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FROM SARA TO HOMELAND SECURITY: THE NIEHS WORKER EDUCATION AND TRAINING PROGRAM CONFRONTS CHALLENGES OF ENVIRONMENTAL CLEANUP

CRAIG SLATIN and MARY LEE DUNN

Abstract

Section 126(g) of the Superfund Amendments and Reauthorization Act of 1986 mandated the National Institute of Environmental Health Sciences to establish a grant program for the training and education of hazardous waste operations and emergency response workers. This program, originally established as the Superfund Worker Training Program, has evolved into the Worker Education and Training Program (WETP) and is currently in its nineteenth year of successful operation. Beginning with eleven awardees in 1987, it currently supports eighteen awardees that include more than one hundred organizations nationally. The NIEHS WETP built upon the lessons learned from earlier worker health education and training programs to establish a national worker health education intervention that has demonstrated the capacity of and potential for public health excellence. The principles and practices established as the program's foundation in its first five years are detailed, providing a basis for understanding how the program was able to take an active supporting role in response to the national disasters on September 11, 2001.

Two years after the World Trade Center imploded on September 11, 2001, the National Institute of Environmental Health Sciences (NIEHS) distributed \$14 million in grants to organizations focused on public health and research responses to the disaster, seeking, in part, lessons that might be learned for catastrophes that might follow. The Fall 2003 disbursement of the Department of Homeland Security funding aimed to build on efforts begun the day after the 9/11 attacks to determine what health effects had been suffered by emergency responders and residents near the trade center site. A portion of the money—\$5 million—was designated for health and safety training programs that support workers who respond to mitigate and control such emergencies in recognition of the view that life is invaluable, protecting the worker also protects the community, and uncontrolled releases may quickly worsen.

The training funds for this new initiative were distributed through NIEHS's Worker Education and Training Program (WETP), which was developed to protect workers whose job it is to deal with the ugly underside of economic activity—the toxic industrial and military wastes that came to public view in alarming headlines starting in the late 1970s. This article reviews the early history of the WETP's development and the national worker health education intervention that is in large part responsible for training that successfully

helps to protect the health and safety of workers who remediate or manage hazardous wastes and engage in emergency response to hazardous materials incidents.

THE MANDATE IN LAW

The WETP originated from the federal Superfund Amendments and Reauthorization Act of 1986 (SARA) [1], which required that NIEHS establish and administer a national grants program “for the training and education of workers who are or may be engaged in activities related to hazardous waste removal or containment or emergency response ... (SARA Sect. 126).” Labor unions were of paramount importance in securing the training provisions of SARA because of their growing knowledge of and concern about the hazards to workers’ lives and health from the toxics economy. Events were making clear the jeopardy for workers as the hazardous waste management and remediation industrial sector rooted itself in the marketplace: there were, for instance, Love Canal, where Hooker Chemical Co. dumped its wastes on land that later became contaminated housing for young families; a number of serious chemical accidents; and the EPA’s efforts to survey and quantify the extent of the nation’s pollution problems.

Staff and leaders at the AFL-CIO, the International Association of Fire Fighters (IAFF), the International Union of Operating Engineers (IUOE), the Laborers International Union of North America (LIUNA), and the International Brotherhood of Teamsters (IBT), manufacturing sector unions, and other unions coalesced around the need to train workers who had to work with, move, store, or otherwise deal with hazardous substances and emergencies involving toxics. The law also mandated that the federal Occupational Safety and Health Administration (OSHA) develop a standard to protect workers involved in hazardous waste operations and emergency response (HAZWOPER). OSHA published interim regulations on Dec. 19, 1986 [2] and proposed a final rule on Aug. 10, 1987 [3]. The regulation’s requirements became the basis for training developed by the WETP awardees.

NIEHS made its first funding awards for worker health and safety training in September 1987. Beginning with a program for Hazardous Waste Worker Health and Safety Training, it has expanded to now include additional programs for Minority Worker Training, Nuclear Workers, and Advanced Training Technology Development and Implementation. Since its start, WETP’s Hazardous Waste Worker Training Program awardees have trained more than 1.4 million workers in more than 77,000 courses at locations across the country. The grant program has distributed \$470 million to subsidize training that is offered now by 18 awardees comprised of more than 100 organizations. More than 17,400 courses have been provided to an additional 230,000 workers through 2004 through WETP’s other programs. The NIEHS’ evolving initiative has become the single most significant worker health and safety training effort in the history of the U.S. health and safety movement, in terms of operation, allocated monies, numbers trained, and program complexity. As a result of labor’s influence on its legal mandate and the direction provided by NIEHS, the training program grew as an extension of the theories and policies of worker health education developed and practiced by the worker health and safety movement between the late 1960s and 1987. Collaboratively, its participants have established benchmarks for worker health and safety training and greatly augmented the scientific literature about worker training. The program

has been viewed not simply as an occupational health education initiative, but as a broader public health effort whose structure and operations have conformed to the policies and procedures of the National Institutes of Health (NIH).

A PRECEDENT: NEW DIRECTIONS

If there was an historical precedent for the NIEHS' worker training program, it was OSHA's New Directions effort of the late 1970s under the leadership of Dr. Eula Bingham, a Carter appointee. A 1977 study for the Department of Labor had found, in the words of Basil Whiting, the man who organized the program, an "imbalanced and incompetent institutional context" [4] and had made the case for federal support of worker health and safety education. Field-based observers commented that Bingham likely viewed health and safety training as a way to make workers the eyes and ears of the fledgling OSHA as well as a vehicle to build a constituency for the agency.

