National Institute of
Environmental Health Sciences

The National Institute of
Environmental Health Sciences/
Department of Energy

NIEHS-DOE PROGRAM EVALUATION REPORT

Executive Summary

The NIEHS Worker Training Program (WTP) requested that the National Clearinghouse for Worker Safety and Health Training (National Clearinghouse) complete an evaluation for the NIEHS-Department of Energy (DOE) Nuclear Worker Training Program (hereafter referred to as the NIEHS-DOE Program) to examine evaluation methods, challenges, and successes of awardees. This report provides a synopsis of evaluation methods used across the NIEHS-DOE Program, a summary of key findings from awardee evaluations, and lessons learned and recommendations for improving evaluation efforts across the program.

National Clearinghouse for Worker Safety and Health Training/MDB, Inc.

Table of Contents

Executive Summary ii

Section I. Program Background 1
- Program History, Mission, and Goals 1
- Program Awardees 2
  - Table 1: Summary of Awardees and Target Populations Served 2
  - Table 2: Training by DOE Site (September 1, 2014 – August 31, 2018) 4
- Evaluation and the Minimum Criteria 6
  - Table 3: Types of Evaluation Required and Encouraged by WTP 6

Section II. Methodology and Limitations 7
  - Table 4: Breakdown of Training Years and Dates 7
- Review of Progress Reports and Other Supporting Data 8
- Review of Evaluation Profiles 8
- Limitations 8

Section III. Main Findings 9
- Target Populations 9
  - Table 5: Primary Populations Trained by DOE Awardees 9
- Changes in Scope of Evaluation 10
- Types of Information Collected 10
- Evaluation Tools and Methods 11
- Components Evaluated 14
- Successes and Outputs for Trainees 16
- Successes and Outputs for Awardees 18

Section IV. Conclusions 21

Section V. Recommendations 23

Section VI. Appendix 25
- Awardee 2018 Evaluation Profiles 25
  - CPWR 2018 DOE Evaluation Profile 25
  - IAFF 2018 DOE Evaluation Profile 27
  - ICWUC 2018 DOE Evaluation Profile 28
  - IBT 2018 DOE Evaluation Profile 30
  - IUOE 2018 DOE Evaluation Profile 32
  - LIUNA Training 2018 DOE Evaluation Profile 33
  - *LIUNA Training 2018 HWWTP Evaluation Profile 37
  - PETE 2018 DOE Evaluation Profile 41
  - USW-TMC 2018 DOE Evaluation Profile 43

Section I. **Program Background**

1

Program History, Mission, and Goals

The NIEHS-DOE Program provides high-quality health and safety training to DOE site workers to ensure they are prepared to work safely in hazardous environments. Workers are trained to identify hazardous situations and take appropriate actions to protect themselves, fellow workers, and the environment. To accomplish this, NIEHS funds programs to deliver both site-specific and trade-specific training that addresses complicated DOE site missions. These missions often include a combination of nuclear, industrial, chemical, demolition, and construction activities.[1]

Over the past 40 years, the mission of the DOE has evolved as the needs of the nation have changed. Moving from a focus on nuclear weapons production through the 1980s to environmental cleanup of weapons complexes in the 1990s, we are now in a shift – not away from cleanup, but towards new weapons manufacturing. In this environment, DOE is responsible for protecting workers who are engaged in both weapons production and environmental cleanup activities.

DOE contractors who employ site workers engaged in these activities are required to meet specific health and safety provisions that are outlined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Federal Register Title 10, Code of Federal Regulations 851 (10 CFR 851). Published in 2006, 10 CFR 851 defines procedures for investigating potential hazards and providing appropriate solutions. Other federal regulations and requirements from the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training are also embedded within CERCLA and 10 CFR 851.

To ensure that workers meet these requirements and that they remain healthy and safe, effective training and education is needed. The NIEHS-DOE Program has worked to provide such training to DOE site workers since its inception in 1993. The program is administered through an interagency agreement between WTP and the DOE Environmental Management Program. The interagency agreement includes a transfer of $10 million per year to fund the NIEHS-DOE Program.

The NIEHS-DOE Program was authorized by Section 3131 of the National Defense Authorization Act (fiscal year 1992). This act gave the U.S. Secretary of Energy authorization to award grants providing training and education to individuals who are or may be engaged in hazardous substance response or emergencies at DOE nuclear weapons facilities and to develop curricula for such training and education. Furthermore, it provided authorization for the secretary to award grants to non-profit organizations (awardees) demonstrating capabilities in conducting effective training and education in these areas.

One of six program areas administered by WTP, the mission of the NIEHS-DOE Program is to provide high-quality, site- and trade-specific training to DOE site workers to ensure they are prepared to work safely in hazardous environments.

Awardees develop and conduct training programs for various workers within DOE nuclear weapons facilities across the country. Additionally, some awardees conduct training for tribal members and fenceline communities, which are those communities in close proximity to DOE facilities.

1 NIEHS-DOE Nuclear Worker Training Program, Accomplishments and Highlights, Sept. 1, 2017 – Aug. 31, 2018. https://www.niehs.nih.gov/careers/assets/docs/wtp_doe_accomplishments_highlights_2018_508.pdf. [Accessed 19 August 2019].

1

Program Awardees

The NIEHS-DOE Program has seven awardees for the September 2015 – August 2020 funding cycle (Table 1). Most of these awardees have been funded since the program's first grants were issued in 1993 and 1995, allowing for consistency, growth, and capacity building of programs over time. Awardees have always sought opportunities to improve and broaden the impact of their training across multiple sites (Table 2) through feedback and evaluation.

Table 1: Summary of Awardees and Target Populations Served

Program Awardee	Target Populations Served
CPWR – The Center for Construction Research and Training	CPWR is sponsored by North America's Building Trades Unions, which represents 14 international/national building trades unions. Their training consortium includes the following international and national construction unions: Insulators and Asbestos Workers, Iron Workers, Boilermakers, Painters, Bricklayers, Plasterers and Cement Masons, Carpenters, Plumbers and Pipe Fitters, Electrical Workers, Roofers, and Sheet Metal Workers. CPWR provides training for many DOE sites across the country.
***International Association of Fire Fighters (IAFF)**	IAFF represents full-time professional firefighters and paramedics in more than 3,200 affiliates. Its members protect more than 85% of the population in communities throughout the U.S. and Canada. IAFF implements national training programs for all-hazards emergency response and recovery, meeting or exceeding minimum requirements of federal regulations and national industry standards. IAFF provides training at or around many DOE sites across the country.
International Brotherhood of Teamsters (IBT)	Through partnerships with major trucking and rail unions, IBT works with remediation site workers and supervisors at DOE facilities; construction workers and supervisors involved in the remediation of DOE facilities, including drivers of specialized off-road and waste-hauling vehicles; truck transportation workers and supervisors who are involved in the transportation of radioactive and chemical waste from DOE facilities; and railroad workers and supervisors involved in the transportation of radioactive and chemical hazardous waste from DOE facilities. IBT delivers training for many DOE sites, bringing in members to their regional training centers across the country.
***International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education**	The ICWUC Center for Worker Health and Safety Education provides training on the dangers of hazardous materials and waste at nuclear facilities and includes the following consortium partners for the DOE program: International Association of Machinists and Aerospace Workers and the University of Cincinnati. ICWUC trains workers primarily at Hanford, Kansas City, Los Alamos National Lab, and Oak Ridge.

Program Awardee	Target Populations Served
***International Union of Operating Engineers (IUOE) National Training Fund**	The workers IUOE represents include operating engineers (heavy equipment operators, mechanics, and surveyors), stationary engineers who maintain buildings and industrial complexes, nurses and other health workers, and a variety of public employees. IUOE provides training for many DOE sites across the country.
***^LIUNA Training and Education Fund (Laborers' International Union of North America)**	LIUNA Training is an accredited workforce development organization dedicated to apprenticeship, training, and certification of construction and environmental workers, supervisors, and organizational staff. Through its North American network of training centers, high school students, employers, apprentices, journey workers and supervisors receive skills, knowledge, and nationally recognized portable credentials in a variety of industry sectors. LIUNA Training provides education and training for DOE facilities across the U.S.
National Partnership for Environmental Technology Education (PETE)	The Community College Consortium for Health and Safety Training (CCCHST) is administered by PETE. Over 150 training organizations are represented in CCCHST, including colleges and universities, community-based organizations, governmental units, independent training providers, and a union. These groups offer hazardous waste training in most states in the nation. PETE primarily provides training at colleges near Oak Ridge, Pantex, and Savannah River.
***United Steelworkers Tony Mazzocchi Center (USW-TMC) for Health, Safety, and Environmental Education**	USW-TMC has established health and safety training programs and has more than 200 national and site-specific trainers who recruit and train workers. Many USW members are concentrated in the paper, petroleum, chemical, rubber, plastics, and primary metals industry groups, all of which contain large quantities of hazardous waste and experience large quantities of toxic releases. USW-TMC primarily provides training at Hanford, Idaho National Lab, Oak Ridge, Paducah Gaseous Diffusion Plant, and Portsmouth Gaseous Diffusion Plant.

*The information provided in this table is also available in the NIEHS-DOE Program Accomplishments and Highlights Report, 2017-2018. *Designates original 1993 and 1995 awardees. *^LIUNA Training, one of the original DOE awardees, participated in the program through a no-cost extension for 2015 through 2017 and to date offers worker and DOE personnel training across DOE complexes utilizing funds from the Hazardous Waste Worker Training Program (HWWTP).*

Table 2: Training by DOE Site (September 1, 2014 – August 31, 2018)

DOE Site	Courses Completed	Workers Trained	Contact Hours
Amchitka Island Test	1	5	50
Ames Laboratory	37	641	6,848
Argonne East	177	3,297	62,274
Ashtabula	48	804	15,870
Barker Brothers	44	596	14,390
Bettis Plant	72	1,107	17,278
Brookhaven National Laboratory	144	2,225	42,626
Department of Energy - Headquarters	18	284	5,876
Department of Energy - SF	2	45	1,800
Elk River Reactor	45	952	11,328
Fermi National Accelerator Laboratory	47	2,126	20,656
Fernald Integrated Demonstration Site	3	55	2,384
Formerly Utilized Sites Remedial Action Program	47	451	5,808
Grand Junction	5	58	634
Hanford Site (Hanford Waste Vitrification Plant)	1,594	27,925	285,694
Idaho National Engineering Laboratory	261	2,698	37,120
Kansas City Plant	142	929	10,178
Lawrence Berkeley	35	598	12,114
Lawrence Livermore National Laboratory	71	1,001	15,582
Los Alamos National Laboratory	461	7,354	60,337
Moab UMTRA Project	5	64	1,024
Mound Plant	5	61	2,856
Multiple DOE Sites	162	2,413	70,840
National Energy Technology Laboratory	43	821	12,184
Nevada Test Site	316	3,944	55,335
Non-DOE Sites	330	4,338	60,057
Oak Ridge Field Office	1,199	16,627	207,147

DOE Site	Courses Completed	Workers Trained	Contact Hours
Paducah Gaseous Diffusion Plant	294	3,964	54,114
Pantex Plant	303	4,694	49,302
Pinellas Plant	11	141	4,320
Portsmouth Gaseous Diffusion Plant	467	7,039	79,924
Princeton Plasma Physics Laboratory	40	894	18,896
Rocky Flats Office	9	176	13,200
Sandia Albuquerque	6	101	1,640
Santa Susana Field Laboratory	137	1,633	21,324
Savannah River Site	612	9,655	77,919
Separations Process Research Unit at Knolls Lab	30	456	4,056
St. Louis Airport Site	43	613	15,876
Stanford Linear Accelerator Center	9	113	1,736
Thomas Jefferson National Accelerator Facility	9	100	1,440
Umtra Project Office	5	85	728
Waste Isolation Plant	1	15	150
Weldon Springs	84	1,627	20,444
West Valley Demonstration Project	73	1,178	13,950

This table presents the totals for courses completed, workers trained, and contact hours across DOE sites for September 1, 2014 through August 31, 2018. These numbers were confirmed using data from WTP's Data Management System.

