This training, considered by the group to be the best foundation for skilled support personnel, needs to be augmented with training on weapons of mass destruction that is trade-specific, as many of the NIEHS grantees are now developing. This recommendation is congruent with the approach of the National Response Team, which encourages all emergency responders be trained to the Operations Level as defined by OSHA at 1910.120(q)(6)(ii).

The recommendation of the 40-hour course as the foundation for skilled support personnel comes with

A major caveat to the recommendation is that it assumes the training takes place prior to an incident. There also needs to be a mechanism to provide awareness training immediately after an incident that is short and focused on the most hazardous conditions. This will avoid the major problem experienced at the WTC response where months passed before the official training program was agreed upon and implemented. The Center to Protect Workers' Rights, a NIEHS grantee, was responsible for creating the first draft of training at Ground Zero, which envisioned a two-day program. Given the pace of the cleanup, there was tremendous opposition to a program of this length. Consequently, the final training module was 3 hours in length.

Learning from that experience, the Center is now developing an awareness course on DVD of only several hours in duration that uses interviews with workers at Ground Zero to prepare other construction workers for the greatest hazards they will face. The Center will be able to supply this awareness program to the

Construction Building Trades Councils across the country where 4,000 instructors who have been certified to provide construction safety and health training under the OSHA 500 program will be able to deliver the training quickly. The Center also recommends that the OSHA 10-hour construction safety course be considered as the basic training program for skilled support personnel if the HAZWOPER 40-hour course is not chosen as the foundation course.¹²

Common understanding and skills that all trades need to receive through WMD training were identified during the New Threats conference held by Johns Hopkins Bloomberg School of Public Health in October 2002. Essential elements of *knowledge* identified by conference participants include:¹³

- 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 Incident Command System (ICS) and the role it plays; and
- Knowledge of how communications systems work in the response to an emergency.

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

- The ability to recognize a threat or abnormal condition;
- The ability to access the emergency notification system;
- The ability to use personal protective equipment (PPE) safely and appropriately;
- The ability to use specific information resources and tools; and
- The ability to evacuate the workplace safely.

The importance of skilled support personnel receiving training on the incident command structure came up repeatedly during interviews. Conversely, members of the International Association of Fire Fighters expressed a need for fire fighters to receive cross training on some basics of construction safety so they are able to more safely interact with the trades on any disaster site.

National Registry of Trained Skilled Support Personnel

Existing registry models

Agency for Toxic Substances and Disease Registry (ATSDR)

There are existing registries that serve as valuable examples for the NIEHS effort. The Agency for Toxic Substances and Disease Registry (ATSDR), an environmental public health agency under the Department of Health and Human Services (HHS), will assist the New

York City Department of Health and Mental Hygiene in creating a registry of people who may have been exposed to the World Trade Center site, either from working, living, or cleaning up in the area affected by the disaster. The registry will follow the health of the 100,000 - 200,000 people exposed to substances emanating from the collapse and cleanup of the World Trade Center to help determine whether their exposure has any relationship to short- or long-term health problems they may experience.

The Federal Emergency Management Agency (FEMA) is providing \$20 million to HHS to establish the registry. Dr. Henry Falk, ATSDR assistant administrator, indicated that the agency is working in partnership with the New York City Department of Health to determine the details of the registry.

The San Francisco Emergency Management Service

The San Francisco EMS Section, in cooperation with the Mayor's Office of Emergency Services, and the Neighborhood Emergency Response Teams (NERT), provides San Francisco residents with the Disaster Registry Program. This program is designed to bring assistance to senior citizens and persons with disabilities in the event of a major disaster or local emergency. In such an event, program enrollees will be included in emergency response efforts by the Dept. of Public Health, in coordination with NERT teams. Assistance may range from simply checking on conditions to seeking additional resources during such events.

National Registry of Emergency Medical Technicians (EMTs)

A model that is noteworthy because of its size and scope is the National Registry of Emergency Medical Technicians, which began in 1970. The program examined over 750,000 EMTs in the last 32 years and currently has over 155,000 EMTs on the registry. The service is part of the EMT licensure process in 39 states.

There are four levels:

1. First Responders,
2. EMT-basic,
3. EMT- Intermediate, and
4. EMT –Paramedic.

State of New Jersey Emergency Management Registry

The most applicable registry effort is one coming to fruition in New Jersey. The NJ Office of Emergency Management is working with the emergency management coordinators from each of the 21 counties in the state to inventory the assets that are available – equipment, materials, and individuals – for disaster response in the state. The system is still under development but has several noteworthy features:

- Only standardized terms will be used to identify assets, avoiding a source of considerable confusion.
- All assets will be identified by GPS coordinates to enable responders to precisely locate what they need.
- Each asset listed will have a “shelf-life” to avoid the biggest problem of inventories: going out

of date. After a period of time, the computer will query the organization that entered the data to determine if the asset is still viable and located at the same location. A fire truck may only be evaluated once a year but a professional diver might be checked every 3 months.

- The entire database will be maintained on the Internet with password-protected access to ER organizations.
- The system will contain not only public assets but those of the private sector, much as the NJ Department of Transportation maintains contracts with private firms to plow snow.¹⁴

Feasibility of a Registry of Skilled Support Personnel

There was strong, if qualified, support for the idea of a registry of appropriately trained skilled support personnel, or the organizations that employ or represent them.

Howard Butt, the coordinator of the registry effort for the New Jersey Office of Emergency Management, indicated that his organization would be able to incorporate an SSP registry directly into their state-wide effort, as long as the information met their data requirements. He also strongly endorsed the idea of conducting fit-testing of the workers as part of the training and then providing them with the correct respirator. In his words, “The more you can put in up front, the better.”

Similarly, Keith Goddard, the past-chair for OSHSPA, indicated that the registry would be a “tremendous resource” for state governments where nothing similar exists.

Beyond the broad concept, specific details of the proposed registry introduced concerns. A representative from the Laborers International Union indicated that the turnover rate of their membership would make keeping a registry current exceedingly difficult. She argued for focusing on the communications link between the local union and the local emergency management organization.¹⁵ Representatives from the Baltimore Construction Building Trades Council endorsed the concept but stressed that for union workers, the effort would have to be mounted at the Local Union level. Without active support from the Business Manager at each local, they were not enthusiastic about the possibility of success.¹⁶

Craig Childress, the president of the South Baltimore Industrial Mutual Aid Plan (SBIMAP), indicated that a list of qualified individuals would not be nearly as useful to his organization as a list of member organizations that could provide the qualified manpower that was needed.

Discussions with emergency management personnel from four counties in Kentucky similarly revealed some misgivings. During the week of September 9, a total of over 80 individuals participated in these discussions. It was clear that most of the participants in the discussion were unsure about which government entity would be responsible for overseeing occupational health and safety of workers who are called to assist in a disaster. The general opinion was that safety would be the responsibility of the agency that employed them, not a separate agency. Some then noted that counting on an employing agency would be very problematic for volunteers who

respond, which is especially important in rural areas (e.g., volunteer firefighters, EMTs, etc.).

A fair number noted that effective prior training, coupled with available protective and other equipment, would be more important for protecting worker health and safety than oversight by any governmental agency, both during the emergency stage and later. A very small number said that in the “second” responder (cleanup) phase, the employer’s approach (training, PPE, equipment, etc.) would be critically important, more so than the role of any government agency. None of the participants knew of any document on how worker safety would be handled during a crisis.