New Directions made training awards to unions, employers, educational institutions, and other non-profit organizations, targeting high-hazard industries. Between 1978 and 1984, the OSHA program disbursed nearly \$57 million and trained 570,000 workers. The National Cancer Institute (NCI), National Institute for Occupational Safety and Health (NIOSH), and the Federal Emergency Management Agency (FEMA) also channeled monies through the program for their own training goals. Key elements included strong administrative support and development of a sense of collectiveness among the grantees. Programs that OSHA supported had peer review, peer training, emphasis on institutional competency, evaluation, innovations in educational methodology and materials, priority for instructor competence, and inclusion of labor-management relations and union rights [5]. Nevertheless, the Reagan Administration eventually severely reduced New Directions funds. Much of its approach to program and training was revived or adapted as NIEHS set up its own worker training under SARA.

GETTING STARTED

In 1986, Dr. David P. Rall, director of NIEHS, and Dr. John Dement, the new director of WETP, were supportive of labor's perspectives and goals on health and safety issues. Indeed, Rall had once worked with the AFL-CIO to support passage of the Toxic Substances Control Act and with several unions on asbestos-related health problems. Dement had worked previously at NIOSH and was responsible for internal NIEHS health and safety. Both men were sympathetic to the needs of organized labor, which had worked so hard to secure SARA's worker training mandates. Rall viewed the new effort as an extension of NIEHS' training for scientists and anticipated that this new effort would be costly but no more difficult. Denny Dobbin, an industrial hygienist and policy specialist who had had a series of positions through the Public Health Service, OSHA, and NIOSH, and had been a labor liaison within the EPA, also came on board to coordinate the effort with Dement.

Joseph "Chip" Hughes, WETP's current director, joined the WETP early in 1990 to help manage administrative and technical aspects of the program. Hughes brought extensive experience with labor and in community development education, organizing, research,

health education, and policy analysis. In addition, he had been responsible for implementing and evaluating a New Directions grant program with the Amalgamated Clothing and Textile Workers Union. His experience with a range of institutions and agencies enabled him to comfortably bridge multiple interest bases within the WETP.

In addition to program management, NIEHS required expertise on grants, contracts, and financial management. Dr. Anne Sassaman (now Director of NIEHS' Division of Extramural Research and Training) was recruited in July 1986 from the NIH Heart, Lung, and Blood Institute to direct external grant programs mandated in SARA. Within ten months, she solicited proposals and distributed funding. Carol Matheny came over from the National Institute for Arthritis to outline budgetary and administrative guidelines. Her duties included assessing financial management and evaluation systems for the grantees, and planning and development, both at NIEHS and for the grantees [6]. Importantly, both became astute in dealing with union awardees who had limited federal grant experience.

GATHERING INFORMATION FROM THE HEALTH AND SAFETY NETWORK

In designing the program's structure and operations, Dement communicated with health and safety educators in university-based labor education programs that had successfully used New Directions to establish health and safety training for workers and unions and considered whether they had an appropriate role in the WETP. He and Rall worried about the abilities of the unions to address the more technical issues related to hazardous waste and ER. Dement and Rall were concerned too about building NIH and NIEHS support for the program and believed success would be more likely if the awardees represented a mix of unions and university programs rather than unions alone.

VALUING COHESIVENESS

As they gauged the experience of New Directions, Rall and Dement came to realize that there might be political obstacles in the WETP's future and tried to build in protections against them. That sense of political jeopardy led them to strive to include both unions and academically based consortia among the first-round awardees. They also planned to foster cohesiveness among the grantee organizations; draw other federal agencies and officials in to the work of the WETP; and document the program's work by building an archive of research and other literature about the program and such training. The other top priority for both men was excellence in instruction and training materials. NIEHS officials repeatedly have ascribed the focus on excellence to commitments to public health practice and the prevention of worker illness and injuries; accountability to Congress and the EPA, whose monies, in a pass-through process, supported the program; a desire to demonstrate to employers the level of quality expected in complying with OSHA's training requirements; and their interest in developing a basis for scientific evaluation of the effectiveness of the training [7].

Rall and Dement believed that a training grants program could and should be organized to promote support from and cohesiveness among its recipients and to maintain close links with other federal agencies. In their view, New Directions had not been sufficiently

organized to develop that cohesive identity needed to sustain it during the Reagan years. Rall and Dement intended to structure the WETP in a way that would increase the potential for constituency-building as a vehicle for defending the program from possible future shifts in funding priorities.

Some of their strategies included national meetings for all award winners and moving some meetings to awardees' back yards; using the national meetings to share training experiences and build consensus about an approach to worker education; encouraging partnering among the grantees; and supporting interest networks, such as workshops aimed solely at grantees' trainers. Conflicts between the awardees sometimes burst into the open at national meetings when individual organizations updated their reports to the group. The awardees, after all, lacked a common set of political objectives, based as they were in different institutions and industrial sectors, and they had come together by obligation more than by shared interest. The WETP administrators accordingly walked a fine line negotiating between the concerns of union and academically based awardees and therefore purposefully worked to resolve disputes in open processes. Conflicts often reflected differences in strategies and institutional needs between the two grantee groups, who aimed to build programs to meet local needs in particular areas or industrial sectors rather than to strengthen a national movement.