1

Evaluation and the Minimum Criteria

Awardees are responsible not only for conducting training within their respective programs, but also assessing the effectiveness of their training efforts. Evaluation is needed in order to assess this, as well as the gaps, successes, and impacts of training.

Evaluation is a major component of the Minimum Health and Safety Training Criteria (Minimum Criteria), WTP's guidance document for training. It is a living document, intended to serve as the quality control basis for awarded training grants. WTP staff and awardees use the Minimum Criteria as a gold standard to develop curriculum, conduct training, and evaluate the effectiveness of training efforts.

Program and training evaluation has always been a core part of WTP's mission. The Minimum Criteria specifies approaches that should be used for evaluation and states that awardees should conduct both process and outcome evaluation of their training programs as part of their ongoing quality control plan. Impact evaluation is also encouraged to assess the longer-term impacts of training (Table 3).

Table 3: Types of Evaluation Required and Encouraged by WTP

Type of Evaluation	Description	Examples
Process (required)	Assesses whether program activities have been implemented as intended, adherence to regulatory requirements, and accessibility of requirements to the target population.	• Determine if course content or delivery fits the needs of the target populations (e.g., job- or language-specific training)
Outcome (required)	Examines progress in the expected learning objectives; determines the degree to which program participants achieve the target knowledge, skills, and abilities, and how the training affects their subsequent actions.	• Determine if there are measurable differences in knowledge proficiency (i.e., pre- and post-test knowledge)
Impact (encouraged)	Determines the degree to which the training program has made an impact on systemic issues in the workplace.	• Determine if there are changes in worker or employer practices related to safety • Determine changes in workplace policies and procedures • Determine changes in work efficiency

This table reflects evaluation language that was significantly revised as part of a 2018 update of the Minimum Criteria. While the basic aspects of evaluation were present before, the update added more specific requirements and detail regarding process, outcome, and impact evaluation.

2

Section II. **Methodology and Limitations**

This section outlines the methods and data sources that were used for the evaluation assessment performed by the National Clearinghouse, as well as specific limitations. The assessment was limited to awardees' efforts during training years 2015 through 2018. Due to the nature of the program's funding cycle, these training years include efforts that occurred between September 1, 2014 through August 31, 2018 (Table 4).

Table 4: Breakdown of Training Years and Dates

Training Year	Dates
2015	September 1, 2014 to August 31, 2015
2016	September 1, 2015 to August 31, 2016
2017	September 1, 2016 to August 31, 2017
2018	September 1, 2017 to August 31, 2018

Review of Progress Reports and Other Supporting Data

On behalf of WTP, the National Clearinghouse maintains records of awardees' curricula and training data in the Data Management System (DMS), a Web-based application for entering and retrieving programmatic data. At the end of each training year, awardees are required to submit progress reports and other data to document their training inputs and outputs. Along with their annual progress reports, awardees typically upload other supporting data, such as trainee profiles, evaluation reports, and publications.

For this project, we used the DMS to pull all progress and evaluation reports submitted by awardees for training years 2015 through 2018. We analyzed these data for common themes, successes, and impacts of evaluation across awardees. We also made note of any challenges or gaps that were highlighted in awardees' current evaluation methods.

2

Review of Evaluation Profiles

Another source of information is data gathered through awardee technical workshops. The National Clearinghouse works with WTP to develop agendas, facilitate logistics, and write reports for these workshops.

In 2012, WTP hosted a technical workshop titled, "Prove it Makes a Difference: Evaluation Best Practices for Health and Safety Training." The purpose was to explore evaluation tools and methods being used by awardees. In preparation for the workshop, WTP and the National Clearinghouse requested that the principal investigator (PI) of each awardee organization complete an evaluation profile. These profiles summarized information on target populations served, as well as evaluation goals, methods, and proof of effectiveness for each awardee.

As part of the current evaluation assessment, we sent the 2012 evaluation profiles to PIs and requested that they review and update them. We received the updated profiles in fall 2018 (see Appendix), and compared the 2012 and 2018 profiles to determine changes in scope of evaluation within the six years. We also used the profiles to identify common evaluation methods used across awardees.

Limitations

This assessment was limited to information provided in awardee progress reports, evaluation profiles, and other supporting documents from the specified training years. Due to this limitation, some awardees' evaluation accomplishments and outcomes may not be captured within this report.

Section III. **Main Findings**

This section summarizes primary findings from the NIEHS-DOE Program evaluation based on a comparison of evaluation profiles, evaluation tools used, and types of information collected and evaluated by awardees.

Target Populations

Awardees have a broad reach to various target audiences through both site- and trade-specific training (Table 5).

Table 5: Primary Populations Trained by DOE Awardees

Craft and trade workers	Community members	DOE site workers	First responders
• Construction craft laborers • Apprentices and journey workers • Insulators and asbestos workers • Iron workers • Painters • Sheet metal workers	• Tribal members • Other communities in areas adjacent to DOE complexes	• Site supervisors • Contractors and sub-contractors • Project managers	• Fire fighters • Law enforcement • Other first responders dispatched to respond to emergencies at DOE facilities

Government employees	Health and safety specialists	Specialized site workers and engineers	Transportation workers
• Federal government employees • State government employees • Local government employees	• Industrial hygienists • Radiation safety officers and scientists	• Remediation site workers • Stationary and operating engineers • Building engineers • Heavy equipment operators	• Drivers of specialized off-road or waste-hauling vehicles • Heavy equipment drivers and operators • Railroad workers • Other workers involved in transportation of waste to and from DOE facilities

The information presented in this table was derived from progress reports, evaluation profiles, and other supporting data provided by NIEHS-DOE awardees. The information is not comprehensive; rather, it provides a summary of the primary target populations trained by awardees from September 1, 2014 through August 31, 2018.

Changes in Scope of Evaluation

After comparing what PIs submitted in their 2012 and 2018 evaluation profiles, we found that the scope of evaluation has been relatively consistent for awardees within the past few years. Most of the updates that PIs made to the 2018 evaluation profiles concerned programmatic changes, such as a new PI or additional courses. On the other hand, some awardees have made moderate changes in the scope of their evaluation by adding new follow-up questions or new measures to track training effectiveness.

Additional courses or curricula. Some awardees have added specific courses or curricula to their programs, such as safety culture/climate courses, Practical Factors for Radiological Worker II, Basic Radioactive Materials in Transportation, and Emergency Response for Specific Hazards.

New training requirements for instructors. LIUNA Training not only requires its instructors to attend an annual Hazardous Waste Instructor Refresher, but they also must enroll in the ANSI-accredited Annual Instructor Conference and attain certification. By requiring both, instructors receive best practices in adult education and learn about new technologies, industry updates, and program policies. Instructors are also provided with opportunities to participate in curricula development, review, and hands-on practice.

Additional follow-up questions for trainers. ICWUC added a question for DOE trainers to determine how frequently they were consulted as a resource outside of the classroom, as well as the subject areas of information that were requested.

3

New measures of course/training effectiveness. PETE indicated that they measure employer perception of course effectiveness by following up with employers to verify that the skills and knowledge acquired through training are being applied on the job. For instance, an employer follow-up evaluation conducted for an 8-hour refresher in 2017 and 2018 revealed that employers view the training as a significant benefit to the employees, as well as the overall workplace. According to one employer, “Since the site still has hazards that can affect the public and the coworkers [the training] has been a big help in the emergency response actions for the site.”

Types of Information Collected

The collection and evaluation of information on trainee demographics and workplace experiences helps awardees adapt and improve several aspects of their training programs.

Demographics. All DOE awardees collect data on basic demographics, such as gender, age, race, ethnicity, and level of education. Some awardees, such as IBT, collect additional information about military and work status. Regarding work status, awardees, including IAFF and IUOE, may ask about the trainee’s position at work, number of years in active service, and primary services provided (e.g., volunteer, emergency medical services, law enforcement, etc.).

Workplace exposure, hazards, and protections. Some awardees ask trainees about their experience working with hazardous waste – whether they have encountered hazardous waste at work or whether they are expected to perform hazardous waste work in the future. They also ask trainees about the types of personal protective equipment (PPE) and resources that are made available to provide protection and improve work conditions. For instance, CPWR collects worksite and exposure history information from its trainees, such as experience with worksite hazardous waste and other jobsite safety and environmental hazards. LIUNA Training collects information on trainee work history, skills used, problems encountered on the job, and benefits derived from training, including information on how often participants use a specific skill.

Evaluation Tools and Methods

Awardees use different tools and methods to ensure that all aspects of their training programs, including content, instructors, delivery methods, and locations, are evaluated accurately and objectively. While the details gathered through each method vary amongst awardees, the general methods used are similar.

Specialized tools to collect data. Some awardees use specialized tools to gather data on demographics, work experience, and other pertinent information from trainees.

- For example, IUOE uses an experience and exposure profile (EEP) to collect data on trainee demographics, work experience, exposure, and protections. IUOE has utilized the EEP to collect data on their trainees since 2010, and it has allowed them to better understand the types of exposures that trainees have experienced within the past year and whether they have been provided with sufficient PPE to ensure their safety.
- The USW-TMC uses their DOE evaluation database, which was designed to streamline data collection and entry for proficiency assessments, end-of-class evaluation forms, and sign-in sheets for the HAZWOPER refresher trainings that they offer across six DOE sites.

Competency tests or proficiency exams. All awardees provide tests to measure trainees' knowledge, proficiency, and competency gained through the course. Some awardees provide both pre- and post-tests, and others provide only post-tests. While some tests require only written responses, others require a combination of written and oral responses. Depending on the course, hands-on competency tests may be delivered to measure trainees' skills with a specific task. For example:

- IAFF captures course pre- and post-test averages, as well as the percentage of knowledge gained between the two written examinations. Another aspect of these tests focuses on trainees' pre- and post-course confidence levels in terms of knowledge, skills, and abilities gained.
- Competency tests for trainees under the ICWUC training program are site-specific and developed by the site instructors with technical support from program center staff. Learning needs are identified at the beginning of the program and are written to measure fundamental skills that relate to each module. ICWUC works closely with DOE staff and representatives to develop tests that are consistent with DOE regulations and orders. For example, when developing tests, they consider wording of questions to ensure similar but not identical questions in key subject areas.
- ICWUC also noted that for refresher classes, the use of tests varies from site to site due to different factors, such as contractor needs and time restrictions. Due to these time constraints, pre-tests were not conducted for the eight-hour refreshers.

