

New Solut. Author manuscript; available in PMC 2014 August 31.

Published in final edited form as:

New Solut. 2013; 23(4): 561-576. doi:10.2190/NS.23.4.c.

## Workplace Safety and Health Improvements Through a Labor/ Management Training and Collaboration

Bruce Mahan, John Morawetz, Ruth Ruttenberg, and Rick Workman

#### **Abstract**

Seven hundred thirty-nine workers at Merck's Stonewall plant in Elkton, Virginia, have a safer and healthier workplace because four of them were enthusiastic about health and safety training they received from the union's training center in Cincinnati, Ohio. What emerged was not only that all 739 plant employees received OSHA 10-hour General Industry training, but that it was delivered by "OSHA-authorized" members of the International Chemical Workers Union Council who worked at the plant. Merck created a new fulltime position in its Learning and Development Department and hired one of the four workers who had received the initial training. Strong plant leadership promoted discussions both during the training, in evaluation, and in newly energized joint labor-management meetings following the training. These discussions identified safety and health issues needing attention. Then, in a new spirit of trust and collaboration, major improvements occurred.

#### Keywords

training; labor-management collaboration; safety and health

Founded in 1988, the International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education in Cincinnati has trained workers nationwide to protect themselves from a range of hazards, primarily from chemical spills. The ICWUC training philosophy concentrates on providing worker-centered small-group training that improves the ability of worker participants to discuss and solve health and safety problems. Much of the Center's funding for training comes from awards through the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program. This paper examines the mechanism of workplace improvements at one site, emerging after successful plant-wide OSHA 10-hour General Industry training. This study builds on two earlier published evaluations of the ICWUC training program, one led by McQuiston in 2000 and the other led by Becker in 2004 [1, 2]. Both McQuiston and Becker found that after training, workers were more active participants in improving their health and safety.

The case study described in this article grew from a training agreement between the ICWUC Center for Worker Health and Safety Education in Cincinnati, Ohio, and the Merck-owned Stonewall Pharmaceutical plant in Elkton, Virginia. Eighty-five percent of the hourly

<sup>© 2013,</sup> Baywood Publishing Co., Inc.

employees in Elkton are represented by Local 94C of the International Chemical Workers Union Council/United Food and Commercial Workers. Fifteen percent (approximately 60 lab technicians and coordinators) are represented by Workers United. Hourly (union) employees comprise approximately 55 percent of the workforce, and 45 percent are salaried (management) employees.

Merck is a worldwide health products manufacturing company. Established in 1941, Merck's Elkton facility performs a range of pharmaceutical manufacturing (batch processing) activities such as fermentation, solvent extraction, organic chemical synthesis, and finishing operations [3]. Among the products manufactured at the Stonewall plant in Elkton, Virginia, are antibiotics, anti-parasitic drugs, anti-inflammatory drugs, and cholesterol-lowering drugs [4].

#### **Literature Review**

A body of workplace health and safety literature and documents provides evidence of the value of worker health and safety training, particularly when delivered by worker trainers, in building a positive work environment that fosters safety and health improvements. Even before he became the head of the U.S. Occupational Safety and Health Administration (OSHA), Dr. David Michaels argued that "a bold campaign to change the workplace culture of safety should be initiated. This can't happen unless workers are trained and given the opportunity to play an active role" [5]. According to OSHA, these improvements "have the single greatest impact on accident reduction of any process" [6]. The following criteria are cited by OSHA as key for developing an environment conducive to health and safety improvements: obtain top management "buy-in" and continue building "buy-in"; build trust; conduct self-assessments/benchmarking; provide initial training of management/supervisory staff, union leadership (if present), and safety and health committee members, and a representative number of hourly employees; establish a steering committee; develop a site safety vision; align the organization by establishing a shared vision of balancing safety and health goals and objectives with production objectives; define specific roles and responsibilities for safety and health at all levels of the organization, with responsibility for everyone; develop a system of accountability for all levels of the organization; develop measures and an ongoing measurement and feedback system; develop policies for recognition, rewards, incentives, and ceremonies; establish awareness and training for all employees; implement process changes via involvement of management, union (if one is present), and employees; continually measure performance, communicate results, and celebrate successes; provide on-going support with reinforcement, feedback, reassessment, mid-course corrections; and on-going training [6].