DRAWING OTHERS IN

All along, Rall and Dement fostered relationships between the WETP and other organizations and agencies and their representatives. They conversed with stakeholders: unions, government, academia, non-profits such as COSHes (the network of occupational safety and health advocacy organizations that had been created around the country since the mid-1970s), and private industry. Dement was familiar with the public health literature as well as with New Directions and he was acquainted with professionals, scientists, academics, and labor representatives in the health and safety movement. He consulted experts from federal agencies involved in worker health and safety—i.e., NIOSH, EPA, OSHA, FEMA, and the Agency for Toxic Substances and Disease Registry (ATSDR), and met with industry representatives [8]. As the WETP got underway, representatives from these other federal institutions were invited to its annual meetings as presenters and guest observers, and some participated in WETP application and program reviews or on its advisory panels. WETP's leaders expected that familiarity, exposure, and inclusion would nurture respect for their goals, processes, principals, and methods.

START-UP CRITERIA AND STRESS ON EXCELLENCE

Rall and Dement chose strong criteria for selecting grantees and began to design the first request for applications (RFA) giving priority to excellence in curricula, instructional materials, and instructor competence. The RFA would address the needs of the building trades and firefighters and build on earlier federal support for health and safety training as established in New Directions. The NIH process for peer review of proposals and the NIEHS's emphasis on building program cohesiveness were incorporated [9].

As part of the pre-awards planning, in December 1986, Dement circulated a draft description of the WETP that stressed the language of SARA's Section 126, which required that grant recipients be nonprofit organizations capable of accessing the targeted populations and experienced in running worker health and safety training programs. Notice of a public meeting to be held for interested parties in January 1987 was published in the U.S. Federal Register. Target populations were to include workers engaged in:

- Waste handling and processing at active and inactive hazardous substance treatment, storage and disposal facilities;
- Clean-up, removal, containment, or remedial actions at waste sites;
- Hazardous substance emergency response (ER);
- Hazardous substance disposal, site risk assessment and investigation, remedial actions or cleanup by state and local personnel;
- Transportation of hazardous wastes [10].

Training programs would be required to satisfy requirements to be established by OSHA. NIEHS encouraged collaborative applications from multiple non-profit organizations and planned a three-day meeting soon after awarding the grants [10]. That meeting was viewed as critical for constituency-building by Dement, Rall, and others and specified seven criteria for the hazardous waste worker training program. They included capacity to access and train the targeted groups; successful worker training experience; a definition of the scope of the director's job that included quality assurance and evaluation; sufficient staff with specified technical expertise; adequate venues and equipment for training; satisfactory curriculum and training delivery plans; and an advisory board representing designated stakeholders that would meet periodically and confer with the director [10].

The criteria reflected the guidance and information that Dement and Rall had gathered in talks with federal and field experts. The need for strong programmatic leadership and staffing acknowledged the difficulty awardees would face in developing curricula and training for workers in an emerging industry whose hazards were not fully known. The criteria also recognized that the programs required sophisticated technical and scientific support, since the nature and health and safety impacts of many chemical components of hazardous wastes were far from known and not well understood. The work would be complicated since the potential existed for waste site workers to face diverse mixtures of chemicals, called "chemical soup" in the field. The depth of the proposal, prepared in such a short time, demonstrated the expertise that Dement brought to the program.

At the public meeting on January 12, Dement reviewed the program description. The grants would be for five-years' duration and annual re-application and renewal would be required. Proposals had to cover hands-on and demonstration aspects of training. NIEHS would require and facilitate coordination and sharing among the grantees, beginning with a meeting in North Carolina after the awards were issued to determine curriculum content.

Because they had worked to obtain the SARA mandates, the unions naturally expected to receive funding to train their own members and the competition for funding from university

programs became a point of conflict. As Richard Duffy of the IAFF said, “I, probably on more than one occasion during that meeting and afterwards, said ‘Hey, this wasn’t your gig. We pushed this through ourselves.’ I think everybody thought, ‘Why did we put it in NIEHS’” [11]?

Labor representatives worried when they eyed the number of university programs at the meeting and feared that NIEHS would fund them at the expense of labor efforts to build what it viewed as its natural constituency [12]. The language in SARA’s Section 126(g)(3) had been carefully worded by the labor representatives so that unions would be the most qualified applicants. They construed the requirements to be a “non-profit,” and “demonstrate the ability to reach and involve ... target populations of workers” to define unions as the most appropriate grant recipients. “It wasn’t necessarily viewed that it was going to be exclusively unions,” Margaret Seminario of the AFL-CIO said. “But there was a real sense that it had to be put in the hands of people who could actually reach folks” [13].

NIEHS published a program announcement and request for applications on Feb. 17, 1987 and received about 145 letters of intent; 78 applications eventually were submitted. Two review teams were organized, comprised of representatives of labor, industry, academia, government, occupational medicine clinics, ER organizations, and independent professionals, whose technical expertise was in toxicology, industrial hygiene, labor education, and hazardous waste management. Professionals and scientists who valued labor-based programs numbered about half of each team. The chairs were Dr. Frank Goldsmith, dean of the School for Labor Studies at the State University of New York’s Empire State College, and Dr. James Melius of the New York State Department of Health. The vice chairmen were Dr. Knut Ringen of NCI and Basil Whiting [14]. Dement and Melius collaborated on the final review criteria.

Fifty applications were reviewed; 22 of them were recommended for approval. Reviewers paid close attention to how each proposal related hazardous waste operations and ER activities to the criteria. The extent of an organization’s prior experience training workers and its previous development and delivery of hands-on technical training for workers were strong factors. The reviewers also considered the appropriateness of the proposed ratio of staff to students. The review criteria, when considered by a team strongly supportive of labor-based worker health and safety training, were central in establishing a fair basis for comparison of union proposals on the merits of their health and safety training programs and not against standards established for more academically oriented programs. The criteria also provided NIEHS with measures for program quality and excellence necessary to maintain NIH’s established high reputation [15].