Specialized tools to measure competency. Some awardees use specialized tools to test and facilitate trainees' knowledge-based review of information.

- For example, ICWUC once used the Quizdom machine as a pre-class review to judge the knowledge of participants and to know what to emphasize in respirator classes. It has also been used at the end of class to evaluate what the trainees learned and whether trainers conveyed the information to participants. The machine allows each student to answer individually and to receive an immediate score of the percentage of questions answered correctly.
- ICWUC also uses two review game exercises – Hazmat Pursuit and Hazmat/Toxic Jeopardy – to determine whether training is effective. Hazmat Pursuit uses a game board with colored spaces, while Hazmat/Toxic Jeopardy uses a familiar television game show format to review key subject matter areas covered during the training.

Student feedback or evaluation forms and surveys. All awardees ensure that trainees are given an opportunity to provide feedback, whether through evaluation forms or follow-up surveys. Most often, these methods are used to rate the effectiveness of materials, instructors, and other components of the course. Awardees are thorough in their analysis of trainee feedback and use it to improve their overall training program.

- For example, IAFF has a centralized database that allows for the collection of student scores and post-course surveys in an online format, providing performance evaluation in real time. The data collected are analyzed on a class-by-class basis by the training coordinators and program director. The data also provide evaluation of the instructors, their delivery, and course content.

Trainee tracking and follow-up. Post-course follow-up is necessary to determine how training impacts trainees' lives, behaviors, and workplace safety culture. In general, awardees use similar methods for tracking trainees following course completion, but the time frame for follow-up varies across awardees, ranging from six months to one year and beyond. Awardees generally provide trainees with surveys for follow-up. These surveys ask about impacts of training, use of training resources, and the capability to improve workplace conditions. Follow-up is also used to collect personal testimonies or stories from trainees to determine how training has impacted their attitude and behaviors, as well as the overall culture of their workplaces.

- To facilitate successful tracking and follow-up, CPWR uses their local union representatives and local directors of joint training programs who know the trainees and their employers.
- CPWR obtains additional information one year after the training regarding where the trainees worked, type of work, skills used, and hazards encountered on the job. This helps CPWR determine whether trainees use information and skills learned during the training.
- IUOE used a revised standardized paper survey of their EEP to ask about trainees' experiences and workplace exposures over the past 12 months. They also have an online trainee follow-up survey that asks about the specific impacts of training after six months.

Self-audits, internal evaluation, and onsite monitoring. All awardees conduct some sort of audit or internal evaluation of courses, materials, and instructors; however, the methods for conducting these vary amongst awardees. Additionally, most awardees conduct regular onsite monitoring, where training coordinators or program directors evaluate the instructor performance and course quality.

- IAFF uses an instructor evaluation program (IEP). In the IEP, three components – a mentor observer program, local instructor evaluation, and master instructor evaluation – are used to evaluate the performance and effectiveness of all instructors. In this program, a local instructor, someone who has completed an IAFF train-the-trainer and teaches within their own department, and a new instructor, are evaluated by master or more seasoned instructors. Co-teaching opportunities allow master instructors to gauge and measure local or new instructors' skills against concrete objectives, such as demonstrating mastery of the program, effectively engaging participants, and presenting themselves professionally. This evaluation tool allows for measured growth, and the online scoring sheet contains several skills that can be measured along a five-point scale. IAFF also pairs these results with feedback from student surveys and evaluation forms to measure overall instructor effectiveness.
- Some awardees, such as IAFF and CPWR, use annual workshops or routine conference calls with peer instructors as a method to audit and adapt courses and training materials. The materials are then routinely evaluated by in-house industrial hygienists, physicians, or other health and safety experts.
- IAFF uses their Checklist for Planners and Evaluators to ensure that the principles of adult education are applied to all training programs. IAFF also created an Instructor Evaluation Summary and Daily Digest Report to allow for timely post-course feedback.

3

- IBT conducts audits of their courses to evaluate several components, including (but not limited to): quality of the instruction; physical learning environment; use of participatory adult education techniques; and effectiveness of hands-on and simulated site activities.
- LIUNA Training monitors training throughout each course by observing participants, providing feedback, and performing comprehension check activities.

Third-party evaluations. Most awardees specified that they hire third-party evaluators to develop survey instruments, analyze training data, and evaluate the overall effectiveness and impact of their training programs.

- Based on their organization's third-party evaluation, ICWUC collected data that showed that worker trainers not only teach health and safety in the classroom setting, but also serve as important peer mentors and experts at DOE facilities. Notably, this is documented in a published manuscript in the Labor Studies Journal, the official journal of the United Association for Labor Education.[2]

Advisory boards. Each awardee has an advisory board, which is primarily composed of leading experts in the worker safety and health field. Advisory boards serve as helpful, trusted resources in evaluating different aspects of training programs and providing recommendations. Depending on the awardee, advisory boards meet once or twice annually to review and discuss training curricula, materials, and instructors. This helps ensure the validity and effectiveness of the training programs.

2 Morawetz JS, Frazee T, Ruttenberg R. 2019. Worker trainers as workplace experts: How worker trainers enhance safety and health at Department of Energy facilities. Labor Studies Journal. https://doi.org/10.1177/0160449X19868771.

Components Evaluated

As mentioned in the previous section, awardees request that trainees complete surveys or evaluation forms to gain feedback on instructors, materials, and other components of courses. The phrasing of questions within these surveys and forms varies amongst awardees, but the primary themes addressed are very similar.

Typically, trainees are asked to rate different components of courses on a Likert scale ranging from "strongly agree" to "strongly disagree" and are given an opportunity to provide open-ended comments. The following are the primary course components and categories evaluated by awardees, along with examples of questions for each category.

Course Material or Content. Most questions related to course content determine its relevance to a trainee's job or how easy the content was to comprehend. In general, awardees ask whether the course helped the trainee:

- Understand the problems of working with hazardous materials or conditions
- Recognize health hazards on the job
- Recognize unsafe work conditions and practices
- Recognize signs and symptoms that may be related to chemical exposure
- Learn how to use PPE
- Understand legal rights
- Understand the importance of safety plans and emergency response planning
- Acquire skills and knowledge necessary to accomplish his/her job

Instructors. To ensure that instructors are not only knowledgeable about the course, but are effective in providing a constructive learning atmosphere, awardees ask trainees whether instructors:

- Conducted the training in a skilled and competent manner
- Delivered the lessons in an easy-to-understand manner
- Described course and lesson objectives clearly
- Explained how course content applies to job or trade
- Fostered a positive and stimulating learning environment
- Gave helpful feedback to the class on exercises and activities
- Made good use of student materials and manuals
- Presented materials clearly
- Reviewed key points and kept the class focused on important points

Teaching format, materials, and environment. In order for awardees to determine the effectiveness of the overall course, they request that trainees rate teaching methods, materials, environment, and equipment:

- Class exercises
- Course materials
- Demonstrations
- Discussions
- Hands-on activities
- Lectures
- PowerPoint slides
- Videos
- Physical facilities (i.e., where the training was held)
- Equipment used for training (e.g., audio and visual aids)

Student performance and perception. Awardees also want to know how well the course and training content helped improve trainees' perception of hazards or skills. To determine this, awardees ask trainees how well the course and training content improved their:

- Confidence level in terms of knowledge, skills, and abilities
- Recognition of hazards on the job or unsafe work conditions
- Recognition of signs and symptoms related to chemical exposure
- Skills and provide them with knowledge to accomplish their job(s)
- Understanding of problems working with hazardous materials and conditions
- Understanding of their legal rights
- Understanding of the importance of safety plans, site safety plans, and emergency response planning
- Use of protective equipment

Some awardees went a step further to ask trainees whether they felt the health and safety training influenced them in the following:

- Discontinuing work in unsafe conditions
- Changing tasks due to unsafe conditions
- Reporting unsafe working conditions
- Requesting PPE at work site, if needed
- Requesting Material Safety Data Sheets (MSDS)
- Requesting that a confined space be monitored

Successes and Outputs for Trainees

Effective training leads to many successes for trainees. A few examples of these successes are highlighted in this section.

Gained employment.

- IBT documented how training has made a meaningful impact on workers' lives and helped them obtain employment. One trainee wrote a letter to the organization, stating:

  "…[thank you] to the Teamsters Organization for providing me with the DOT, HAZWOPER, and OSHA certification training. This training was not only interest[ing], informative, and exciting, but was also the "turning point" in my obtaining gainful employment after serving a 'life sentence' in California State Prison. This has changed my life and [it's] only gonna get better. Thank you."

Gained knowledge on proper PPE.

- PETE indicated that in an evaluation conducted as a follow-up to an 8-Hour HAZWOPER Refresher course at Amarillo College, 66% of the trainee respondents reported wearing PPE on the job as a result of information provided during that course.

Increased appreciation for hazard awareness and responsibilities on the job.

- IBT recorded a statement from a HAZWOPER course trainee, which showed an increased appreciation for the job and line of work:

  "The quality of learning was superb, and I left with a new sense of responsibility and a higher level of knowledge in the field of Hazardous substance response. I plan to keep my ERG [Emergency Response Guidebook] handy in all of my vehicles and at my desk at work."

- Evaluation comments from trainees showed that IAFF's training approach and format were useful in delivering knowledge to trainees:

  "The class was taught extremely well. The course material was helpful/useful to apply in my everyday services in the fire industry."

  "The format of having a week of classroom and then a week of practical exercises was excellent. Applying the knowledge gained in the first week was a great approach. Overall the class exceeded my expectations and [I] will recommend it to others in my department.

  "This class had wonderful information and helped with real life emergency training and response."

Increased awareness of emergency response actions and drills.

- As a result of the 8-Hour HAZWOPER Refresher course conducted by PETE at Amarillo College, 53% of the trainee respondents indicated that they applied knowledge during response operations and 50% applied knowledge to training drills.

Increased awareness of health and safety issues and how to conduct pre-job analyses.

- PETE reported 50% of trainee respondents noted that they conducted pre-job analysis for hazards as a result of the 8-Hour HAZWOPER Refresher course offered at Amarillo College.

Increased capacity to recognize hazards and protect oneself and peers.

- LIUNA Training reported that between the 2015 and 2017 training years, more than 1,350 Hazardous Waste Refresher trainees indicated that their hazardous materials training positively affected their performance and safety on the job.
- USW-TMC proficiency assessment results revealed that trainees strongly agreed that the training met the objectives of recognizing multiple causes of an incident and using safety systems to eliminate or reduce the hazard.
- CPWR noted that refresher training helps workers mitigate a harmful exposure situation. Once trained, workers are more likely to take actions to improve not only their safety and health, but the safety and health of those around them. An anecdote from CPWR demonstrates the value of refresher training:

  "A twenty-year tradeswoman, who took Hazardous Waste refresher training at HAMMER, in 2016, told how training was responsible for deescalating what could have been a much more serious chemical exposure. The event occurred at 200 West Pump & Treat, which is part of the Hanford Site. It is a 'legacy site' where ground water contamination is being remedied. An incident took place in the spring of 2016 at the water treatment plant where large conveyor belts transport the chemicals. Someone had failed to close the vents on top of some of the tanks so that the chemicals in the tanks generated sulfur dioxide that was released into the air above the tanks, exposing two of the workers to the fumes. Once the workers were exposed, they couldn't breathe; they backed away from the open vents and were treated at the hospital and returned to work later that day. They did not suffer long-term effects."