Another view of necessary elements for an environment conducive to workplace improvements comes from Jane Ardern, the manager of Education and Information Services for WorkSafe. She argues that the following are necessary: commitment at all levels; safety and health treated as an investment, not a cost; safety and health seen as part of continuous improvement; training and improvement provided for everyone; systems in place for workplace analysis and hazard prevention and control; a blame-free work environment; and organizational celebration of successes [7].

#### Safety and Health Training as a Key Component for a Safe and Healthy Workplace

"The training of workers plays a critical role in the prevention of injury and disease in the workplace" [8]. Research shows that hands-on, small-group training is a necessary element of most workplace changes and improvements. Scholars writing in the *American Journal of Public Health* concluded that "[a]s training methods became more engaging (i.e., requiring trainees' active participation), workers demonstrated greater knowledge acquisition, and reductions were seen in accidents, illnesses, and injuries" [9]. Weinstock and Slatin in a *New Solutions* issue devoted to health and safety training discuss the importance of "helping workers establish the power to reduce and eliminate workplace hazards" [10] as a key training goal. They go on to review the literature of empowerment-oriented health and safety training. Jean Manoli, who provides training and compliance assistance as staff of the Massachusetts Department of Labor Standards, believes that OSHA 10-hour training is "becoming 'industry standard' and the 'way of doing business' in both construction and general industry" [11].

The value of training, not only for worker safety but also for the bottom line, is increasingly recognized by employers [11]. For example, the National Institute of Environmental Health Sciences (NIEHS) program was created, in large measure, to help companies in the clean-up business by providing a trained work force, and initially it faced a great deal of opposition, in large part because of perceived cost. Years later, with an excellent safety and health record and few injuries, businesses seem to have stopped complaining about the training [12]. OSHA 10-hour construction training is deemed so critical on construction work sites that it is now a requirement for work in many cities and states across the nation. New York City is just one of these cities. Connecticut, Massachusetts, Missouri, Nevada, New Hampshire, New York, and Rhode Island all have OSHA 10-hour training requirements. In addition, many general contractors have their own requirements for training as a prerequisite for working on one of their sites. A loss control specialist with Liberty Mutual Insurance, Ted Christensen, has said of many cities, states, and individual employers, "They recognize that you have to spend the money in training, and equipment and safety provides a return on the investment" [13].

#### Peer Training is a Particularly Effective Training Model

The concept of peer training is that workers learn best from other workers, and that the best teachers are workers themselves [14]. Peer trainers have more credibility with most workers, because they have "walked the walk" and they "talk the talk." Peer trainers can often deliver the same training as professionals in a timelier manner and at a lower cost [15]. OSHA supports many train-the-trainer programs for worker trainers through its Susan Harwood grants [16].

An evaluation of a United Auto Workers train-the-trainer program found that most trainees thought that worker-trainers communicate better than other types of trainers. Trainees also "agreed that worker-trainers are more knowledgeable about trainees' work sites" [17]. As far back as 1999, training staff from the University of Alabama–Birmingham (UAB) spoke of the acceptance of worker trainers, not just by workers, but by management as well. The plant manager of a paper facility where UAB-trained worker-trainers provided training to

over 6,000 hourly and salaried employees said, "Any employee-driven program tends to come across with credibility, thus acceptance and effectiveness." Successes of worker-trainers in corporations cited by UAB included local divisions of Georgia Pacific, International Paper, Weyerhaueser, Union Camp, Stone Container, and Potlatch [18].

## Elkton, Virginia: the Beginning of Collaboration

In September 2009, at Merck's Stonewall facility in Elkton, Virginia, at a labor-management health and safety meeting, a decision was made that all 739 of its employees should receive the OSHA 10-hour General Industry training course. Bold leadership, both from the union and from management, allowed for this ambitious objective. Shortly thereafter, four members of the International Chemical Workers Union Local 94 from the facility attended a four-day emergency response scholarship class in Cincinnati at the ICWUC training center. When they returned to work they spoke highly of the Center to both the union leadership and Merck management.

A decision was also made, at the September meeting, for a union member to become part of the Learning and Development Department of the facility to help in the training and to carry out recommendations resulting from the training. Management approved the new position, and potential candidates were trained with OSHA courses, authorizing them to deliver the OSHA 10-hour General Industry training. One of the four trainees that attended the ICWUC training was hired into the Learning and Development Department in February 2011.