On the issue of a registry, the reaction from the Kentucky officials was decidedly mixed. A fair number of individuals immediately responded that a registry would be very useful. Others, about equal in number but generally the first responder types in urban areas, said they already knew who to call for trained personnel (not only government agencies but a few private entities, including cleanup contractors), and that a separate registry was not needed. However, several people from urban centers disagreed, indicating that a registry for major cities would be valuable. A small number said that a registry of qualified *contractors* (for both emergency response and later response) would be more valuable than a registry of *trained personnel*. Finally, the Kentucky discussion participants were unsure how a registry would be maintained or made available.

On the issue of documentation of training, several NIEHS awardee organizations, including the Center to

Protect Workers Rights and the Operating Engineers National Hazmat Program, are piloting “smart” cards containing small chips capable of holding enormous amounts of information about the worker, including all of the training that is current, respirator fit testing information, assigned respirators, medical testing information, and security clearance. Given the enormous problems that were experienced with documentation at the WTC response, these cards hold real promise. The rights of personal confidentiality need to be balanced, however.

During discussions on the value of a registry among New York City union workers at a meeting sponsored by the New York Committee on Occupational Safety and Health on December 11, 2002, there was fairly strong agreement that the most useful form would be a registry of firms that could provide adequately trained workers. There was also serious concerns raised about whether this would be a voluntary registry or if worked would be coerced to participate.

Other populations at risk

During this review, which focused primarily on the risks to construction workers, it became obvious that populations of workers in general industry could also be at significant risk during a terrorist attack. As pointed out in a letter from three industrial unions, there are over 15,000 sites that produce chemicals that could be possible targets of terrorist attacks.¹⁷ David Ortlieb from PACE, Michael Wright from United Steel Workers of America, and Frank Mirer, from the United Auto

Workers further pointed out that, “The prevention and preparedness systems at chemical sites across the country need an unprecedented infusion of knowledge and skill related to prevention.”

A representative from the International Chemical

Workers Union stressed the importance of,

“addressing the clearly identified needs for pre-planning, vulnerability analysis and engineering/process design and control measures - all crucial steps in reducing the impact of any potential terrorist attacks. Such efforts have already shown their potential to reduce adverse consequences. Limiting the NIEHS study solely to addressing post event response unduly constrains the recommendations and the planning process for NIEHS, its grantees and others to whom this study will be sent. At a minimum, the feasibility study should therefore refer to the other important OSHA and EPA requirements (in addition to HAZWOPER) when addressing training for the threat of terrorist attacks (i.e. Subpart E, Egress, Process Safety Management and EPA’s Risk Management Planning rule).”¹⁸

APPENDIX A:

WMD TRAINING ACTIVITIES AND RESEARCH OF NIEHS GRANTEES

International Association of Fire Fighters (IAFF)

The International Association of Fire Fighters used their NIEHS funds to help rebuild the HazMat instructor losses to the Fire Department of New York (FDNY) as a result of the events of September 11, 2002. All 343 of the line-of-duty deaths from FDNY were members of the IAFF. Specifically, the IAFF lost three of its accomplished Master Facilitators and eleven local instructors from the FDNY Fire Academy. These deaths occurred at a time when 85 percent of the human and equipment resources of FDNY's special operations units were lost. The IAFF was able to:

- Identify more than 50 new instructor candidates from the various Special Operations Command (SOC) units of FDNY;
- Deliver two comprehensive, 32-hour, Instructor Training events; and
- Provide the training and course materials needed for each of the instructor trainees to return to FDNY and serve as HazMat instructors during both IAFF and FDNY training events. The focus of these events was on the delivery of First Responder Operations Level courses, the minimum level of HazMat competency required of all fire fighters.

The IAFF was able to determine a training regimen that will help FDNY deliver what is needed to rebuild its

HazMat response capability:

- Provide Technician-level Instructor Training so that FDNY instructors can deliver the highest level of training to their members;
- Provide four courses so the more than 80 FDNY technician candidates who were unable to complete the second, 40-hour, segment of their Technician training are able to do so;
- Provide 16 courses for the more than 300 FDNY Technicians throughout the City who are behind schedule on their refresher training;
- Deliver two, 80-hour, Technician courses in order to educate new members to help staff FDNY's HazMat Company 1 and Squad 288, the only two units in New York City dedicated to HazMat response;
- Provide twenty, 40-hour, Technician courses to rescue support companies throughout the City; and
- Educate up to 1,000 support units from all of the battalions in First Responder Operations Level training that provides specific emphasis on Chemical Protective Clothing (CPC) and decontamination techniques

Center to Protect Workers' Rights (CPWR)

As the safety and health research and training arm of the Building and Construction Trades Department, of the AFL-CIO, CPWR was dispatched in support of its affiliated Building Trades Council and its partnership with WTC site contractors. As a first step, CPWR met with the leadership of the Council and affiliated unions representing workers at WTC, as well as with principals

representing WTC site contractors. The Center then participated in initial planning meetings at WTC of all parties engaged on-site, including those with safety and health roles/responsibilities. Parties involved with worker safety and health at WTC included representatives of New York City's Department of Design and Construction (acting as owner and manager of the site), union safety and health representatives, prime contractor safety directors, OSHA, Liberty Mutual Insurance Co. (site workers' compensation carrier), firefighters, Port Authority representatives, safety equipment manufacturers, and other public/private organizations.

Based on the safety and health needs identified at these meetings, along with a review and written assessment of the WTC Site Safety & Plan, CPWR developed a 6-point proposal that was presented to all parties on behalf of the labor-management partnership. The proposal included the following recommendations:

- Develop, deliver, and certify a site-specific safety and health orientation program for all workers;
- Phase-in the OSHA 10-hour hazardous awareness training program for all workers, with additional training components to be developed as warranted by site-specific conditions, i.e., confined space training;
- Establish joint labor-management safety and health committees in each of the four zones, for the entire site, and on the leadership level;
- Create structure to ensure open line of communication between all parties with safety and health roles at the site;
- Implement medical surveillance programs for all WTC site workers; and

- Evaluate the effectiveness of WTC site worker safety and health activities.

Based on the proposal submitted, CPWR was asked to proceed with the development and delivery of a 3-hour WTC site safety and health orientation training program. With support of NIEHS supplemental funding, the worker training curricula was developed; a train-the-trainer program was conducted, where fifty-five union, employer, and government representatives were trained to deliver the worker program; a delivery mechanism was finalized; and over 1,200 workers were trained as of February 1, 2002.

Laborers-AGC

Immediately following the attacks on the WTC, Laborers-AGC and its affiliated training funds quickly responded to provide workers and worker training at the disaster site. Locals 78 and 79, with workers and staff located in Manhattan sent laborers to the site to begin the remediation process. Thousands of laborers over the next few weeks would remove debris and clean dust and debris from both Ground Zero and the surrounding streets and buildings. It immediately became clear that workers were in a highly hazardous work environment, both from potentially toxic dust and smoke, but also from the hazards associated with demolition sites. The Mason Tenders Training Fund in Manhattan provided on-site training, protective equipment, respirator fit testing, and medical testing when appropriate.