The second-level review winnowed the field to 11 applications (see awardees list, p. 83), which received awards on Sept. 15, 1987. Five of them aimed at specific populations nationally. Five university consortia were selected, each with multiple member organizations. Consortia won awards and were encouraged for three primary reasons: to minimize duplication of curriculum development efforts; to expand the geographic and worker population coverage; and to reduce grant administrative costs [8].

AWARDEES' REACTIONS AND CONFLICTS

The level of funding for LIUNA, IUOE, and IAFF was considerably less than what the unions had anticipated from the program allocation of \$10 million that they had worked to secure. With the awards to university consortia, the building trades organizations had to share resources with programs that might even train non-union workers. The Firefighters were in a similar situation, since they had fought to win the mandate to protect and train firefighter hazardous material (hazmat) incident emergency responders. University consortia were funded to train other ER personnel, while the IAFF received less than the amount for which it had applied.

ROLE OF UNIVERSITIES

NIEHS funded the university consortia because reviewers understood that although the universities might not gain access to targeted workers as effectively as the unions could, those selected had developed strong track records for training workers in earlier efforts, especially under New Directions. In addition, the universities brought excellence in key areas: curriculum development, evaluation, and scientific and technical expertise, particularly on medical, chemical, toxicological, and radiation issues. Rall, Dement, and the review teams saw that these skills would be important for success. Several university consortia, such as the University of California's at Los Angeles and the University of Lowell's (now the University of Massachusetts Lowell), which included three New England COSH groups that had received New Directions funding, already had demonstrated success in developing participatory methods for worker training, which was important for the new program. Finally, the inclusion of the university programs was seen as a way to expand the program's political support, which was important in considering how to maintain the training over a long time period should it be necessary to encourage Congress to continue it [16].

BUILDING COHESIVENESS AND MUTUAL SUPPORT

The WETP awardees met regularly to discuss program experiences, curriculum and training delivery, and issues related to the regulatory and work site contexts of the effort. A meeting was held in November 1987 and a second took place in January 1988. Both focused on curriculum development and sharing resources to maximize the ability of all awardees to prepare for training delivery. The meetings allowed the awardees to become familiar with each other's intentions for program development, discuss common goals and objectives, and establish plans for curriculum development. The awardees had relative autonomy to develop their programs as they found appropriate, but NIEHS set priorities, such as use of participatory adult education methods, hands-on training, and establishing the WETP as a benchmark for training quality in hazardous waste operations and hazmat ER [15].

Curriculum was a contentious issue at the meetings. While the groups developed their own separate curricula, NIEHS encouraged a core set of topics. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, a federally produced book, along with OSHA's proposed rule for hazardous waste operations and ER, served as guides. Most

awardees developed their curricula to match the requirements of the OSHA rule, which was necessary since the rule mandated employer compliance with specific training requirements.

During discussion of medical issues of the training, the WETP awardees and administrators identified a strong need for appropriate procedures to "... prevent individuals at high risk of heart attack or stroke from jeopardizing their health during exercises in which they wear self contained breathing apparatus (SCBA), fully encapsulating suits, or both" [17]. Even for healthy individuals, working in the suits posed a significant risk for heat stress and heat stroke. A committee of individuals—occupational physicians, occupational nurses, and industrial hygienists—with responsibility for or interest in medical clearance or medical surveillance was formed. This early collective effort gave awardees a working context for collaboration and became the basis for a training manual chapter on medical surveillance in hazardous waste operations and ER.

ESTABLISHING SEMI-ANNUAL PROGRAM MEETINGS

Dement and Dobbin established a number of mechanisms to present technical and programmatic support to the awardees. They included semi-annual meetings to exchange ideas; collaboration on efforts to conserve and extend resources; and gradual development of a sense of cohesiveness among the awardees as part of a national program and a national health and safety movement [15]. Representatives of other federal agencies attended the meetings to promote increased awareness of the WETP. Their participation helped the awardees learn about other federal agencies and develop or strengthen relations with them. One meeting each year usually was held at NIEHS, but at least one was scheduled at or near an awardee's site. In this way, NIEHS fostered familiarity with each other's programs among the awardees [18].

In the early years, more often than not, conflicts between the awardees became evident at the meetings. The awardees represented different institutions and industrial sectors and did not have common objectives. Each intended to build a program that addressed its own unique needs and the needs of the workers in a specific geographical area or industrial sector. Awardees sometimes presented an aspect of their work that opposed the objectives of another awardee.

Midway through the program's second year, awardees discussed their evolving programs at a Monterrey, California meeting. The IUOE had developed 149 instructors and the OCAW had 26 worker-trainers. Both the Midwest and the California Consortiums had devised courses for training trainers. The IAFF had completed a set of seven high-quality training videos and six hundred slides. Awardees vigorously debated marketing and outreach efforts. Whether the programs had to sell their courses or promote them to gain access to the targeted workers, all faced the challenge of creating public and employer awareness of their efforts.

EVALUATION OF TRAINING

Dr. Rall and WETP managers insisted on evaluating the training, both to assess its effectiveness and as a quality control measure. They believed that evaluation research was

needed to raise the consciousness of health and safety professionals and regulators about worker health and safety training. In 1989, the Midwest and the New Jersey-New York consortia were funded to conduct evaluation projects. Their efforts included collecting information from trained workers about changed work practices and asked whether they talked with co-workers about the training program or attempted to make health and safety improvements in their workplaces. If the latter, they asked about the degree of success. This initial evaluation of the NIEHS training established some criteria used for much later evaluation.