  "The result of this incident was a re-evaluation of the use of the chemicals that injured the two workers and the elimination of those chemicals. Because both workers had been trained, they knew the proper procedure to follow in such an emergency and did so by backing away and leaving the area where they had been exposed. Training educates people, she said, to learn about conditions at the worksite, to avoid problems, to protect themselves, and to respond in an emergency."

Increased reporting of health and safety issues to managers and supervisors.

- Seventy-nine percent of the employers surveyed after PETE's 8-Hour HAZWOPER Refresher at Amarillo College noted that the training helped employees recognize and prevent physical hazards on the job. Eighty-eight percent of the employers reported that the training helped employees recognize chemical hazards on the job.

Improved workplace conditions.

- Similarly, 88% of the employers responded that PETE's 8-Hour HAZWOPER Refresher course helped create a safer workplace through employee recognition of physical hazards.
- LIUNA Training reported that for all courses conducted under the DOE, 98% of participants reported that the training made them aware of health and safety issues that they had not previously considered. One hundred percent believed that the training will help make their work practices and life safer.

Successes and Outputs for Awardees

Evaluation also leads to successes and outputs for awardees, many of which are realized only after careful evaluation of trainee feedback and outcomes.

Evidence of quality instruction, peer training, and learning outcomes.

- Evaluations of PETE's classroom training at Amarillo College indicated that 97% of the respondents agreed that the teaching methods used were well suited to the course, 96% agreed that the physical facilities were appropriate, and 97% agreed that the audio/visual aids and equipment were useful and effective.
- PETE noted results from trainee evaluations at the Savannah River site, Pantex, and Oak Ridge National Laboratory showed that trainees strongly agreed that course content was presented in a logical and organized manner and that learning objectives were clearly stated and guided the course presentation. The quality of instructors was rated highly as well as the relevance and effectiveness of the trainings.
- Based on the pre- and post-test knowledge assessment report, LIUNA Training found that trainees taking 40-hour HAZWOPER classes for the first time increased their knowledge by about 15%. Those taking the 8-hour refresher increased it by about 9.5%.
- A peer-reviewed article, "Worker Trainers as Workplace Experts: How Worker Trainers Enhance Safety and Health at Department of Energy Facilities," showed that ICWUC peer trainers not only teach health and safety in the classroom setting, but they also serve informally as important peer mentors on the shop floor. The basis of this ICWUC-initiated study was information collected from two surveys in 2016 and 2018. Results showed that ICWUC peer trainers provide formal quality training to members and also informally provide quality information on an as-needed basis at the work site. The peer trainers also use their knowledge and online research to improve conditions in their own workplaces.[3]
- In a 2017 evaluation report for IUOE, it was noted that "Skills and Practices Learned" received the highest average score from trainees amongst all other aspects of the training courses. This is a strong indicator that the main objective of the training courses is being met and also indicates that emphasis placed on skills and practices in train-the-trainer classes is being effectively passed on to trainees.

Increased awareness of target populations' training needs and challenges.

- Based on demographic survey questions, IUOE noted that because 25.6% of trainees have five or fewer years of experience and 35.2% have 21 years or more, instructors need to teach the foundations thoroughly to address the needs of inexperienced workers while at the same time keeping the material fresh, interesting, and up-to-date for those who have taken the refresher course many times.
- LIUNA Training's efforts to diversify the DOE training and worker population have been largely successful. While approximately 9% of construction workers in the U.S. are women, participation in the LIUNA Training DOE program by women in 2017 was 16%. Minority participation in the LIUNA Training DOE program was approximately 44%.
- Exposure data collected by IUOE's EEP help them better understand the type of exposure workers have experienced and the type of PPE they have been provided. These findings help IUOE assess training needs for its members.
- CPWR increased their volume of OSHA courses to meet the specific needs of construction workers within their constituent unions.
- In their 2017-2018 progress report and reporting period, ICWUC noted that pre-training scores from multiple-day courses at most sites, in topic areas related to chemical protective clothing, respirators, decontamination, and

3 ibid.

labels and placards, continue to show a significant training need. These training needs are expected since these participants are either newly hired or are not in jobs that mandate yearly refreshers. With the DOE and contractor mandate to conduct individual testing for initial training, ICWUC implemented methods to remediate any trainee who did not have the passing score of 80% to avoid any perception of job jeopardy. ICWUC noted that ongoing analysis and monitoring of scores continues to be an effective quality assurance tool for both participants and trainers and that these results may be helpful in shifting the curriculum and revising the next refresher to areas with a greater need for training.

Improvements to enhance courses for trainees' comprehension.

- To enhance trainees' comprehension of course materials, IBT revised their student manuals and incorporated more graphics to facilitate better understanding among trainees.
- USW-TMC reported that evaluations indicated that use of visual aids, primarily the Chemical Safety Board videos, enhanced discussion during the classes.
- Oftentimes, training content will remain the same from one year to the next. However, as noted by IUOE, trainers' approach in delivering the content can make a difference and enhance trainee comprehension. For example, one trainee noted:

  "While the material was primarily the same as it is every year, the way it was taught and the approach used was not the same at all. To these gentlemen's credit there was an excellent balance of teaching the necessary classroom information and providing multiple positive messages on personal accountability, working as a team, and caring for the safety of others regardless of your classification in the workforce or in the public. The material and the mentoring they provided during the class was absolutely outstanding as they were able to keep the entire room engaged allowing all the employees in the room to learn from the different perspectives and experiences."

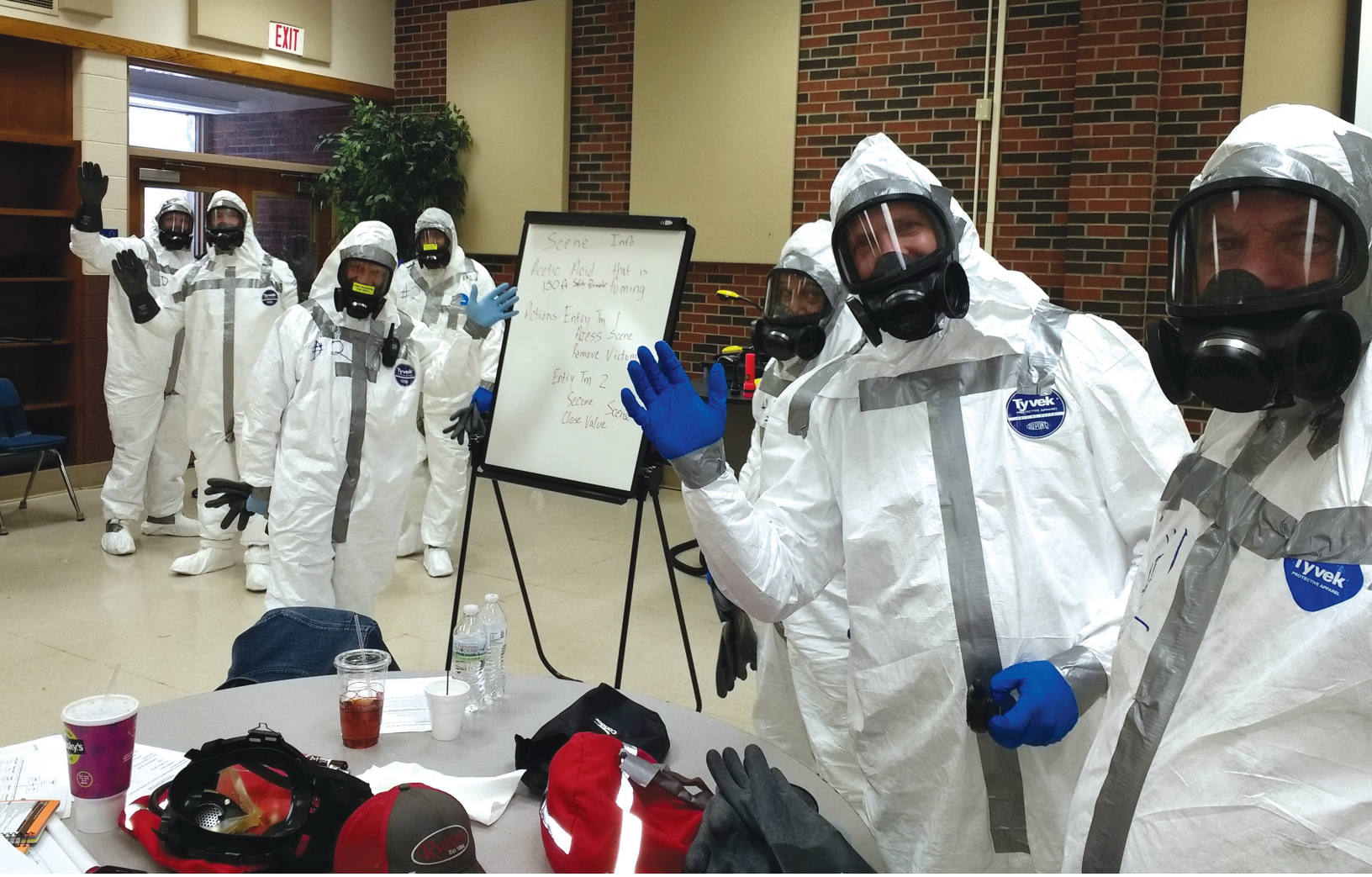
- Due to the nature of the DOE grant, refresher programs are often requested by contractors for essentially the same workers each year. With this in mind, ICWUC further enhanced their team method to develop new refresher courses and modify existing material. ICWUC utilizes the direct experience of the trainers to incorporate specific examples from each site. This individualization ensures that the training program is consistent with Institute for Supply Management (ISM) Principle 6, that hazard control is tailored to work being performed. The reliance on trainers and their direct site-specific experience enables ICWUC's programs to be tailored to the work being performed.

Improvements to enhance evaluation efforts and methods.

- At the end of 2014, IAFF migrated from FileMaker Pro to the iMIS database system to track training data. IAFF's iMIS database has allowed them to streamline the process of instructor selection, trainee online registration, test scoring, and student survey collection. Use of this automated system has allowed them to quickly gather data and post-course surveys on each instructor, which enables performance evaluation in real time.
- IAFF also created new evaluation tools, such as the Instructor Evaluation Summary (IES) and Daily Digest Report (DDR). These evaluation methods allow IAFF to receive timely post-course feedback from trainees. The IES was created to provide overall feedback to each class instructor and provides a summary of student comments related to instructor performance and course quality. The DDR enables IAFF staff to review student feedback comments for each class incrementally. This reporting process allows IAFF department leadership to get an initial gauge of student feedback related to instructor and course quality.
- USW-TMC noted in their 2018 evaluation profile that they sought to enhance evaluation efforts by conducting a gap analysis across all DOE sites it serves to identify training challenges and potential solutions. They also hosted an Evaluation Summit in 2018, which brought together nationally recognized evaluation experts and key worker-trainers. The Summit laid the groundwork for a renewed and enhanced effort to conduct robust evaluation of training programs in the coming years.
- USW-TMC developed an evaluation database to be used by all sites for which they offered training. The database helped streamline collection of training proficiency assessments, end-of-class evaluations, and sign-in sheets for their 8-hour HAZWOPER Refresher course.