Laborers-AGC also responded quickly by providing respirators and hard hats through the NIEHS grant.

There was also a need for additional construction workers with training in environmental remediation and, in particular, respiratory protection. Under the NIEHS program, the Iowa Mobile Unit, the West Virginia Mobile Unit, and highly qualified instructors from the New York and New Jersey training funds were sent to conduct HW Operations courses. Five HW Operations courses were conducted under this program for 122 workers, accounting for 5,490 training hours. During training, special emphasis was placed on PPE, use of respirators, WTC site hazards, and hazard identification and response.

At about the same time, the anthrax mailings had also begun and a short module on anthrax was quickly developed with the help of the Laborers Health and Safety Fund of North America (LHSFNA). This module was included in the information provided to the WTC workers. Other new information provided during the courses included blood-borne pathogens, and references to organizations locally and on-site that could help workers with post-traumatic stress syndrome.

Through a Department of Labor grant, Laborers-AGC developed an anthrax remediation worker manual and is in the process of creating a CD-Rom version of this course. The course materials were extensively reviewed by scientists, physicians, health and safety experts, anthrax contractors, and government personnel from various agencies. This manual is regarded as the best, most comprehensive material currently available for anthrax remediation training.

Laborers-AGC is translating the anthrax remediation manual into Spanish and Polish. Many of the workers

(and a large majority in NYC) who are engaged in the ongoing anthrax remediation projects do not speak English. The predominant language spoken is Spanish, and Polish is also heavily used in the NYC metropolitan area. Workers must clearly understand all material to ensure their safety and health in the extremely hazardous anthrax contaminated job sites. Providing the training in their native language helps accomplish this.

Laborers-AGC has developed short modules on each of the following biological/chemical agents:

- Nerve agents (sarin, tabun, soman and VX)
- Blister agents (mustard and lewisite)
- Pulmonary agents (phosgene, cyanide, and chlorine)
- Biological agents (smallpox, botulism, plague, and tularemia)

The New York Committee for Occupational Safety and Health (NYCOSH) initiated a program to train 100 members of the Transport Workers Union, Local 100 in the 24-hour Hazardous Materials Technician course. The Transport Workers Union, Local 100 represents 2,300 members who were involved in the initial rescue and recovery efforts following the fire and subsequent collapse of the World Trade Center Towers. Their employer, the New York City Transit Authority, assigned 300 members to work at jobs around the World Trade Center area.

International Brotherhood of Teamsters

International Brotherhood of Teamsters (IBT) members involved in remediation activities at the WTC were primarily truck drivers. They were engaged in the transportation of debris off the WTC cleanup to landfills located in New York and New Jersey. Their largest need for training was for WTC site-specific information, especially regarding site hazards, decontamination procedures, emergency protocol, locations of first aid stations, and ingress and egress procedures.

Two instructors from the Eastern Region Training Center in Providence, RI assisted in presenting the 3-hour Site Worker Orientation Courses for WTC workers. For the period of December 3 through December 20, 2001 the Eastern Region Training Center assisted in 27 Site Orientation Courses in which approximately 974 WTC workers were trained.

Before participating in the Site Worker Orientation Courses, the instructors attended an 8-hour Train-the-Trainer Program developed by the Center to Protect Workers' Rights. By successfully completing the program, the instructors received their certification to teach the Site Orientation Course. The instructors provided appropriate responses to the questions and issues raised by the workers during the Site Orientation Course. The instructors also brought these issues to the attention of the appropriate parties during the site safety meetings.

National Puerto Rican Forum (NPRF) and consortium members

The Alice Hamilton Occupational Health Center, a non-profit occupational health and safety training organization and member of the National Puerto Rican Forum consortium, provided anthrax training to workers in a dozen facilities – including post offices - around the Washington, D.C. area immediately following the attacks. The center developed 18 anthrax-specific modules in English and Spanish. Further curricula development efforts are underway. The Center has been working on the student manuals for both the Emergency Response and incident cleanup training. Some of these products are available for review at www.alicehamilton.org/English/bioterror.html. The Center may also be coordinating bioterrorism training for the Los Alamos National Lab.

Another member of the National Puerto Rican Forum consortium, the Office of Applied Innovations (OAI), delivered training in biological hazards and weapons of mass destruction (WMD) in July and August 2002.

Two meetings with Kentucky's top officials were held in early June to discuss the planning and coordination of the WMD training schedule. A daylong single briefing for an audience of 75 to 100 on biological and chemical weapons was also held. NIEHS funds will be used to help the State of Kentucky prepare a protocol for handling calls from first responders about potential biological/chemical weapon attacks. This activity includes developing a decision tree or analytical framework to be used by professionals in a central headquarter-

ters who are contacted by phone by first responders who are trying to figure out whether they have an actual chemical agent or biological agent attack.

Operating Engineers National Hazmat Program (OENHP)

The International Union of Operating Engineers (IUOE) had a team of safety professionals and Industrial Hygienists from the union's National Hazmat Program at Ground Zero from September 17, 2001 through the official closing on May 30, 2002. The team collected over 150 samples of heavy equipment operator airborne exposures and provided over 11,000 respirators to anyone needing one at the site. The IUOE was the lead organization in delivering the 3-Hour Safety & Health Orientation class required for all trades at Ground Zero. By the end of March, 1,512 individuals had attended the mandatory three-hour safety and health awareness program.

NIEHS funds have allowed OENHP to initiate modules specifically geared to train heavy equipment operators to function as skilled support personnel capable of responding quickly and effectively to destruction of the magnitude seen at the WTC. These modules are being crafted with specific case studies from the WTC to redirect both the 40-hour and the refresher training away from normal hazardous waste site cleanup practices, as described in 1910.120(a) through (p), toward the requirements of the emergency response requirements found in (q).

The first pilot of these new training materials took place on June 26, 2002, during a master instructor refresher in Beckley, WV. At the end of the training, each of the 21 instructors were provided with a support package that included sampling data information, hundreds of WTC digital photos, and video footage.

On February 11-15, 2002, the OENHP conducted a WMD pilot training program. Approximately 20 West Virginia State mine rescue personnel who were also mine inspectors attended a 40-hour HAZWOPER class at the OENHP facility in Beckley, WV. The training included special modules on biological and chemical agents. The hands-on exercises, which are normally conducted at the Beckley facility, were moved to a location that enabled the class to participate in extremely realistic conditions. The hands-on exercise was held at the National Response Memorial Tunnel complex in Standard, West Virginia, off the West Virginia Turnpike. Inside this tunnel, disaster conditions can be approximated with numerous crushed cars, rubble, smoke, and even a subway station with a subway car.

The mine rescue teams were given the scenario of a large parking garage collapse, possibly the result of terrorist actions, that they were entering to search for survivors. As part of the HAZWOPER exercise, the teams wore Level B suits provided by IUOE, with which they had no previous experience. The teams wore their closed-circuit rebreather - respirators that they normally use in mine rescue. These units can provide up to four hours of air, rather than the 30 minutes normally experienced with open circuit SCBAs.