EXPANDING THE PROGRAM

By the end of the program's second year, Congress acknowledged its successful startup phase and the need for additional resources with a \$10-million increase in funding. The action permitted expansion of some existing programs and inclusion of new awardees—bringing the total to sixteen, comprising 58 institutions. WETP's scope was broadened to target additional worker populations who are or may be exposed to hazardous wastes but had not been covered in the first set of awards.

MINIMUM CRITERIA FOR TRAINING

As the WETP grew, it became increasingly evident that it was developing excellent worker-oriented training programs. However, Dement and Dobbin worried whether training by non-grantees, such as employers, consulting groups, and other universities and colleges, was provided in accordance with the OSHA HAZWOPER standard. Such programs, Dement said, sometimes assembled "... 25 or 30 or 50 people in a conference room on a weekend and you hammer away, and you make a lot of money, and they come over with a certificate, and they are 'trained'" [19]. With OSHA's issuance of the Notice of Proposed Rule-Making for the Accreditation of Training Programs for Hazardous Waste Operations (29 CFR, 1910.121), NIEHS considered how best to use the experience and expertise of its awardees to encourage OSHA to establish "reasonably high benchmarks" [19]. The WETP wanted to help set market conditions in a way that demonstrated that it had authority on the issue. Its leaders visualized a "bottom-up" approach that could produce a pivotal model; they believed that when it came to public health for workers, labor's views ought to be included. In short, NIEHS acted from the belief that its awardees should help shape OSHA's rule.

Dobbin and John Moran, a technical expert with the Laborers-Associated General Contractors program, wanted the WETP to sponsor a technical workshop for awardees and guests to establish minimum criteria for HAZWOPER training so as to develop a document that OSHA would endorse and accept when it promulgated a training accreditation rule. They also hoped that, in Moran's words, the document "... might serve as a specification for employers who were purchasing training programs or developing [their own programs]" [20]. They wanted OSHA, other federal agencies, and employers to base their training specifications on NIEHS guidelines. They intended to produce a consensus document developed by technical representatives from a national network, and invited experts from industry, labor, government, and academia to participate in the process.

THE MINIMUM CRITERIA DOCUMENT EFFORT: SUPPORT FOR 1910.121

Moran and Dobbin have described elsewhere how the Spring 1990 technical workshop was developed by NIEHS and addressed its outcomes [20]. An ad hoc committee was established in Spring 1989 to steer and plan the workshop. A draft, or “straw-man” document, written primarily by Moran and Dobbin, was submitted to the committee for review, and a meeting of the planning group was scheduled for Jan. 4–5, 1990. Before that event, the Oil, Chemical, and Atomic Workers Union (OCAW) sent a letter about trainee testing issues to the committee members [21]. The first draft of the “straw-man” document called for training organizations to administer a closed-book, multiple-choice exam, and OCAW strongly objected to making the test a minimum criterion. OCAW stressed the importance of an “appropriate evaluation process” for all awardees, but believed that a multiple-choice exam would not be universally appropriate. The union offered revisions to “... ensure that our minimum criteria are both flexible enough to be relevant to every situation and rigorous enough to guarantee that only programs of the highest quality offer training courses” [22]. The statement demonstrated that NIEHS had facilitated a process that afforded opportunities for voicing opposition yet at the same time maintained its commitment to building cohesiveness.

Representatives of eight awardees attended the planning meeting. According to Moran, the most difficult issue facing the workshop was the position taken by OCAW on testing [23], but a range of other issues came up as well. Most of the committee was concerned that OSHA was not realistic in its description of the course material that providers would be required to present. OSHA had conceded to employer demands to establish a limited training course (24 hours instead of 40) for personnel who would be occasional site visitors and thus would be free of significant health and safety risks. Rather than set training criteria for such workers, the committee decided, it would write to OSHA to explain its objections. Another major concern was the appropriateness of using a written test to assess instructor competence [24].

The testing issue arose again during an “intense debate” about whether individuals or groups of trainees should be evaluated. Representatives of the Laborers, the IUOE, and the Midwest Consortium contended that “an individual trainee should attain a minimum level of knowledge and skill before he or she could be considered to have ‘successfully completed’ a hazardous material course” [24] and believed that trainees should exhibit a minimum level of proficiency by use of written examinations and/or skill demonstrations. OCAW, which emphasized group training throughout its program, argued for group learning that would be evaluated through instructor observation and anonymous pre- and post-course surveys. In the end, language was accepted that permitted both modes of evaluation.

Involving awardees and other key participants in crafting documents during the planning stage established a level of consensus even before the workshop took place. Working groups supplied sufficient support that the three-day workshop substantially completed the draft, and the revised “straw-man” document was widely distributed to awardees and external experts for their input [20] in preparation for the workshop. The workshop that convened on March 22–24, 1990 in Washington, D.C. represented successful implementation of NIEHS’

strategies to build a national constituency for health and safety training. NIEHS received strong awardee participation. The WETP challenged OSHA's and the EPA's weak support for HAZWOPER worker health and safety training, but OSHA continued to waver over its Congressional mandate to implement HAZWOPER training certification procedures. To date, only a non-mandatory appendix that details criteria for the training programs is in place. The appendix is based on the NIEHS minimum criteria but omits significant portions.