Improvements to overcome cultural, language, and educational barriers.

- It is often difficult to determine whether trainees have literacy issues; therefore, ICWUC has made all their modules interactive so participants can learn the material without being singled out, regardless of their literacy level. Instructors read the text of problems and paraphrase questions to ensure all participants fully understand the material.
- CPWR introduced Spanish-language courses to meet the needs of Spanish-speaking construction workers who, as shown by statistics, are at higher risk for occupational safety and health injuries in the construction industry. CPWR has continued to deliver bilingual train-the-trainer programs to encourage participation of bilingual minority instructors and has translated various training materials into Spanish. As noted in their progress report, CPWR has seen many of those bilingual participants assume leadership positions in training programs and unions.



Section IV. **Conclusions**

4

Results from this evaluation assessment show that training delivered by NIEHS-DOE program awardees is making a difference for workers. Training increases workers' awareness of health and safety and improves their capacity to respond to hazardous situations within their workplaces. The return on investment for training is high not only for trainees, but for awardees as well, as they learn more about the dynamic needs of their target populations. This helps awardees and instructors ensure that training content is relevant, accessible, and engaging for a variety of audiences.

Awardees are doing considerably well with their evaluation efforts, especially as measured against the Minimum Criteria. They continue to collect data to identify trainee needs, measure the effectiveness of training, and conduct trainee follow-up to detect measurable changes in process, outcome, and impact.

The collection of basic demographic data, such as age, race and ethnicity, and gender, helps awardees better understand how to reach or deliver training to specific target populations. These data help awardees better understand the needs of their target populations and provides insights on how to tailor recruitment strategies or curricula content. For example, if awardees notice an increase in Hispanic or Latino training participants, they may consider implementing capabilities to offer bilingual training. Similarly, if there is an overrepresentation of males, awardees may consider

how to better recruit women for their training programs. Additionally, by collecting information on trainees' workplace experiences and exposure to hazards, awardees can assess training gaps that need to be filled and better understand the types of training and protections their target populations need.

Evaluation should not solely be based on one method. Awardees use various evaluation methods to ensure that the instructors, courses, and course materials are comprehensive and effective. This includes the use of database systems to streamline data collection in real time, as well as interactive games to measure trainees' knowledge proficiency and skills following a course. Onsite monitoring and special mentorship programs are implemented as methods to assess the effectiveness of new courses or instructors. Additionally, third-party evaluations are implemented to provide unbiased review and assessment of the impact of training. Trainee follow-up is a crucial method to determine whether training made an impact on trainees' choices and behavior in the workplace. This is also a great way for awardees to obtain input from employers on changes noted in workplace culture or safety.

Section V. **Recommendations**

In moving forward, awardees should continue working with local union leaders and partners to conduct post-training follow-up. Due to their personal interactions, these local partners are often in the best position to encourage follow-up and obtain honest feedback from trainees and employers. Awardees should also continue collecting anecdotes on how training helps workers protect themselves and others and improve conditions within their workplaces. These stories provide qualitative evidence on the effectiveness of the instructors and courses.

Finally, awardees should continue sharing lessons learned and best practices with one another on evaluation. In doing so, awardees gain more insight on the tools and methods that have proven effective within their respective consortia and locales. For example, one unique item that awardees could consider modeling is IUOE's EEP to better gather data on trainees' experiences, exposures, and training preferences or needs. This is to ensure that awardees are well-informed on the hazards that trainees face within their respective sites and occupations; as the DOE culture shifts over time, so will the demographics of workers and the nature of chemicals and hazards. Additionally, it ensures that awardees are providing training that is relevant to their target audiences. Awardees could also consider use of innovative methods, such as ICWUC's HazMat Jeopardy and HazMat Pursuit games, to measure knowledge and skills gained by trainees. These types of activities fall in line with the principles of adult education and are useful in reinforcing course topics and themes. By carrying on the evaluation efforts that are currently underway and incorporating suggested methods, awardees can continue to make a difference in protecting the safety and health of DOE workers.

5

Section VI. **Appendix**

Awardee 2018 Evaluation Profiles

CPWR 2018 DOE Evaluation Profile

CPWR DOE TRAINING:
Principal Investigator:
• Chris Trahan Cain
Evaluator(s):
• Ruth Ruttenberg and Associates • Instructor Performance Evaluation performed by CPWR staff
Grant Number:
• U45ES09764
Goal(s) of Evaluation:
• Measure knowledge gained through training • Determine how to improve training materials • Ensure the accuracy, credibility, comprehensiveness, clarity and practicality of courses and course materials • Measure program success through the utility of the training as expressed by the graduates • Determine effectiveness of instructors
Evaluation tools:
• CPWR collects work-site and exposure history information from its trainees, with a survey on the back page of the registration form. This form asks them about their experience with worksite hazards including hazardous waste, and other jobsite safety and environmental hazards • Pre- and post-tests to measure knowledge gained through training • Instructor recommendations and student feed back in order to determine how to improve curriculum • CPWR maintains detailed records of trainees working for contractors conducting hazardous work throughout the country by # of employers and workers per state • The accuracy of curricula materials is routinely evaluated by CPWR's in-house technical experts and affiliated health and safety professionals • CPWR's Training Director conducts regular site-visits of training courses to evaluate performance of instructors and peer instructors

CPWR DOE TRAINING:

Population Served:

- Construction workers who do hazardous waste cleanup; lead and asbestos abatement; renovation, repair and painting of lead-contaminated structures; permit-required confined space entry; and disaster cleanup; and to those who may be exposed to chemical or biological hazards on the job.
- Construction workers contributing to cleanup activities at the DOE nuclear weapons complex nationwide.
- CPWR's Consortium includes the following international/national construction unions: Insulators & Asbestos Workers, Painters & Allied Trades, Boilermakers, Plasterers & Cement Masons, Bricklayers, Plumbers & Pipe Fitters, Carpenters, Roofers, Electrical Workers, Sheet Metal Workers, and Iron Workers.
- 92% of the trainees were male and 73% were White (2018)

Types of Courses/ Training Curricula Offered:

- Hazardous Waste Worker courses, Confined Space courses, Asbestos Abatement courses, Fall Protection courses, Lead Abatement courses, Lead RRP courses, Safety Culture/Climate courses, Train-the-Trainer courses, General Construction Safety, etc.

Trainers:

- CPWR employs a staff of worker trainers
- CPWR supports a wide range of instructors from the Consortium unions involved in providing the training
- Continuing support and development is provided for health and safety trainers from the participating unions and joint employer-union training committees in the Consortium

Proof of effectiveness/value?

- An overwhelming majority, approximately 95 percent of participants, said that training made a difference in their workplace behavior – making them more likely to discontinue work in unsafe conditions, to change tasks due to unsafe conditions, to report unsafe working conditions, to request PPE if needed, to request an SDS, and/or to request monitoring of a confined space.
- A greater than 99% completion rate for students enrolled in training classes conducted directly by CPWR
- Students routinely score above 92% on the post tests for those completing exams

Most beneficial aspects/well received methods:

- Due to the diversity of the consortium and the transient, sporadic, and cyclical nature of our industry, the types and amounts of training are continually adjusted as demanded by the target population. This demand-driven quality is a strength of the CPWR/NIEHS program.
- Efforts to include minorities in training programs such as highlighting health and safety concerns of the Latino construction workforce and making training materials available in Spanish
- Efforts to address literacy issues through awareness and hands-on training
- A dynamic, de-centralized and very flexible relationship between construction employers and the representatives of the trainees who pass though our programs
- Emphasis on hands-on instruction, interaction, problem-solving, and group activities enhances quality of training

IAFF 2018 DOE Evaluation Profile

IAFF DOE TRAINING:
Principal Investigator:
• Elizabeth M. Harman
Evaluator(s):
• Dr. Harold Stolovitch has aided in establishing and reviewing the evaluation protocol • Dr. Alex Cohen, Evaluation Expert, performed analysis in 2005 • Third Party Evaluation Report from Bruce Lippy in 2007 • Third Party Evaluation underway from FACETS 2018-2019
Grant Number:
• 5UH4ES009759
Goal(s) of Evaluation:
• Determine student experience in practicing a drill or mock scenario • Obtain structured feedback for instructors • Determine whether IAFF training is having a positive impact on the students trained • Measure the correlation of behavior before training and subsequent changes in behavior leading to increased safety
Evaluation tools:
• Pre-/post- test (First Responder Operations (FRO) exam evaluates factual recall of course units) • In trainee follow-up examines how the students behavior has changed after the class • Student evaluations and peer evaluations/observations of instructors • In 2008 the IAFF conducted Level III evaluations through the assistance of Dr. Harold Stolovitch • Review of the HazMat/WMD training program by an outside consultant (the Lippy Group, LLC), conducted September 2006 through March 2007 (note: Appendix C from 2007 report is a copy of the final Lippy report) • Use of an online Registration and Survey system to gather demographic information on each student, the course taken, and feedback about the instructor • Quality Assurance Program (QAP) – consists of a Quality Assurance Checklist (addressing issues of program quality prior to, during, and after training events), the Internal Quality Assurance Report (ensures that planning, logistics, registration, and reporting functions are completed properly), and the External Quality Assurance Report (distributes a review of pre- and post- test scores, etc.)
Population Served:
• Emergency responders (predominantly male, having at least a high school education, and serving as fire fighters)
Types of Courses/ Training Curricula Offered:
• Hazardous Materials Technician (Tech) and Confined Space Rescue (CSR) training programs
Trainers:
• IAFF instructors assigned as subject matter experts from different regions and department sizes • Each year the IAFF conducts and Instructor Development Conference (IDC) to provide program policy and curriculum updates to IAFF instructors who are independent consultants

IAFF DOE TRAINING:
Proof of effectiveness/value?
• IAFF exceeds its training goals each year • 95% of students responded as “strongly agree or agree” that they will practice and use the skills from this workshop on the job in 2018 • 96% of students responded as “strongly agree or agree” that the workshop increased knowledge, skills and abilities in 2018
Most beneficial aspects/well received methods:
• Participants cited the experience of instructors and their ability to explain in practical terms, safety as the primary goal of all concepts, and hands on activities as the best features of their courses

ICWUC 2018 DOE Evaluation Profile

ICWUC DOE TRAINING:
Principal Investigator:
• Frank Cyphers
Evaluator(s):
• Ruth Ruttenberg, Evaluation Consultant
Grant Number:
• ES09758
Goal(s) of Evaluation:
• Participant evaluations intended to identify learning needs at the beginning of the program and to measure fundamental skills relating to each module • To determine how the expertise of site worker trainers is used in their workplaces as a resource by their colleagues and managers.
Evaluation tools:
• Site specific tests and participant evaluation methods • Pre-/ post- test used for most courses that are longer than one day • Feedback from the trainers’ report • Follow up evaluation of DOE trainers as site resources outside the classroom. Questions center on frequency and subject areas of information requests. • The Center Director and DOE Coordinator periodically audits programs, especially new programs as they are being piloted
Population Served:
• DOE workers with a range of hazardous substance exposures. • Women and minority participants are encouraged to participate in programs

ICWUC DOE TRAINING:
Types of Courses/ Training Curricula Offered:
• Include train-the-trainer courses, 40 hour CERCLA, 24 hour Bridge, an Emergency Response class, Treatment Storage and Disposal classes, refresher, respirator, CPR/First Aid, confined space and fall protection courses
Trainers:
• On site worker-trainers from the shop floor who have completed the Chemical Emergency Response program followed by the train-the-trainer program • Training and development of trainers is a key objective of this program
Proof of effectiveness/value?
• In the 2012 report, almost half of trainees said that they had tried to make changes in health and safety at their DOE facilities in areas such as gloves, respirators, and chemical protective clothing. Of those who had attempted to make changes, 65% reported being successful. • In 2015, 90% of trainers have been asked questions, 65% on a monthly basis in areas such as toxic effects, respirators and gloves. Initial results from 2018 indicate that more questions are asked of senior trainers.
Most beneficial aspects/well received methods:
• The peer trainers not only formally teach health and safety in the classroom, but, informally teach in the work place during their day to day work. They offer valuable expertise, recognized by salaried and hourly workers alike which helps empower both themselves and their co-workers. • The ongoing analysis and monitoring of scores continues to be an effective quality assurance tool both of the participants and the trainers.