New Jersey/New York Hazardous Materials Worker Training Center

The New Jersey/New York Hazardous Materials Worker Training Center received supplemental funding to provide training and other activities in response to the disaster at the World Trade Center. The three agencies that received funding are the University of Medicine and Dentistry of New Jersey (UMDNJ) School of Public Health, the New York Committee on Occupational Safety and Health (NYCOSH), and the New York District Council of Carpenters Labor Technical College (NY Carpenters). Since September 11, 2001, the Center members have been actively involved in the response to the WTC disaster. In addition, the New Jersey State Police (NJSP) has participated by developing WMD training for hospital and other emergency personnel such as police and EMTs

The University of Medicine and Dentistry of New Jersey (UMDNJ)

UMDNJ has developed a relationship with the Port Authority of New York and New Jersey, and has provided many training courses for their employees and contractors. Immediately after September 11, 2001, UMDNJ was contacted to provide assistance at the WTC site. UMDNJ provided assistance and guidance on several issues, including toxicological data, environmental sampling strategies, odor suppression, rodent/insect control, how to handle human remains, and general site safety. UMDNJ staff provided input into the decision-making process as events unfolded, including the development of a WTC site safety and health plan, review of specific issues including confined space entry, environmental impact, blood borne pathogens, and odor suppression.

UMDNJ provided training for Port Authority employees in the eight-hour Emergency Response Awareness and eight-hour Emergency Response Operations courses. Each course was presented to Port Authority employees. Additionally, UMDNJ provided an awareness of anthrax hazards to members of the Ridgefield Park Fire Department and Mid-Bergen Hazardous Materials Team.

New York Committee for Occupational Health and Safety (NYCOSH)

NYCOSH received supplemental funding to provide assistance to workers affected by the disaster at the World Trade Center. NYCOSH developed written materials for workers and the lay public. The materials included a web page (www.nycosh.org) and fact sheets. NYCOSH has updated its website daily to include new information about health and safety issues associated with the World Trade Center attack. In particular, the website features several NYCOSH fact sheets and links to additional information including the following topics: asbestos, compensation, government resources, news, occupational safety and health resources, and psychological trauma.

NYCOSH provided industrial hygiene services, which included reviewing numerous industrial hygiene reports and sampling data to various organizations. Additionally, NYCOSH conducted several industrial hygiene walkthroughs and conducted sampling in buildings near the WTC, including the Stuyvesant High

School, the Center for Workers' Education, and the Community Resource Exchange.

NY Carpenters

The Health & Safety Staff of the New York District Council of Carpenters' Labor Technical College responded to the World Trade Center emergency recovery effort effectively and over a sustained period of time. What began as a primarily above-ground effort evolved into a concentration on the subterranean. The Carpenters implemented special training in shoring, confined space entry, and trench box operations because their members were involved in the effort to reconnect utility and communication networks (water, sewer, fiber optics, broadcast, etc.) in the "bathtub" of the WTC foundation after all of the debris was removed. Carpenters were, and continue to be, involved in shoring up existing subway tunnels and tracks under the razed area. Consequently, training in core drilling and the installation of tiebacks to hold the bathtub and shore up streets and underground supports to prevent collapse was also added.

Further, all Carpenters on the site were required to attend the special 3-hour site safety training designed by CPWR, and approved by the site Contractors. The Health and Safety Staff for the New York District Council of Carpenters' Labor Technical College were trained in a train-the-trainer course by CPWR, and undertook the task of assisting in the training of more than 1,200 workers at the Ground Zero site between Thanksgiving and Christmas 2001.

The New Jersey State Police (NJSP)

The New Jersey State Police (NJSP) has initiated its training program addressing Weapons of Mass Destruction Training for Emergency Responders. Since September 11, 2001, the NJSP has been actively developing and presenting courses to prepare emergency responders to effectively respond to WMD incidents. The NJSP oversees the operations of the New Jersey Urban Search and Rescue Team that conducted stabilization and recovery operations at the World Trade Center Site for three weeks beginning on the afternoon of September 11, 2001. Their experience at the site proved an invaluable source of information and experience.

The NJSP Domestic Preparedness / Weapons of Mass Destruction (WMD) Training Program is a comprehensive series of training modules designed to allow the participant to achieve the level of training appropriate to their response role. Those who participate or expect to participate in emergency response to WMD incidents are being offered training in the following courses. The four-hour Domestic Preparedness/WMD Awareness course was offered 116 times for 3,704 first responders. It provides participants with a general understanding and recognition of terrorism, defensive considerations for biological, nuclear, incendiary, chemical, and explosive incidents, and control issues associated with criminal activities. When an incident occurs, the student will be able to implement self-protective measures; secure the scene; make the appropriate notifications to local, state, and federal authorities; and assist in completing the transition from emergency to recovery.

The four-hour Domestic Preparedness/WMD Operations course was conducted 55 times for 1,819 first responders. It provides participants with a greater understanding of terrorism, defensive considerations for biological, nuclear, incendiary, chemical, and explosive incidents, and control issues associated with criminal activities. When an incident occurs, the student will be able to implement local emergency plans; secure the scene; complete appropriate notifications to local, state, and federal authorities; and take a more active role in the transition from emergency to recovery.

The 16-hour Domestic Preparedness/WMD Technician program was conducted twice for 60 Hazmat technicians. It is a combination of classroom lecture, tabletop and practical exercise. It is designed for hazardous materials technicians who may have to operate in a WMD scene. Lectures familiarize participants with terrorism, weapons of mass destruction, and the actions that may be applied in response to a terrorist incident. The course reviews basic technician level response principles and may serve as a refresher program for (OSHA) level 3 trained individuals.

The eight-hour WMD Operations for Hospital Staff offers training to hospital staff and Emergency Medical Technicians who may have to handle a medical emergency involving weapons of mass destruction. It deals with the defensive actions and the role and duties that they may be called on to perform when providing support for a hazardous materials team. As per a recent position letter from OSHA, the course will concentrate on personal protective equipment (PPE) and patient

decontamination and emphasize hands-on training over lectures.

The Hazmat/WMD Hospital Provider Operations (10-Hours) is an auditorium lecture course designed to instruct emergency department staff (including physicians, nurses and medical technicians) in the hazards associated with handling contaminated patients at the hospital during a WMD incident. The course was offered 8 times for 571 participants. It includes material identification, patient assessment, patient decon and care, and personal protective equipment. There are no prerequisites for this program.

Research Organizations

The following research institutions have been funded through supplemental awards from the National Institute of Environmental Health Sciences, specifically to address issues arising from the destruction of the World Trade Towers.

Johns Hopkins University

This program is building on work conducted immediately after the disaster. The objectives are to continue the creation of a registry of cleanup workers and to conduct an epidemiologic investigation of the potential relationship between health response and exposure for these workers.

Researchers are developing the cleanup worker registry to have access to information for follow-up health effects studies. The registry includes rescue, recovery,

cleanup, security, and medical and food service support personnel. Project investigators are conducting a more comprehensive health assessment survey on a group of disaster site workers to determine if working at the WTC disaster site is associated with an increase in adverse health symptoms. Additionally, extensive outreach activities will provide an opportunity for impacted workers to identify exposure and health concerns, to provide stakeholder input into the research program, to help design and implement effective risk communication activities, and to facilitate the communication of study results.