In anticipation of OSHA's hearings, NIEHS scheduled two meetings for awardees. The first was a Mini-Technical Workshop on Quality of Training Issues for Emergency Responders, held in Washington, D.C. on December 11, 1990. In a memo, Hughes told awardees that NIEHS wanted to develop a proposal "... for inclusion of ER training with the OSHA 1910.121 regulations." He framed questions about emergency responder training and solicited opinions from awardees. The second meeting was held in Cincinnati in February 1991. NIEHS had contracted with the Association of Occupational and Environmental Clinics (AOEC), a national network of occupational medicine clinics, to develop training modules on health effects. Although the awardees had produced some excellent materials, most saw value in having case-based modules developed by clinicians. The meeting's goal was to help AOEC develop general criteria for health effects curriculum modules for hazardous waste and ER worker training.

At the bottom of the meeting agenda which was distributed in advance, Dobbin had placed a note telling awardees that OSHA's hearings on the proposed accreditation rule would take place in Cincinnati the three days following the workshop. NIEHS had planned the meeting so that awardee representatives who intended to testify at the hearings could do so conveniently without a conflict. It was another example of the WETP's effort to build cohesiveness in the program so as to strengthen the national health and safety movement. The workshop itself showed how NIEHS integrated the efforts of occupational health professionals with those of labor in developing worker-oriented health and safety training. Nearly all of the awardees reviewed drafts of the hazardous waste training program accreditation rule that OSHA proposed on January 26, 1990. In July, OSHA announced a schedule for hearings on the rule for the week of October 2. The hearings were rescheduled twice, with final dates in January 1991 in Washington, D.C., and February 1991 in Cincinnati. Many WETP awardees presented written comment and oral testimony to OSHA about the proposed rule, as did NIEHS.

NIEHS submitted 34 pages of testimony with three appendices, including sections from the Minimum Criteria Document and a thorough review of the literature evaluating the effectiveness of worker health and safety training. NIEHS urged: coverage of all 1910.120 training programs in the accreditation rule (including emergency responder training); accreditation of annual refresher training; establishment of 40 hours of training as a minimum for all hazardous waste site personnel; incorporation of specific quantitative and qualitative measures of effectiveness, as detailed in the Minimum Criteria Document; incorporation of a peer review process; and use of the NIEHS Characteristics of Hazardous Waste Worker Training Programs, as stated in the original NIEHS program announcement, "... as minimum criteria for evaluating worker training programs which seek OSHA accreditation" [25]. Testimony and comment by the awardees generally addressed the issues

that were covered by NIEHS, as well as some others related to each industry sector or type of program offered.

DOCUMENTING THE WORK

The WETP's managers required annual reapplications from awardees. The mandate provided a mechanism for tracking the work and also promoted consistent focus and some level of annual review within each grantee group. The administrators also singled out the maintenance of trainee records as a priority concern for the training organizations.

Another innovation was the establishment in 1988 of a national clearinghouse of information about hazardous waste worker training which a review panel called "the most extensive, accessible collection of its kind in the country" and which can now be searched by computer. The Clearinghouse has organized two technical workshops annually since September 1989 to address topical issues and has provided technical support for training programs. The Clearinghouse maintains sets of curricula developed by NIEHS grantees and publishes weekly on-line information about the WETP program and issues related to HAZWOPER work and training. Its resources are not used only by the grantees; 40–60% of its requests come from private industry and the rest from unions, academics, and public officials. Its web site is at <http://www.wetp.org/wetp/>.

A 1995 review noted that the WETP had "made a substantial contribution to a more systematic, analytical and scientific approach to training program development, delivery and evaluation in terms of advancing the state of the art." It pointed to seven published program-related studies from 1988 to 1995. Said the panel: "This is no small accomplishment given the generally weak emphasis on training evaluation [nationally] in the past" [26].

5 YEARS AND BEYOND

By August 1992, a total of 12,647 courses ranging from fewer than eight hours up to eighty hours in length had been delivered to more than 285,000 workers nationally. By September 1992, the WETP had expanded to eighteen awardees, and by 1995 twenty programs were funded. In its 1995 Compendium, NIEHS provided profiles of the awardees indicating that several programs had established state-of-the-art training centers and union programs had trained worker-trainers as course instructors. All awardees were offering multiple-day training courses, each with at least 30% of course time devoted to hands-on activities. A particularly entertaining activity was the California Consortium's learning game, *Toxic Jeopardy*. Many awardees pushed the boundaries of participatory training activities by developing worker-centered or -oriented materials. By the end of the fifth year, nearly all of the awardees were engaged in comprehensive evaluation of their programs and training courses, and NIEHS had implemented a well-developed program of peer review of its awardees. By the end of 1992, the U.S. Department of Energy (DOE) and the NIEHS had agreed to jointly develop worker training programs for hazardous waste workers at nuclear weapons facilities. NIEHS has worked closely with the DOE in its efforts to remediate the nation's legacy of radioactive and chemical wastes from its nuclear weapons facilities.

In addition to hazardous waste cleanup and treatment, storage, and disposal operations, the program had successfully addressed the needs of workers with responsibilities for hazardous materials incident ER. A range of public and private ER workers were being trained, including firefighters, rail workers, and manufacturing and other industrial workers with in-plant ER duties. In addition, workers in public works departments and waste water and water treatment facilities, as well as other public facilities and institutions at which hazmat incident ER may be required, were participating in the training programs.