IBT 2018 DOE Evaluation Profile

IBT DOE TRAINING:
Principal Investigator:
• Lamont Byrd
Evaluator(s):
• HAMMER Federal Training Center • Robin Gillespie, Ph.D., Consultant • Ms. Chee Chang, Program Manager
Grant Number:
• UH4ES0140103
Goal(s) of Evaluation:
• Identify knowledge gains as a result of training events • Evaluate students' opinions on the courses and the material learned • Evaluation changes in knowledge, attitudes, and outcomes from courses • Maintain quality control of training and promote a sense of ownership among the principals involved in this training program
Evaluation tools:
• Multiple choice pre- and post-tests are used for many courses. A comparison of group results on the pre-tests and post-tests provides an indication of course effectiveness. Some of the questions measure the participants' knowledge of radiological subjects, such as radiological terms, types of radiation, package labels, and use of the DOT Emergency Response Guidebook. • Students complete anonymous evaluation forms after each course regarding whether their expectations for the course were met, whether they will be able to utilize course learning at work, whether they found the materials useful, and whether hands-on and dress-out activities were appropriate to their jobs. • Site visits from the program manager. Includes visits to classrooms as well as physical inventory of equipment and supplies purchased with federal funds • Audit reports from independent auditors evaluated student participation, small group activities, required contact hours, and course content. • The IBT Worker Training Program tracks workers who acquire or continue employment in the field of hazardous waste clean-up and transportation • Self-audits ensuring compliance with Minimum Criteria Document, monitoring facilities, training, education materials, trainer/trainee ratios, etc
Population Served:
• Workers and communities affected by and involved in the remediation of DOE sites and the transportation of radioactive and chemical waste • Workers employed or potentially employed within the DOE nuclear weapons complex include remediation site workers and supervisors, construction workers and supervisors, truck transportation workers and supervisors, railroad workers and supervisors

6

IBT DOE TRAINING:

Types of Courses/ Training Curricula Offered:

- Include Train the Trainer courses, Hazardous Waste Worker courses, Respiratory Protection courses, OSHA Construction Safety and Health courses, OSHA General Industry courses, Radiological Worker courses, Forklift Safety courses, Load Securement courses, etc

Trainers:

- Worker-trainers, including bilingual trainers
- Annual 40-hour Instructor Development Program required as a qualification for instructors
- OSHA 5600 – Disaster Site Trainer
- First Aid/CPR
- OTI certifications

Proof of effectiveness/value?

- The Level 1 Student Evaluation rating from the HAMMER Federal Training Facility goes from 0 being the worse to 4 being the best. The student rates the curriculum, instructor, and perception.
- In 2015 and 2016, the average HAMMER student learning rated 3.66
- In 2017 and 2018, the average HAMMER student learning rated 3.73
- Responses from trainees on what knowledge they have gained from training:
  - "I feel confident about applying what I learned back on the job "
  - "I believe my safety and job performance will be improved as a result of this training"

Most beneficial aspects/well received methods?

- To address literacy issues, if a trainee is having difficulty comprehending the questions on either the Pre-Test or Post-Test, the instructor administers the test orally.
- Program expressly lays out requirements for student safety during dress-out activities, ensuring a max student/instructor ratio of 5:1, and requiring that all trainers are CPR certified for hands- on training.
- When asked what was helpful, trainees cited the diverse backgrounds as well as the personal experience of the instructors
- Expressly report measures made to ensure trainee safety, such as student/instructor ratio, CPR requirements for instructors, evacuation plans, etc

IUOE 2018 DOE Evaluation Profile

IUOE DOE TRAINING:
Principal Investigator:
• Barbara McCabe
Evaluator(s):
• ATL International, Inc – provided a peer review
Grant Number:
• U45ES09763
Goal(s) of Evaluation:
• Determine specific impacts of training and record workplace exposures • Assess whether the training meets the needs of the workers both to work safely on the job and to be employable
Evaluation tools:
• Use of a revised standardized paper survey of the Experience and Exposure Profile (EEP) to record experiences and workplace exposures • Online trainee follow-up survey six months after training, asks about specific impacts of training • Written tests, hands-on exercises, scenarios and competency based evaluation methods are provided to local unions and DOE sites • Quality Control program assessment incorporates course evaluations and trainee feedback that supplement the program review by management • Impact evaluations (measuring worker behavior change on the job and employability) • anecdotal feedback
Population Served:
• Heavy equipment operators and stationary engineers at DOE sites • A cadre of peer trainers from this group
Types of Courses/ Training Curricula Offered:
• Trainer courses such as HAZWOPER Train-the-Trainer, Teaching Techniques, OSHA 521 Industrial Hygiene/Monitoring • Other trainings such as HAZWOPER Basic Superfund Site Worker, Rigging & Signaling, Excavation Competent Person, Radiation Worker, etc

6

IUOE DOE TRAINING:
Trainers:
• Peer trainers • Consortium aims to improve instructors' credentials by helping them obtain OSHA Master Trainer Status authorization • Additional technical experts are recruited to facilitate specialized courses and development
Proof of effectiveness/value?
• The program has become the sole provider for HAZWOPER training at the Los Alamos National Laboratory. • Of those working at a height over four feet, 91.3% wore fall protection. • Of those working on a DOE site, 69.3% were trained on the specifics of DOE's worker safety and health regulations and 85.3% received site-specific hazard training.
Most beneficial aspects/well received methods:
• Train-the-trainer peer model • High levels of hands-on training in courses • Use of Blackboard, a comprehensive learning management content system. • Having staff instructors and access to hundreds of local union instructors and DOE site trainers allows the NTF to respond quickly to training needs • Online proposal form and tracking system improves efficiency and reduces costs.

LIUNA Training 2018 DOE Evaluation Profile

LIUNA DOE TRAINING:
Principal Investigator:
• John J. LeConche
Evaluator(s):
• Trained Internal Evaluators/Certified Internal Auditors • Trained External Evaluators
Grant Number:
• 5U45ES009760-23
Goal(s) of Evaluation:
• Evaluate the participants' mastery of course material • Evaluate the appropriateness and effectiveness of training conducted • Evaluate training provider adherence to Minimum Criteria and LIUNA Training grant policies • Determine impact of Hazardous Waste Worker training on workers • Evaluate effectiveness and training abilities of trainers • Evaluate the quality of training and training resources • Track and evaluate grant program implementation and oversight according to internal Standard Operating Procedures (SOP)

LIUNA DOE TRAINING:

Evaluation tools:

- Administration of a final course exam determines participant achievement of knowledge-based learning objectives.
- Evaluation of performance in classroom and hands-on activities documents participant achievement of skills-based learning objectives. Records on participant progress and skill demonstration are kept throughout training.
- Information on the participants' use of the skills and information learned through the HW Worker and Refresher training is obtained in the Hazardous Waste Refresher course application and survey. Participants provide information on work history, skills used, problems encountered on the job, and benefits derived from training.
  - Survey obtains information on how often participants use a specific skill and on problems encountered on the job by having them select from four possible answers: very often, often, occasionally, and never.
  - Participants report on whether their training has positively affected their performance and/or safety on the job and are asked to provide work examples.
  - Participants report if they have attempted to resolve problems on the job and, if so, to describe the incident.
- Information on employment and the type of jobs worked post-training is also obtained from the HW Refresher Survey. Participants identify jobs worked during the past year, the type of work conducted (e.g. hazardous materials cleanup, radiation, biological hazards, etc.), the location and contractor, and the length of the job. This information helps LIUNA Training determine if trained workers find jobs that use the skills taught in the DOE training program and if they work at DOE facilities.
- Course evaluations are completed by participants at the end of all courses. The evaluation form rates overall course performance, including specific questions on the course content, pace, and materials. Participants specify whether they strongly agree, agree, disagree, or strongly disagree with statements about the course. Open ended questions regarding what the participant liked best about the training and what could be improved are also included in evaluation form.
- LIUNA Training also contracts with the Laborers' Health and Safety Fund of North America (LHSFNA) to observe the Health Effects portion of the 80-hour HW Worker course and to monitor the participant medical screening conducted by trained health professionals.
- On-site monitoring visits by LIUNA Training staff help the program evaluate compliance with the Minimum Criteria and LIUNA Training policies. Monitors observe instructor training techniques and implementation of interactive teaching techniques and note participant engagement and reaction to the training. Monitors also assess the quality and safety of hands-on training and training supplies/equipment. In addition, monitors perform a records review to ensure compliance with reporting requirements and conduct interviews with the training director, instructors, and administrative staff to determine understanding of and compliance with policies and the Minimum Criteria.
- LIUNA Training also operates grant programs according to its Grants Management Standard Operating Procedures. The SOP requires specific processes for conducting activities under grant programs, establishes controls, and sets metrics that apply to all grant programs. The SOP ensures that the LIUNA Training grant programs, including the DOE training program, are managed in a manner that ensures the highest quality and accountability.

Population Served:

- DOE workers who come to demolition and decommissioning jobs. Some are employed in waste site remediation, general construction, and maintenance positions and some as supervisory personnel.
- During the last year of the LIUNA Training DOE program (2016-2017) the percentage of minorities trained under the DOE program was approximately 44%. Approximately 16% of the participants were female. Most of the participants were between 30 and 59 years of age.
- Participants in the program are primarily construction craft laborers although other construction trades workers attend training and training is provided to DOE headquarters personnel.