Columbia University

The Columbia University program is based on prior World Trade Center (WTC)-related research activities at Columbia's Environmental Health Center and its collaborators at Johns Hopkins and Mount Sinai as well as initial work carried out by Columbia's Children's Center for Environmental Health. The program's overall goals are to place WTC-related contaminant levels into perspective and to identify compositional tracers of WTC contaminant fluxes that can be used to identify and quantify the transport and deposition of WTC emissions.

In collaboration with Johns Hopkins on the Teamsters study, Dr. Chillrud and colleagues are developing a database of both pre- and post-September 11 contaminant levels in NYC. This overview will provide perspective on whether certain contaminants were significantly elevated above levels observed prior to the WTC

attacks. Efforts will be made to ensure that this database is accessible to researchers, government agencies, and the public. For certain WTC-related contaminants such as brominated diphenyl ethers and brominated dioxins/furans, little to no data exists for time periods prior to September 11. To obtain baseline levels, the investigators will perform additional air sampling and analysis after completion of the cleanup efforts as a proxy for pre-September 11 base line data for lower Manhattan.

Additionally, Dr. Perera and colleagues in the Columbia Center for Children's Environmental Health have been carrying out a study of 300 women and their babies to evaluate the potential effects of pollutant exposure from the WTC fires. The study is funded by the New York Times Company Foundation and the September 11 Fund established by the United Way and the New York Community Trust. This molecular epidemiologic study combines available monitoring and GIS data with biomarker data on exposure and assessment of fetal growth and development. The Center is collaborating with the Centers for Disease Control and with Lamont Doherty's CIESIN. NIEHS supplemental funding will assist the team in following the babies postnatally to monitor development.

New York University

Drs. Costa and Slechta from New York University are determining whether inhalation of WTC dust may cause alveolitis/bronchiolitis of the lower respiratory tract in the NY Fire Department (FDNY) members who were heavily exposed during and after the collapse. Small

airway disease or airway hyperresponsiveness is believed to be responsible for the new onset of respiratory symptoms experienced by the residents in the WTC area. Particulate matter (PM) samples of airborne and settled material that were collected around the WTC area in the days following the collapse are being characterized, and current air quality is being compared to the air quality immediately after the collapse. Finally, the scientists will assess the toxicological effects of samples of the settled PM collected at the WTC in animals with compromised health.

These projects will complement each other in developing critical information to assist federal, state, and local government agencies in health assessment and environmental remediation decisions.

Mount Sinai Medical School

The goal of the Mount Sinai School of Medicine program is to assess the health and environmental consequences of the attacks on the World Trade Center (WTC). The program includes two epidemiologic investigations—a study of pregnant women and their infant and a study of iron workers—an exposure assessment project and an outreach project to provide unbiased, evidence-based information and guidance to parents, families, pediatricians and policy makers.

This program is built on a partnership between Mount Sinai School of Medicine and Lamont-Doherty Earth Observatory. Mount Sinai is providing overall project coordination, direction of the epidemiology projects, and direction of the outreach program. Lamont-Doherty

is performing the exposure assessment project and the laboratory analyses of poly aromatic hydrocarbons (PAH) adducts for the epidemiologic investigations.

University of North Carolina

Investigators in the UNC program are assessing levels of PAHs in filter and dust samples gathered by EPA at ground zero since the WTC collapse. These measurements provide preliminary quantitative relationships among specific PAH compounds in the WTC debris. Correlation among these filter data, the dust and soil sample results, and the temporal and spatial distribution of PM₁₀ will allow researchers to gauge the potential exposures of the public to PAHs in the aftermath of this disaster.

Dr. Swenberg and colleagues are also conducting a limited pilot project, in collaboration with Hunter College in Manhattan and the State of California, to evaluate current exposures of NYC residents to particulate matter and VOCs. This study employs user-friendly air samplers that allow residents to monitor their own exposures to particulate matter and VOCs for two one-week periods during the next several months. Half of the participants live and work in Manhattan, close to the WTC site, while the other half live and work elsewhere in New York City.

Another line of inquiry involves spatiotemporal mapping of particle concentrations in NYC before and after the WTC disaster. The distribution of PM concentrations has been monitored for more than 20 years at stations in and around NYC and has been extensively

monitored since the WTC disaster. Using these databases, the researchers will utilize an advanced Temporal Geographic Information System to characterize the composite space/time distribution of PM concentrations and generate spatiotemporal maps that show air quality in NYC.

APPENDIX B

WORKER SAFETY AND HEALTH POLICY AND TRAINING IN FEDERAL, STATE, LOCAL, AND NON-GOVERNMENTAL ORGANIZATIONS INVOLVED IN WMD RESPONSE

This section is a review of key federal, state, and local organizations from the perspective of worker safety and health. This section includes interviews conducted with officials from some of these organizations. As will be noted, worker safety has not been given strong attention by some organizations. A recent review of homeland security training found that:

- The current training regime involves courses and exercises conducted by at least ten federal departments and agencies;
- There is little standardization, much duplication, huge gaps, and inadequate integration.
- There may be significant weaknesses in the nation's ability to respond to emerging threats such as nuclear or biological attacks, and
- New initiatives that focus on training multi-echelon, complex tasks are required.¹⁹

Federal governmental organizations

Homeland Security initiative

The administration's recent strategic report on Homeland Security pointed out that there are "too many

seams in our current response plans and capabilities."²⁰ The report pointed out that there are at least five different plans that govern the federal government's response to acts of terrorism:

- The Federal Response Plan
- The National Contingency Plan
- The Interagency Domestic Terrorism Concept of Operations Plan
- The Federal Radiological Emergency Response Plan, and
- A new bioterrorism response plan

The intent of the administration is to integrate these separate federal response plans into "a single all-discipline incident management plan." The unprecedented effort to combine numerous agencies into one department – the Department of Homeland Security - will greatly affect the role of all of the agencies listed below. Their current efforts, as they affect improving worker safety and health, are indicated.

Federal Emergency Management Administration (FEMA)

FEMA has been at the center of the federal government's response to terrorism. The agency provided significant support to the rescue and recovery efforts at the World Trade Center even though New York City officials never considered it necessary to officially shift the incident command responsibility to FEMA, as the federal government agency designated to take charge under the NRP. Consequently, the New York Office of Emergency Management's command center on Pier 92 was the heart of the response coordination. It was also, therefore, the lead organization in protecting the work-

ers involved in the cleanup, which it delegated to the New York Department of Design and Construction (DDC). FEMA would assume that role whenever the federal government is requested by state and local authorities to assume the incident command. The agency has extremely limited staff expertise in occupational safety and health, however, and would rely upon OSHA for assistance – as stipulated in the NRP. FEMA provided significant funding for the response and rebuilding efforts after the destruction of 9/11, expending, obligating, or authorizing nearly \$5.5 billion for a wide range of public and private relief activities.²¹

FEMA has been working admirably to build alliances with other federal agencies to ensure a more consistent and effective handling of worker protection in future responses. FEMA and the Army Corps of Engineers will be producing a guidance document for responding to acts of terrorism. To that end, officials from the two organizations met in September, 2002, in New York City with agencies and several contractors that had been involved in responding to the destruction of the World Trade Center and anthrax contamination incidents to discuss response issues. Current guidance - relating primarily to natural disasters, such as hurricanes and earthquakes – needs to be updated to deal with contamination, crime scene evidence, and human remains. Bill Irwin, a Corps official detailed to FEMA's new Office of National Preparedness, said the agency will create a response manual on the new threats that will be distributed to federal, state and municipal agencies.²² FEMA and OSHA officials have begun meeting regularly, including a planned summit meeting with NIOSH and

other agencies.