Several awardee programs had begun to focus on the needs of underserved worker populations. Spanish materials were developed and used in California and in training workers along the U.S.-Mexico border. Limited-literacy manuals were developed for blue-collar workers who had not finished high school. In 1995, the WETP established its Minority Worker Training Program (MWTP) with \$3 million of additional funding allocated by Congress to support training of young people from urban minority communities for work in the environmental industry. These programs represented a broad expansion of the activities supported through the WETP. The minority program awardees gave pre-employment job training that included literacy, life skills, and other training in addition to hazardous materials/waste remediation health and safety training. NIEHS has supported its awardees in addressing the training needs of workers laboring to redevelop Brownfield sites.

Sharon Beard, an industrial hygienist hired in 1995 to manage the MWTP, came to the agency with a wealth of environmental health science laboratory and field experience. Her graduate research had focused on technical and policy issues related to urban hazardous waste sites in a community of color—the Roxbury area of Boston. Beard's experience enabled NIEHS to extend its programmatic approach to work effectively with its new minority training awardees.

TECHNICAL WORKSHOPS AND CONSENSUS DOCUMENTS

NIEHS has continued to sponsor semi-annual technical workshops. The model established for the Minimum Criteria Workshop was used for a second workshop addressing the Minimum Criteria, but this time developing interpretive guidance to the original document. The goal was to create a consensus document that OSHA could use for promulgating its proposed accreditation rule or for an appendix to 29 CFR 1910.120. OSHA used the NIEHS Interpretive Guidance to the Minimum Criteria Document as a basis for a non-mandatory appendix to the 1910.120 standard—Appendix E to §1910.120—Training Curriculum Guidelines.

NIEHS and DOE co-sponsored two technical workshops about the health and safety needs of hazardous waste operations and ER workers facing the introduction of new remediation technologies. The workshops resulted in a report and a proposal for the development and implementation of Technology Safety Data Sheets that would supply health and safety information for remediation process technologies similar to what is provided for chemical substances on the long-used Material Safety Data Sheets.

Other WETP projects included a technical workshop on Environmental Job Training for Urban Inner City Youth and another on Measuring and Evaluating the Outcomes of Training, which produced a report. Three National Trainers' Exchange Conferences were held to bring together the trainers in the WETP programs. Trainers presented their best modules and activities, shared views about training, and developed ongoing relationships.

CONCLUSIONS

In 1998, the WETP confidently asserted that "Worker Training is Primary Prevention." The WETP has emerged as a cooperatively developed public health approach to crafting and delivering worker health and safety education. Public health scientists and professionals directly interact with other professionals and labor leaders, along with rank-and-file union members and non-union workers, in the implementation and evaluation of this important worker health intervention. The WETP has established a national network that, along with its awardees, includes representatives of other government agencies and nongovernmental organizations involved in hazardous waste, environmental protection, public health, and labor and industrial development, as well as employers and community-based organizations. NIEHS leadership has promoted and built on a view of public health practice open to exploring how public health principles can best be applied to local conditions, specific industrial sectors and facilities, national regions, and even communities.

WETP administrators were inclined to "let a hundred flowers bloom" to encourage pedagogical and curriculum experimentation in diverse industrial sectors and learn how industry-specific organizational contexts might affect how interventions function. They established and have supported an iterative public health process with multiple mechanisms for feedback and review in order to permit flexibility and determine the required scope of interventions. As a result of the process, the scope has been adjusted a number of times throughout the program's history, giving the program indisputable legitimacy as well as prestige.

When it began eighteen years ago, the WETP may have seemed a far-sighted if overdue venture. But the value of training workers to protect their own health and safety and thereby the public's—to work not only pro-actively but also protectively—attained its most graphic and public impact as the rescue, recovery, and cleanup efforts progressed after the destruction of the World Trade Center in New York City on September 11, 2001. NIEHS responded immediately and delivered 3,000 respirators to the site. It gave expert support to coordinate occupational health issues during the recovery and cleanup processes.

Recognizing the enormity of the needed emergency response, rescue, and recovery effort, WETP and some of its awardees were key participants in the federal government's response. WETP also commissioned short-term technical assistance and coordination that included assessing the safety and health status of response personnel at Ground Zero and preliminarily determining the health and safety training needs of workers at the site. The integration of search-and-rescue operations with recovery, removal, and remediation tasks conducted by skilled construction support personnel meant establishing new procedures to protect involved workers. The applicable regulations and the roles of enforcement agencies were confused, given the circumstances. On October 6, 2001, less than a month after the

horrific event, the WETP-supported National Clearinghouse for Worker Safety and Health Training issued a report that cautioned

... rescue, recovery, and other activities have occurred in a scenario never anticipated by the safety and health legislation or the subsequent standards/regulations. The injury and illness reports for the initial weeks of the search-and-rescue activity were at unacceptable levels. Moreover, the exposure data, as well as the potential for serious exposure to toxic materials ... among the construction response workers raises significant concerns. Accordingly, how to respond to such situations demands serious attention in the context of worker protection and training needs [27].

The supplemental funding for WETP awardees in Fall 2003 was dedicated to support the creation, delivery, enhancement, and promotion of education and training materials and activities intended to protect the immediate and long-term health and safety of worker populations who are called on to respond to significant disasters and terrorist attacks using weapons of mass destruction. WETP and its awardees also have recognized that the Minimum Criteria for Worker Health and Safety Training for Hazardous Waste Operations and Emergency Response, and the resulting non-mandatory appendix to OSHA's HAZWOPER standard, required review and expansion in light of these new developments.