LIUNA DOE TRAINING:

Types of Courses/ Training Curricula Offered:

- Various courses including Hazardous Waste Worker and Refresher, Asbestos Abatement, Hazard Communication, Radiological Worker, First Aid/AED, Lead Abatement, OSHA 10-hour and 30-hour Construction Safety, Confined Space, Hoisting and Rigging, and other construction safety training are provided. All curricula meet the standards established by LIUNA Training's accreditation as a Curriculum Development Agency under the International Accreditation Service (IAS).

Trainers:

- Staff members stay updated on environmental remediation techniques, technologies and regulations. Staff participate on various industry and professional committees to update and revise safety and professional standards.
- Each year a HW Instructor train-the-trainer course is held and other instructor training is provided on an as-needed basis. Radiological Worker Instructor refreshers and train-the-trainer courses are provided as required.
- Instructors all participate in the ANSI accredited LIUNA Training Instructor Certification Program. All DOE instructors participate and work toward certification. The multi-year training and certification process includes:
  - Initial Baseline Assessment where instructors participate in several assessments to determine their teaching and computer skills and their reading and math literacy.
  - Participation in Year 1 and Year 2 instructor training in activity-based, experiential teaching techniques and principles of adult learning and teaching.
  - Math, reading, and computer skills training if the participant did not achieve the qualification scores required to sit for the certification exam.
  - Taking and passing the certification exam.
  - Post-certification participation in continuing education courses and/or teaching documentation as described and approved by LIUNA Training.
  - Monitoring of teaching skills if selected on a random basis.
- DOE grant program instructors are required to attend an annual Hazardous Waste Instructor Refresher where they learn about new technologies, industry updates, program policies, and topics of interest for inclusion in HW Refresher training. Instructors also participate in curricula review and hands-on practice.

Proof of effectiveness/value?

- Annually, hundreds of workers trained under the DOE program and who return for HW Refresher training are employed at DOE sites. During the 2016-2017 program year, a minimum of 375 participants worked on DOE facilities.
- Overall, for all courses conducted under the DOE in 2017, 98% of participants reported that the training made them aware of health and safety issues that they had not previously considered. One hundred percent believed that the training will help make their work practices and life safer.
- For the 2017 program year, 97% of participants successfully completed the training for which they were enrolled.
- One hundred percent of DOE instructors participated in the LIUNA Training Annual Instructor Conference. Fifty-two percent have achieved their ANSI accredited LIUNA Training Instructor Certification. Ninety-eight percent of DOE instructors attended the 2017 HW Instructor Refresher.

LIUNA DOE TRAINING:

Most beneficial aspects/well received methods:

- LIUNA Training's efforts to diversify the DOE training and worker population have been largely successful. While approximately 9% of construction workers in the United States are women, participation in the LIUNA Training DOE program by women in 2017 was 16%. Minority participation in the LIUNA Training DOE program was approximately 44%.
- From information gathered using the Hazardous Waste Refresher application, the skills that participants learned and subsequently used on the job were respiratory protection, reading safety data sheets, working in or near confined spaces, demolition, injury protection, hazard recognition, and decontamination.
- The most frequently encountered job site hazards reported by program participants were: equipment and tools in poor condition, untrained supervisors or co-workers, poor housekeeping, improper or inadequate PPE and fuel leaks or spills.
- For the 2015 to 2017 program years, more than 1,350 Hazardous Waste Refresher participants indicated that their hazardous materials training positively affected their performance and safety on the job. The most common benefit mentioned was increased ability to recognize hazards and safety issues. Many participants stated that the training helped them be safe on the job. Many mentioned that they learned how to protect themselves and use the proper PPE. Participants also noted that the training provided them with the ability to work safely with hazardous substances and how to respond to unsafe or unexpected situations.
- For the 2015 to 2017 program years, approximately 840 program participants stated that they had attempted to resolve safety problems they observed on the job. Most were successful at resolving the issues. The most common response was that participants brought the problem to their supervisor, safety officer and/or safety meetings. Some other methods of problem resolution included:
  - Informing and training co-workers
  - Tagging out unsafe tools and equipment; requesting/receiving replacement tools
  - Pausing/stopping work
  - Requesting appropriate PPE
  - Cleaning up spills
  - Conducting and encouraging good housekeeping practices
  - Recommending appropriate training for workers
  - Requesting and/or consulting SDS
- When asked what they liked most about their training, participants felt very positive about the hands-on training and the activity-based learning exercises. They appreciated the real-life examples that instructors provided and the relevance of the information to their jobs and lives.

*LIUNA Training 2018 HWWTP Evaluation Profile

**Included because LIUNA Training participated in the NIEHS-DOE program through a no-cost extension for 2015 through 2017 and still continues to offer training to its members across the DOE complex through the NIEHS HWWTP.*

LIUNA HWWTP TRAINING:
Principal Investigator:
• John J. LeConche
Evaluator(s):
• Trained Internal Evaluators/Certified internal Auditors • Trained External Evaluators
Grant Number:
• 5U45ES006174-27
Goal(s) of Evaluation:
• Evaluate the participants' mastery of course material • Evaluate the appropriateness and effectiveness of training conducted • Evaluate training provider adherence to Minimum Criteria and LIUNA Training grant policies • Determine impact of Hazardous Waste Worker training on workers • Evaluate effectiveness and training abilities of trainers • Evaluate the quality of training and training resources • Track and evaluate grant program implementation and oversight according to internal Standard Operating Procedures (SOP)

LIUNA HWWTP TRAINING:

Evaluation tools:

- Administration of a final course exam determines participant achievement of knowledge-based learning objectives.
- Evaluation of performance in classroom and hands-on activities documents participant achievement of skills-based learning objectives. Records on participant progress and skill demonstration are kept throughout training.
- Information on the participants' use of the skills and information learned through the HW Worker and Refresher training is obtained in the Hazardous Waste Refresher course application and survey. Participants provide information on work history, skills used, problems encountered on the job, and benefits derived from training.
  - Survey obtains information on how often participants use a specific skill and on problems encountered on the job by having them select from four possible answers: very often, often, occasionally, and never.
  - Participants report on whether their training has positively affected their performance and/or safety on the job and are asked to provide work examples.
  - Participants report if they have attempted to resolve problems on the job and, if so, to describe the incident.
- Information on employment and the type of jobs worked post-training is also obtained from the HW Refresher Survey. Participants identify jobs worked during the past year, the type of work conducted (e.g. hazardous materials cleanup, radiation, biological hazards, etc.), the location and contractor, and the length of the job. This information helps LIUNA Training determine if trained workers use the skills taught in the training program and if they work on environmental remediation jobs.
- Course evaluations are completed by participants at the end of all courses. The evaluation form rates overall course performance, including specific questions on the course content, pace, and materials. Participants specify whether they strongly agree, agree, disagree, or strongly disagree with statements about the course. Open ended questions regarding what the participant liked best about the training and what could be improved are also included in evaluation form.
- LIUNA Training also contracts with the Laborers' Health and Safety Fund of North America (LHSFNA) to observe the Health Effects portion of the 80-hour HW Worker course and to monitor the participant medical screening conducted by trained health professionals.
- On-site monitoring visits by LIUNA Training staff help the program evaluate compliance with the Minimum Criteria and LIUNA Training policies. Monitors observe instructor training techniques and implementation of interactive teaching techniques and note participant engagement and reaction to the training. Monitors also assess the quality and safety of hands-on training and training supplies/equipment. In addition, monitors perform a records review to ensure compliance with reporting requirements and conduct interviews with the training director, instructors, and administrative staff to determine understanding of and compliance with policies and the Minimum Criteria.
- LIUNA Training also operates grant programs according to its Grants Management Standard Operating Procedures. The SOP requires specific processes for conducting activities under grant programs, establishes controls, and sets metrics that apply to all grant programs. The SOP ensures that the LIUNA Training grant programs are managed in a manner that ensures the highest quality and accountability.

Population Served:

- Construction craft laborers working at environmental remediation sites, demolition and reconstruction sites, health care facility renovation, and in general construction sites where exposure to hazardous substances is possible. Some training of other construction trades workers and apprentices and supervisors is also conducted. Training is also provided to employees of government agencies when requested.
- In the 2017-2018 program year, approximately 34% of participants trained were minorities. The largest minority group represented was African American at 14%. Latino/Hispanic represented 12% of the participants. Thirteen percent of the program participants were female. This number exceeds the percentage of women working in the construction trades overall, which is approximately 9%.
- Most of the HWWTP participants were between 30 and 59 years of age.

LIUNA HWWTP TRAINING:

Types of Courses/ Training Curricula Offered:

- Various courses including 80-hour and 40-hour Hazardous Waste Worker, Hazardous Waste Worker Refresher, Infection Risk Control Assessment (ICRA), Hazard Communication, OSHA 10-hour Construction Safety, Radiological Worker II, and other training related to hazardous substance remediation are provided. All curricula meet the standards established by LIUNA Training's accreditation as a Curriculum Development Agency under the International Accreditation Service (IAS).

Trainers:

- Staff members stay updated on environmental remediation techniques, technologies and regulations. Staff participate on various industry and professional committees to update and revise safety and professional standards.
- Each year a HW Instructor train-the-trainer course is held and other instructor training is provided on an as-needed basis.
- Instructors all participate in the ANSI accredited LIUNA Training Instructor Certification Program. All HWWTP instructors participate and work toward certification. The multi-year training and certification process includes:
  - Initial Baseline Assessment where instructors participate in several assessments to determine their teaching and computer skills and their reading and math literacy.
  - Participation in Year 1 and Year 2 instructor training in activity-based, experiential teaching techniques and principles of adult learning and teaching.
  - Math, reading, and computer skills training if the participant did not achieve the qualification scores required to sit for the certification exam.
  - Taking and passing the certification exam.
  - Post-certification participation in continuing education courses and/or teaching documentation as described and approved by LIUNA Training.
  - Monitoring of teaching skills if selected on a random basis.
- HWWT grant program instructors are required to attend an annual Hazardous Waste Instructor Refresher where they learn about new technologies, industry updates, program policies, and topics of interest for inclusion in HW Refresher training. Instructors also participate in curricula review and hands-on practice.

Proof of effectiveness/value?

- Annually, approximately 2,000 workers trained under the HWWTP return for HW Refresher training. Roughly two-thirds of these report having worked on environmental remediation sites or other jobs that carried a risk of exposure to hazardous substances during the past year. During the 2016-2017 program year, a minimum of 500 participants worked on hazardous waste sites and 170 addressed radiological contamination. Another 600 worked on asbestos and/or lead abatement and over 400 worked on demolition. Pipeline work grew with 214 reporting work in that industry. Another growth area was work in health care facilities or other jobs that addressed biological hazards (106 respondents).
- Overall, for all courses conducted under the HWWTP in the 2017-2018 program year, 98% of participants reported that the training made them aware of health and safety issues that they had not previously considered. Ninety-nine percent believed that the training will help make their work practices and life safer.
- For the 2017 program year, 97% of participants successfully completed the training for which they were enrolled. Ninety-eight percent of participants believe they understand the course content well enough to explain the information to others, indicating confidence in their learning and achievement of course objectives.
- Nearly all HWWTP instructors participated in the LIUNA Training Annual Instructor Conference and as of August 2018, 75 have achieved LIUNA Training's ANSI accredited Instructor Certification. One hundred thirty-seven HWWTP instructors attended the 2018 HW Instructor Refresher and 18 new instructors participated in a Hazardous Waste train-the-trainer.