Environmental Protection Agency (EPA)

The EPA has been a key agency dealing with environmental disasters since its creation. This country instituted the National Oil and Hazardous Substances Pollution Contingency Plan in 1968 to be able to handle disasters like the Torrey Canyon tanker spill of 37 million gallons near England the previous year. This National Contingency Plan (NCP) was the first comprehensive system of reporting, containing, and cleaning up environmental disasters. It also established national and regional response teams. EPA heads the national team, which has given the agency tremendous experience in protecting emergency responders. There are several established response assets, including Federal On-Scene Coordinators and Special Forces, the latter dealing with specific hazards that a release may present such as radiation. The NCP can provide responses to all types of terrorism incidents and is responsible for a Nuclear, Biological or Chemical Domestic Preparedness Training Program.

The EPA also is a signatory to the Federal Response Plan (FRP), which was issued in 1992. The plan defines the mechanism and structure by which the Federal government mobilizes to provide assistance to state and local governments that are overwhelmed by major disasters or emergencies. There are 27 federal agencies signatory to the FRP. The FRP is based upon the position that state and local authorities handle most disasters and emergencies while the federal role is to provide assistance and resources. In a response, the FRP functions within a multi-agency incident commander system

not unlike that employed by local fire and rescue organizations. The plan includes twelve Emergency Support Functions to assist local and state response authorities. The EPA is the lead agency for the Hazardous Materials Annex, which is a support function for releases of hazardous materials, which include WMD.

As Christine Todd Whitman, the EPA Administrator, pointed out in her September 24, 2002, testimony before the Committee on Environment and Public Works, the EPA has led the National Response System (NRS) for over 30 years. The National Response Team (NRT), established by the NCP, consists of 16 Federal agencies with responsibilities in various aspects of emergency response to pollution incidents. The EPA serves as chair and the Coast Guard serves as vice chair of the NRT. Administrator Whitman told the committee that the NRT has an excellent track record for Federal, state coordination and was asked by the Office of Homeland Security (OHS) in April 2002 to be an OHS workgroup providing interagency policy coordination assistance on terrorist incident preparedness and response.

At the request of OHS, NRT is developing a Technical Reference Document for Determining Adequacy of Cleanup Following Incidents Involving Weapons of Mass Destruction. This interagency effort will identify existing standards and guidelines, processes and key Federal resources that will be used to determine when it is acceptable to reoccupy areas that have been decontaminated following incidents involving chemical, biological, radiological, nuclear, and explosive agents. The document will have major implications for the safety of

skilled support personnel.

The NRT's priorities in 2002 also include implementing its recommendation to the Justice Department from the Top Officials 2000 exercise that all responses to Weapons of Mass Destruction incidents utilize the Incident Command/Unified Command (IC/UC) structure such as the National Interagency Incident Management System (NIIMS). This will help ensure improved response management coordination at WMD incident sites. In 2002 the NRT published an ICS/UC technical assistance document and developed training policy encouraging ICS/UC use for Federal training grants.

The NRT also completed Anthrax and World Trade Center / Pentagon Lessons Learned Documents for use by member agencies and developed Anthrax cleanup technical assistance documents for use by planners and responders at all levels of government. Further, the NRT participated in the Coast Guard Gulf of Mexico Spills of National Significance Exercise in April 2002, which tested the national level command for a multi-jurisdictional incident. NRT projects for the coming year will be drawn from its Lessons Learned reports from the 2001 WMD incidents.

EPA has important roles in U.S. counter terrorism activities. EPA assists the FBI during crisis management in threat assessments and in determining the types of hazards associated with releases or potential releases of materials in a terrorist incident. As the lead agency for Hazardous Materials Response under Emergency Support Function (ESF) #10 of the Federal Response Plan, EPA also assists the Federal Emergency

Management Agency during consequence management with environmental monitoring, decontamination, and long-term site cleanup. EPA is the lead agency with regard to protecting the Water Supply Sector of the Nation's infrastructure. In the Nunn-Lugar-Domenici legislation, EPA was identified as one of the six key Federal agencies for assisting in the WMD training program for the nation's first responders.

EPA has more than 200 On Scene Coordinators (OSCs) at 17 locations throughout the country, who are ready to quickly respond to release notifications. OSCs are the Federal officials responsible for monitoring or directing responses to all oil spills and hazardous substance releases reported to the Federal government. OSCs coordinate all Federal efforts with, and provide support and information to, local, state, tribal, and regional response communities. EPA has two specialized Environmental Response Teams and a Radiological Emergency Response Team available at all times. Working through the National Response System, these teams and experts are available and trained to respond to incidents involving hazardous substances. EPA can also provide direction, coordination, and support on hazardous release situations as needed.

In the September 2002 Senate hearings, despite many accolades, it was also clear that the agency has critics who feel the EPA should have done much more for the community around Ground Zero in a much more timely fashion.

Occupational Safety and Health Administration (OSHA)

OSHA is a signatory agency to the Federal Response Plan (FRP), which was indicated earlier as one of several plans for the federal government to coordinate and apply the resources of the federal government to a disaster. Under the Stafford Act, FEMA serves as the primary coordinating agency for disaster response and recovery activities. The agency is specifically directed to establish disaster-specific safety and health guidance and policies for deployed personnel in cooperation with HHS, OSHA, and other agencies. It is important to stress that under the Federal Response Plan, OSHA is intended to provide assistance and advice only to other federal agencies - not to local governments. The OSHA standards are referenced in the FRP as being applicable even during an emergency.²³

OSHA's role under the FRP is to

“Make available safety and health specialists to provide safety-specific assistance to affected disaster response agencies as required by the Federal Coordinating Officer. Requirements may include safety consultation and training programs, air contaminant sampling and analysis, and other safety services preparatory to, during, and/or following disaster operations under the FRP.”

A conclusion from the April 2002 NIEHS workshop was that OSHA needs to update the policy under which the agency operates in declared disasters and OSHA must become an active participant in the National Terrorism Preparedness Program.²⁴ Specifically, the

1991 Policy (CPL 2.94) governing OSHA's role in national disaster responses needs to be reconsidered based upon the experience in the recent terrorist incidents. In fact, neither OSHA nor worker safety are even mentioned in the two recent terrorist incident planning guidelines issued by FEMA. Worker safety is assumed to be the responsibility of local authorities. The NIEHS workshop participants felt that OSHA should be the federal agency developing guidance for and providing assistance to local and state emergency planning and response organizations.

National Institute for Occupational Safety and Health (NIOSH)

NIOSH participated in a joint workshop with the Department of Defense and OSHA on March 10-12, 1999, to examine what respiratory protection would be necessary for workers facing biological or chemical terrorism incidents. This workshop provided a forum for 140 subject matter experts representing 63 different emergency responder, fire fighter, domestic preparedness, equipment manufacturing, federal research, and state and federal regulatory organizations.²⁵ This Workshop was the first endeavor by the sponsoring agencies to join with the emergency responder community to understand the issues regarding personal protective equipment for counterterrorism response.