A participatory technical workshop was held in Spring 2005 to create a new consensus document for this purpose. "Minimum Health and Safety Training Criteria: Hazardous Waste Operations and Emergency Response, HAZWOPER—Supporting and All-Hazards Disaster Prevention, Preparedness, & Response" was released in January 2006. With the understanding that the hostile destruction of any modern building will create a hazardous waste site that requires emergency response, recovery, and remediation, WETP and its awardees have sought to assure that workers engaged in such activities will have appropriate health and safety training and protection.

The concept of "All-Hazards" has resulted from national efforts to integrate public health with a post-September 11, 2001 focus on homeland security. It covers hazards posed by attacks and incidents using chemical, biological, radiological, nuclear, and explosive agents, as well as those same hazard categories resulting from natural disasters, failures in safety systems, and infectious disease outbreaks. The WETP has intentionally chosen to focus on prevention and preparedness, as well as response actions, to events presenting these hazards because of its public health orientation; accepting the program's charge to prepare HAZWOPER workers in order to prevent morbidity and mortality that might result from their work.

Between the workshop and the release of the report, the U.S. Southeast Gulf Coast area was devastated by hurricanes Katrina and Rita. The storms exacerbated weaknesses and failures in the existing flood control systems and destroyed industrial, commercial, and institutional facilities, which released vast quantities of hazardous and toxic materials. Those exposure hazards were compounded with a broad range of biological hazards posed by the resulting conditions faced by workers engaged in the response, recovery, remediation, and reconstruction activities in the affected areas. Residents faced the same hazards during the

events as they gradually attempted to reconstruct their lives and communities. As the WETP participated in the federal response to these disaster areas, it sought creative solutions to the training needs of the work force there. The WETP awardees are developing creative strategies to assist the residents in their efforts to safely assess the damage, and where possible, to remediate and rebuild their communities. The lessons learned from these experiences have informed the revised minimum criteria document.

The WETP's continuing and forward-thinking focus on the integration of worker health and safety and environmental health that builds on the program's many learned lessons is a fitting testimony to WETP's nineteen-year record of public health excellence. Within the context of HAZWOPER work, which exists to varying degrees in a majority of industrial sectors, the program continually raises the bar for national worker health education strategies. It also has established a strong model for funding and running a cooperative program that unites federal resources with private and public non-profit organizations coordinated to promote public health and safety.

THE FIRST AWARDEES

The following organizations were funded by NIEHS in 1987 (28) and became the WETP's first grantees:

1. The International Association of Firefighters (IAFF). Target populations: ER personnel and first responders nationwide.
2. The International Chemical Workers Union (ICWU). Target populations: Industrial fire brigades and hazardous waste treatment, storage, and disposal facility workers. The awardee was a consortium that included the United Steel Workers of America, the University of Cincinnati, and the Greater Cincinnati Occupational Health Center.
3. The International Union of Operating Engineers (IUOE). Target population: Operating engineers in hazardous waste operations (heavy equipment operators in construction).
4. The Laborers-AGC Education and Training Fund. Target population: Laborers engaged in hazardous waste clean-up. (It was the only joint labor-management trust fund that received an award.)
5. The Oil, Chemical and Atomic Workers Union (OCAW). Target populations: Hazardous waste treatment, storage, and disposal workers.
6. The Seattle Fire Department. Target populations: ER personnel and first responders. The Washington State Fire Training Service was a participating organization.
7. The University of Alabama at Birmingham, Center for Labor Education and Research. Target populations: Heavy equipment operators, laborers, waste transportation workers, and governmental personnel involved at hazardous waste sites. The Deep South Educational Resource Center was a participating organization.

8. The University of California at Los Angeles (UCLA), Institute of Industrial Relations, Labor Occupational Safety and Health Program (The California Consortium): Target populations: Superfund site workers; state/county ER personnel; waste transportation and waste site assessment personnel. This consortium included UC Berkeley, Labor Occupational Health Program; UCLA, University Extension Service; UC Davis Extension Program; UC Irvine Extension Program; University of Southern California, Continuing Education Program; Los Angeles Committee on Occupational Safety and Health (LACOSH)
9. The University of Cincinnati, Department of Environmental Health (The Midwest Consortium): Target populations: Waste dump site workers and supervisors; treatment, storage, and disposal workers; ER personnel; and waste transporters. The consortium included Greater Cincinnati Occupational Health Center; University of Illinois; University of Kentucky; University of Michigan; University of Wisconsin; Murray State University; Michigan State University; Purdue University; and the Southeast Michigan Coalition on Occupational Safety and Health (SEMCOSH).
10. University of Lowell, Department of Work Environment (The New England Consortium): Target populations: Waste site clean-up workers; ER personnel; treatment, storage, and disposal workers; and waste transporters. This consortium included Boston University School of Public Health; Harvard Educational Resource Center; Tufts University, Center for Environmental Management; Yale University, Occupational Medicine Program; Massachusetts Coalition for Occupational Safety and Health (MASSCOSH); Connecticut Committee for Occupational Safety and Health (ConnectiCOSH); Rhode Island Committee for Occupational Safety and Health, (RICOSH); Maine Labor Group for Health.
11. University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School (The New Jersey/New York Consortium): Target populations: Waste site clean-up workers and supervisors; site assessment personnel; waste, treatment, storage, and disposal facility workers; and waste transporters. The consortium included the New Jersey Department of Labor; Hunter College, School of Health Sciences; Empire State College; State University of New York; American Red Cross; OCAW Local 8-149; and the New York Committee for Occupational Safety and Health (NYCOSH).

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