LIUNA HWWTP TRAINING:

Most beneficial aspects/well received methods:

- LIUNA Training's efforts to diversify the hazardous waste worker training and worker population have been largely successful. Minority participation in the program was approximately 34% in 2017-2018. Of all participants, the largest minority group represented is African American at 14%. Latino/Hispanic represents 12%. Thirteen percent of participants were female. This number exceeds the percentage of women working in the construction trades overall, which is approximately 9%.
- From information gathered using the Hazardous Waste Refresher application, the skills that participants learned and subsequently used most frequently on the job were:
  - Injury protection (hearing, back, heat/cold stress)
  - OSHA rules and regulations
  - Hazard recognition
  - Fall protection
  - Respiratory protection
- The most frequently encountered job site hazards reported by program participants were:
  - Equipment and tools in poor condition
  - Poor housekeeping
  - Untrained supervisors or co-workers
  - Improper or inadequate PPE
  - Fuel leaks or spills
- Since 2015, approximately 6,375 Hazardous Waste Refresher participants indicated that their hazardous materials training positively affected their performance and safety on the job. The most common benefit mentioned was increased ability to recognize hazards and safety issues. Many participants stated that the training helped them be safe on the job. Many mentioned that they learned how to protect themselves and use the proper PPE. Participants also noted that the training provided them with the ability to work safely with hazardous substances and how to respond to unsafe or unexpected situations.
- Since 2015, more than 3,500 Hazardous Waste Refresher participants stated that they had attempted to resolve safety problems they observed on the job. Most were successful at resolving the issues. The most common response was that participants brought the problem to their supervisor, safety officer and/or safety meetings. Some other methods of problem resolution included:
  - Informing and training co-workers
  - Tagging out unsafe tools and equipment; requesting/receiving replacement tools
  - Pausing/stopping work
  - Requesting appropriate PPE
  - Cleaning up spills
  - Conducting and encouraging good housekeeping practices
  - Recommending appropriate training for workers
  - Requesting and/or consulting SDS
- When asked what they liked most about their training, participants felt very positive about the hands-on training and the activity-based learning exercises. They appreciated the real-life examples that instructors provided and the relevance of the information to their jobs and lives.

PETE 2018 DOE Evaluation Profile

PETE DOE TRAINING:
Principal Investigator:
• Margaret Mellecker
Evaluator(s):
• Steve Fenton, external evaluator
Grant Number:
• U45ES019338
Goal(s) of Evaluation:
• Measure the effectiveness of the overall project • Measure student performance • Measure student perception of course effectiveness • Measure employer perception of course effectiveness • Measure student perception of trainers • Track and follow up with students and employers
Evaluation tools:

• Hands-on and electronic testing of students
• Electronic course evaluations completed by students
• For evaluation of online courses students were asked to respond to a series of positive statements covering six broad categories. Those categories included: Distance Learning Environment, Trainer, Method Presentation, Overall Impressions, and a general Category. They were asked to respond to each of those statements on a scale of 1 – 5 with a 5 being strongly agree and a 1 being strongly disagree
• Evaluation of in classroom trainings, included ten questions to be rated by students on a scale of 1 – 5 with 5 being "extremely well satisfied" and 1 being "extremely dissatisfied."
· Student tracking and follow-up to determine the extent that workers are using their training.
  · Follow up questions asked for students include:
  · To what extent did the HAZWOPER training help you in the workplace?
  · To what extent did the class help you reduce hazards?
· Instances when you used information from the HAZWOPER course in your job.
· Follow up questions asked for employers include:
  · To what extent did your employees' HAZWOPER training benefit workers?
  · To what extent did your employees HAZWOPER training benefit the employee?
  · To what extent did your employees' HAZWOPER training benefit the overall workplace?
• Employer follow-up to verify that the skills and knowledge acquired through training are being applied on the job
• PETE staff members conduct site visits to consortia sites and, when possible, attend classes, and review curriculum, equipment, facilities, site safety plans, first aid certifications.

Population Served:
• DOE contractors, subcontractors and public officials serving DOE facilities

PETE DOE TRAINING:

Types of Courses/ Training Curricula Offered:

- Various courses, including Confined Space Awareness and Entry, Emergency Response to Chemical Spills, Emergency Response Incident Command, Disaster Site Worker, Mold Awareness and Inspection, Operations Level Emergency Response, Rad Worker II Practical Factor, Basic Radioactive Materials in Transportation and Emergency Response for Specific Hazards.

Trainers:

- Train-the-Trainer and Refresher Training courses for instructors
- To become a member of CCCHST, consortium instructors must successfully complete a two-week Great Environmental Safety Trainers' (GreatEST) Train-the-Trainer Institute, and participate in training evaluation and data collection.

Proof of effectiveness/value?

- The majority of students in the 8-hour online course either disagreed or strongly disagreed with the following statement: "I would have learned more in a classroom." This is a strong indication that students felt the online training received was of high quality and met their needs.
- The results of evaluations at the Savannah River site, Pantex and Oakridge National Laboratory show that trainees strongly agree that the course content was presented in a logical and organized manner, and that learning objectives were clearly stated and guided the course presentation. The quality of instructors was rated highly as well, as was relevance of training to job and effectiveness of training.

Most beneficial aspects/well received methods:

- A Spanish translation of the 40-hour HazWOPER book and online course has been developed.
- In 1991, HMTRI (a PETE strategic partner), recognized the need to provide distance-learning opportunities for students who were unable to attend structured classes. Ever since, HMTRI/PETE has been committed to providing opportunities for long-distance learners but also instructors who offer online training.
- Because the majority of students in 1910.120 courses are adults, PETE ensures that traditional and electronic courses accommodate the adult learner.

USW-TMC 2018 DOE Evaluation Profile

USW-TMC DOE TRAINING:
Principal Investigator:
• Ashlee Fitch
Evaluator(s):
• Scientific needs assessment from Dr. Beth Rosenberg (Tufts University)
Grant Number:
• U45ES09761
Goal(s) of Evaluation:
• Assess trainees' proficiency following training • Scientific needs assessment designed to inform and improve health, safety, and related trainings • Promote Lessons Learned as part of the evaluation process to be carried out across DOE's Lessons Learned System
Evaluation tools:
• The USW-TMC incorporates its proficiency assessment and training evaluation tool into all small group activity-based training manuals. • Evaluation responses are collated by Tab Services and reviewed weekly by the USW-TMC. • In addition to ongoing monitoring of evaluation forms from every course, we report in the year-end final progress report on samples from each area of training to assess participants' overall evaluation of training courses. • In-person trainers enhancement meetings are held on a quarterly basis at each DOE site. All of the site trainers and representative(s) of the USW-TMC meet to discuss training successes and challenges. • The USW-TMC conducts periodic trainer enhancement meetings with attendance from each of the sites providing an opportunity to share challenges and ideas among the sites. • The USW-TMC hosts quarterly telephone calls for the lead trainers from each of the DOE sites to share challenges and ideas among the sites. • In 2018 the USW-TMC conducted a gap analysis with all of the DOE sites to identify issues that have come up regarding the training and ideas for ways in which the USW-TMC can respond to those challenges. • The USW-TMC contracted with Tufts University to assist in training evaluation. The evaluation project was conducted by Dr. Beth Rosenberg. Dr. Rosenberg conducted participant focus groups at selected DOE sites and reported back on findings. • In July 2018 the USW-TMC brought together nationally recognized evaluation experts and key worker-trainers for an Evaluation Summit. The Summit laid the groundwork for a renewed and enhanced effort to conduct robust evaluation of our programs in the coming years.
Population Served:
• Workers employed at Department of Energy sites who will benefit from learning how to protect themselves during emergencies and to implement strategies to prevent potentially deadly accidents. • Our training partners from the CWA, NDLON and Make the Road New York who may be contracted to work in DOE facilities • The Tribal communities in areas adjacent to DOE complexes. • Community/Student populations in areas adjacent to DOE complexes who have interest in preparing for possible future employment in these facilities.

USW-TMC DOE TRAINING:

Types of Courses/ Training Curricula Offered:

- Courses include HAZWOPER, Final Rule Awareness, Process Safety Management, Trainer Reauthorization, OSHA Outreach courses, HAZWOPER Refresher, Near-Miss Reporting, Hazard Mapping, Radiation Technician Control Course etc.

Trainers:

- Worker-trainers used
- Trainers are eligible for 8 hours of trainer enhancement training quarterly
- In 2016, The SCEO-TMC's DOE site worker trainers received 40 hours of training designed to refresh and enhance the technical expertise of the trainer

Proof of effectiveness/value?

- Participant evaluations revealed a high level of satisfaction with the worker-led training sponsored by the USW-TMC.
- Dr. Rosenberg's report affirmed the high level of satisfaction with the USW-TMC sponsored training.
- Suggestions reported across several forms of evaluation indicated that use of visual aids (mainly Chemical Safety Board videos) enhanced discussion during the classes.
- At the site specific enhancement meetings worker trainers reported specific examples of how "real life" situations and conditions were improved and/or incidents were responded to properly as a result of the training.
- USW-TMC sponsored a training program to get community members certified to become Radiation Control Technicians. All of the participants passed their final test and all were offered positions by site contractors.
- The Oak Ridge and Portsmouth DOE site worker-trainers conducted OSHA Outreach Training Sessions at local high schools and vocational schools. The classes were very well-received and additional classes are being requested. This program is highly valued in the communities served and are seen as a pathway to employment.
- In 2017 the National Training Center (NTC) awarded the USW-TMC reciprocity for its 40-hour HAZWOPER and 8-hour HAZWOPER Refresher classes.

Most beneficial aspects/well received methods:

- The organization continued to move towards a blended learning approach that combines technology (use of iPads to use DOT Emergency Response Guidebooks) and web-based videos with small group and hands on learning activities.
- Incorporation of videos from the Chemical Safety Board into the 8-h9our HAZWOPER Refresher. These videos serve as visual representation of real scenarios that effectively demonstrate the results of what can happen when hazards are reported. These videos set the stage for classroom participants to volunteer report near-misses and hazards and will hopefully lead to eliminating those hazards.
- Focus on near miss reporting: The centerpiece of this initiative is an activity that seeks to actively engage participants in reporting near-misses and hazards. This initiative has had two objectives: 1) to train the workers to identify and report those hazards and near-misses that can cause injuries; and 2) To evaluate after one year of reporting how much reporting has increased and how many hazards were eliminated and at what level of hierarchy.
- Sharing success stories within and among sites has helped worker-trainers put the training into perspective and offer examples to their classes that can make the Refresher training immediately relevant to the participants.

CAUTION
HAZARDOUS MATERIAL
CAUTION
HAZARDOUS MATERIAL
CAUTION
HAZARDOUS MATERIAL
CAUTION
HAZARDOUS MATERIAL

National Institute of
Environmental Health Sciences

This publication was made possible by contract number HHSN273201500075U from the National Institute of Environmental Health Sciences (NIEHS), NIH to MDB., Inc.