One of the key findings was that responders felt obligated to follow OSHA and EPA regulations, as well as NIOSH guidelines. Some suggested that the solution was for NIOSH and OSHA to develop and coordinate a team of experts to address the protection issues associ-

ated with terrorism. Multiple OSHA and EPA regulations require a diverse set of emergency responders to provide NIOSH-approved respirators for the specific hazards.

Current NIOSH regulations contain provisions for approval of other respiratory protective devices (84.60b) and application of additional requirements deemed necessary to establish the quality, effectiveness, and safety of any respirator used as protection against hazardous atmospheres (84.63c). Also, NIOSH has authority to approve gas masks (84.110c) and chemical cartridge respirators (84.190b) for protection against additional unlisted gases and vapors. NIOSH is using these authorities to accelerate approval of CBRNE respirators for terrorism hazards.

Currently, NIOSH respirator standards are based on industrial and mining incident exposures. There are no current approvals for chemical or biological warfare agents. The U.S. military mask standards assume open battlefield exposures to biological and chemical warfare agents with clear escape paths and with an acceptable casualty rate. This philosophy does not apply to workers.

Center for Disease Control (CDC)

The CDC was closely involved in the response to the World Trade Center. The CDC is particularly involved with tracking worker injuries and illnesses through their DEEDS system. In any major disaster, however, the National Response Plan requires that the local entity receiving federal assistance take specific actions, including establishment of an injury and illness inci-

dence reporting system. The current system does not permit the clear identification of injuries or illnesses that meet the definitions of occupationally reportable injuries and illnesses in the OSHA record-keeping and reporting standards.

Department of Energy (DOE)

The U.S. Department of Energy (DOE) is responsible for the Radiation Response Team, as defined in the Federal Response Plan. This highly specialized team will prove critical in responding to explosions of “dirty bombs” that can spread radiological contamination. DOE has also developed many innovative technologies for cleaning up the nuclear weapons complex that can provide safer, more effective cleanup of the destruction from terrorist actions. Many of these technologies are remotely controlled so workers are taken out of direct exposure. Attempts made to introduce them at Ground Zero met with limited success because the agencies controlling the cleanup were not aware of these technologies beforehand and did not want to slow down the rescue and recovery to try robotic equipment that seemed too untried.

The DOE, however, has demonstrated the success of these technologies at numerous sites. The Operating Engineers National Hazmat Program (OENHP) has evaluated the safety and health aspects of over 50 of these technologies and found them to be generally safer than the older technology they are replacing. Through the OENHP, the department has created a Technology Safety Data Sheet for each of the technologies evaluated. These innovative documents transmit

key risk information about operating and maintaining a piece of equipment at hazardous waste sites and could prove quite valuable in training skilled support personnel to safely use technologies to handle acts of terror.

As an example, the oxy-gasoline torch is similar to the oxyacetylene torches that were being used at the WTC site, except it is fueled by a mixture of gasoline and oxygen. The gasoline tank may be pressurized either by a built-in hand pump or by an external source of compressed air. Liquid gasoline is safer to handle than pressurized acetylene gas. In its liquid form, gasoline will neither burn nor explode. Acetylene can burn even in the absence of oxygen, and will explode if subjected to high temperature, excessive pressure, or shock – all of which were present at the WTC site. The torches cut faster and more cost effectively, too. DOE has demonstrated several pieces of heavy equipment that can perform most of the demolition tasks required at the WTC while operated remotely, taking workers out of harm’s way. The NIEHS supports the active promotion of innovative technology for homeland security efforts.

Department of Defense (DoD)

The Army Soldier Biological and Chemical Command (SBCCOM) is a key part of the DoD efforts for WMD response. The command has more than 80 years of experience in testing chemical and biological materials, including protective masks and garments. This organization participated in the development of military standards and works with NIOSH to coordinate resources on respiratory protection.

The military is working with the Justice Department in an online training effort that could greatly support the NIEHS initiative to provide safety and health training to response workers. The Center for Domestic Preparedness (CDP) of the U.S. Department of Justice and the American Military University (AMU) have teamed to develop five online academic courses that comprise a new Weapons of Mass Destruction Certificate Program.²⁶ Designed for AMU's full-service distance learning platform, the courses are available to first-responder and homeland security communities across the country. The WMD Certificate Program courses are:

- Emergency Response to Terrorism
- Chemical, Biological, and Radiological Hazards
- Weapons of Mass Destruction Incident Command
- Federal Response to Weapons of Mass Destruction
- Regulatory Issues in Weapons of Mass Destruction Response

As background, the DOJ's Center for Domestic Preparedness trains emergency responders to deal with terrorist attacks involving WMD and incidents involving hazardous materials. The CDP can train approximately 20,000 students annually at its Anniston, Alabama site. AMU is a member of the American Public University System and has more than 10,000 students from all 50 states and 30 foreign countries.

Federal Bureau of Investigation (FBI)

The FBI is in charge of handling a terrorist action as a federal crime scene, which can have a direct impact on

workers at the site. The Laborers-AGC Education and Training Fund (Laborers-AGC) provided extensive training and on-site support to laborers working at the WTC site, which included facilitating coordination with the New York Police Department Criminal Division with respect to identification and recovery of evidence, as the WTC site was a criminal scene and laborers represented a majority of the workers on the ground during debris handling and removal.

State governmental organizations

State and local organizations have historically handled most disasters - such as floods, tornadoes, and hurricanes - and request federal assistance only when the scope of the destruction is beyond their resources.

There are nearly 3 million first responders at the state and local level.²⁷ There are multi-state organizations that are examining the issues of how best to coordinate state efforts in ensuring homeland security. The Western Governors Association issued a policy on Homeland Security that stressed supporting the President's efforts and the need to integrate and coordinate efforts across state and territorial boundaries.²⁸

The policy pointed out that each state must create systems that are interoperable with other state and federal systems and can maintain essential services in the event of natural disasters or acts of terrorism. Areas of special concern include communications, creation of food security and health information networks, and approaches to ensure and protect citizens' identities from theft and prevent the issuance of identity documents to people who try to obtain them under false

names or identities. Unfortunately, protection of workers who will handle terrorist attacks is not addressed in writing by any state organizations.

According to Dr. Keith Goddard, the past-chairperson for the Occupational Safety and Health State Plan Association (OSHSPA), an organization covering the states that enforce OSHA regulations themselves rather than relying on federal OSHA, their organization has not yet addressed the issue of appropriate training for response workers. Individual states, however, have taken some initiatives. Maryland, for instance, worked out a consensus standard with the state firefighters that is more stringent on worker protection measures than applicable OSHA and NFPA standards.

The new standard has not been enforced, however, because of declining budgets according to Dr. Goddard, who is now the head of the Maryland OSHA program.²⁹ He also pointed out that the population at greatest risk is the eight million public sector employees who work in states that are covered by federal OSHA because these workers were excluded from protection under the OSHA Act. Many are covered through other mechanisms, but the most vulnerable are the volunteers, particularly firemen.

About half of the states have their own OSHA plans. Some states, like New York and Connecticut, have plans where the federal government is responsible for enforcing the regulations in the private sector but the state is in charge for government employees.

Local governmental organizations

Local governmental organizations are the decision-makers on the type and scope of response actions to terrorist attacks, calling in the federal government only if they cannot handle the response themselves. This has enormous implications for workers. Some areas have taken major strides in organizing for disasters. South Baltimore, for instance, is a high risk section containing major chemical plants and oil refineries. To better protect the public, the South Baltimore Industrial Mutual Aid Plan (SBIMAP) was formed in 1982 by the Baltimore City Fire Department and the chemical companies of South Baltimore. The organization has grown to 80 member organizations, 60 percent of which are private industry and 40 percent are public agencies.

This group has supplied members with emergency equipment and know-how, has developed emergency preparedness plans, and has promoted cooperation between industry, public agencies, and citizen groups. They have also distributed dedicated radios so that when a request goes out, it goes out to all members.³⁰ The organization maintains a database of assets similar to what the State of New Jersey is constructing. SBIMAP annually conducts large-scale disaster simulations to test their plans. The chemical plants are also working with federal agencies on homeland security issues and with the local emergency planning committee (LEPC).

Unfortunately, the success in Baltimore is not typical. There are more than 4,100 LEPCs across the country that were to be the backbone for state and local emergency planning, as envisioned in EPA regulations in the late 1980's. In 1994 and again in 1999, the EPA surveyed these committees to determine their current via-

bility. The apparent trend has been for an increasing number of LEPCs to become inactive after the EPA's 1988 deadline passed. As of 1999, only 24% of the responding LEPCs had revised their emergency response plans to incorporate counter-terrorism measures.³¹

• NFPA 472 – *Standard for Professional Competence of responders to Hazardous Materials Incidents, 1997 Edition and the recent 2002 update, which includes information for antiterrorism responses.* NFPA 472 and OSHA's 1910.120 are essentially the same.³²

Non-governmental organizations (NGOs)

National Fire Protection Association

The National Fire Protection Association has been active creating standards for appropriate respirators and protective garments for fire fighters. Two particular standards are important for response to terrorist actions:

- NFPA1981 - *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire Fighter*
- NFPA1404 - *Standard for a Fire Department Self-Contained Breathing Apparatus Program*

The NFPA has also defined the recommended practices for responding to hazardous waste incidents as well as the professional competencies needed by emergency responders. This latter standard is particularly germane to the NIEHS goal of defining appropriate training for skilled support personnel. The population of concern for NIEHS is not the first responders that NFPA has targeted, however. The experiences at the Murrah Federal Building, the Pentagon, and World Trade Center have shown that skilled support personnel enter these disaster sites very shortly after the fire fighters, medical personnel, and police arrive. The standards from NFPA that are referenced above are as follows:

- NFPA471 – *Recommended Practice for Responding to Hazardous Materials Incidents, 1997 Edition, and*

ENDNOTES

1. Elisburg, D. and Moran J. (2001, Oct 6). NIEHS Worker Education and Training Program (WETP) Response to the World Trade Center Disaster: Initial WETP Grantee Response and Preliminary Assessment of Training Needs. National Clearinghouse for Worker Safety and Health Training, Washington, D.C.
2. NIEHS. (2002). Learning from Disasters: Weapons of Mass Destruction Preparedness Through Worker Training. Report of an Expert Workshop.
3. Blackwood, V. (2002, May/June). Utilizing information technology to prepare the nation's responders to chemical, biological, radiological, and nuclear events. FAS Public Interest Report. Federation of American Scientists. Vol. 55.
4. U.S. Department of Labor, (2002, Dec.) The employment situation: November 2002. Bureau of Labor Statistic News. [on-line]. Available at: <http://www.bls.gov/news.release/pdf/empsit.pdf>.
5. 29 CFR 1910.120(a) Scope, application, and definitions.
6. Elisburg, D. and Moran, J. National Institute of Environmental Health Sciences Worker Education and Training Program Response to the World Trade Center Disaster: Initial WETP Grantee Response and Preliminary Assessment of Training Needs, Contract #273-FH-013264, October 6, 2001.
7. OSHA (2002). Occupational exposure to anthrax: OSHA frequently asked questions. [on-line]. Available at: <http://www.osha.gov/bioterrorism/anthrax/faqs.html>.
8. Kuczma, J. (2002, Aug. 7). Presentation at meeting of the National Response Team's training subcommittee. National Fire Academy, Emmitsburgh, MD.
9. Coluccio, V. (2002, Nov. 25). Email to WTC Medical Screening Program Executive Steering Committee.
10. Levin, S., et al. (2002, Dec.). Health effects of World Trade Center site worker. *American Journal of Industrial Medicine*, 42:545-547.
11. Kelly, K. (2002, Sept 24). Testimony before the Senate Environment and Public Works Committee. [Online]. Available at: http://www.senate.gov/~epw/Kelly_092402.htm.
12. Ellenberger, D. (2002, Sep 24). Personal communication.
13. Johns Hopkins Bloomberg School of Public Health (2002, Dec.) Worker training in a new era: Responding to new threats. Draft proceedings from a workshop held October 26-27, 2002 in Baltimore, MD.
14. Butt, H. (2002, Oct. 21) NJ Office of Emergency Management. Personal communication.
15. Herleikson, C. (2002, Oct 23). Personal communication.

16. Correll, J. and Coleman, J. (2002, Oct 11). Personal communication.
17. Ortlieb, D., Wright, M. & Mirer, F. (2002, Oct. 20) Letter to Joseph Hughes, Director Worker Education and Training Program.
18. Morawetz, J. (2002, Nov. 22) Written review of the draft feasibility report.
19. Carafano, J. (2002, 10/29). Homeland security and the trouble with training. CSBA Backgrounder Newsletter. [online]. Available at: <http://www.csbaonline.org>.
20. Office of Homeland Security. (2002, July). The National Strategy for Homeland Security. [Available online]. P.42.
21. Allbaugh, J. (2002, Sep. 24). Statement of Joe M. Allbaugh, Director of Federal Emergency Management Administration before the Committee on Environment and Public Works of the U.S. Senate.
22. Rubin, D.K. (2002, Oct. 7). FEMA and corps plan new guide for terrorism catastrophes. ENR.
23. Federal Emergency Response Agency. *Concept of Operations from the Basic Plan of the Federal Response Plan, April 1999*. [On-line] Available at: <http://www.fema.gov/r-n-r/frp/frpconc.htm> 3-21-02.
24. NIEHS. (2002, April). P.46.
25. Dower, J. (2002, June 27). Personal Protective Equipment for CBRN: The Latest from NIOSH. PowerPoint presentation given at Operating Engineers National Hazmat Program in Beckley, WV.
26. PR Newswire. (2002, Oct. 9). The Center for Domestic Preparedness And American Military University Develop WMD Certificate Program. Manassas, VA.
27. Ibid. p.ix
28. Western Governors Association. (2002, June 25). Policy Resolution 02-24, Homeland Security. Presented at the Annual Meeting in Phoenix, Arizona.
29. Goddard, K. (2002, Oct 22). Personal communication.
30. Childress, C. (2002, Sept 20). Personal communication.
31. OSHA. (2002, Fall). OSWER/ Profiling local emergency preparedness. Labor Union Health & Safety Task Force Update. 1-2.
32. Lamar, E. (2002, Sept 24). Personal communication.