## **Pilot Programs Led to Site-Specific Training**

The training initiative began with two pilot courses. These pilot programs were generic OSHA 10-hour courses for General Industry. Upon completion of these pilot courses the participants met in January 2010 to determine whether or not the Center's training methods and curriculum would be a good fit for Merck's population. The pilot programs were considered successful, but both labor and management agreed that the training needed modification to meet site-specific requirements as well as OSHA requirements. ICWUC staff began detailed program development to meet these two requirements.

## **Collaboration to Meet Training Needs**

At the meetings held following the pilot programs, participants discussed the capabilities of the ICWUC's training center to develop site-specific modules for the Stonewall plant that would lead to a card from OSHA certifying that each trainee had completed the requirements for the OSHA 10-hour General Industry training course.

Details concerning scheduling were also discussed during these meetings. The plan was to schedule people from the same departments to attend classes together to keep the materials focused and applicable. This proved to be difficult, and the classes were actually comprised of workers from a variety of departments. The original thought was that the classes could be

<sup>&</sup>lt;sup>1</sup>The modules required at the time were: Introduction to OSHA, Walking and Working Surfaces, Emergency Evacuation, Electrical Safety, Personal Protective Equipment, and Hazard Communication [19]. Electives were Hazardous Materials, Fall Protection, Industrial Hygiene, Materials Handling, Safety and Health Programs, and Ergonomics.

scheduled during turnarounds (changes in the chemical in production) and times when departments could release people without having a negative impact on production. Scheduling during turnarounds, however, did not prove feasible.

## **Curriculum Development and Evaluation**

Development of site-specific training modules that fulfilled the OSHA requirements for participants to receive OSHA's 10-hour card for General Industry began in February 2010 with a completion deadline of May the same year. The ICWUC Center agreed to be responsible for developing site-specific curricula, providing all manuals and resources, presenting modules, and co-facilitating as much as possible with the newly authorized inhouse trainers. The goal was that once the planning was completed, the in-house worker trainers would be able to present the entire course without assistance, chair the follow-up evaluation meetings, and write summary reports.

The curriculum development began with objectives for each module agreed upon by the labor-management planning group at the Stonewall plant in Elkton, Virginia. The module development aimed to create site-specific curricula, and multiple critical changes did add site-specificity to the core generic training materials that were used.

## **Walking and Working Surfaces**

The generic health and safety curriculum included a PowerPoint presentation about walking and working surfaces. Site-specific pictures were added to the presentation, and an effort was made to focus on the plant areas most applicable to each group of trainees. A site-specific small group activity was also developed which met OSHA objectives.

#### **Emergency Action and Fire Prevention Plans**

Merck had been offering Emergency Evacuation training in-house at its Stonewall plant as an on-line module and the company provided ICWUC staff with a copy of that module to help with development of a site-specific OSHA 10-hour training module. After going through the e-module several times and comparing it to the OSHA requirements, ICWUC staff members were in agreement that the module was very good and exceeded most of OSHA's requirements. The e-module had all the information necessary and was very detailed. However, Merck had been unhappy with the results of recent drills. It seemed that even though the electronic training module was well done, it was still ineffective in generating the needed real-life practices.

Staff from the ICWUC training center, with advice from members of Local 94C, took all the information from the e-module and created a small group exercise for this section of training. This seemed to be well received, and early evaluations were supportive of this exercise. However, the plant had a real incident during one of the training sessions and evacuation still did not go well. Even though the majority of plant employees had the necessary classroom knowledge to answer all the questions about evacuation, they still failed when it came to implementing that knowledge. The biggest shortcoming was accounting for everyone in their designated assembly areas. It became apparent that the scope of the training was insufficient to establish the necessary knowledge for this type of

critical practice, so trainers adjusted the module so that everyone would conduct drills at the assembly areas and ensure that they would know where they were to report and to whom. This continuous collaboration and evaluation led to the evolution of a module that had quality hands-on training and achieved the necessary results. Employees continue to receive reinforcement of the evacuation process with semi-annual drills.

#### **Personal Protective Equipment**

Personal protective equipment (PPE) of all types was gathered from across the plant and used for training. Included were air line hoods (Versa hoods) and respirators; Saranex, Tyvek, and TyChem 300 chemical suits; polyvinyl alcohol, nitrile, butyl rubber, neoprene, Silver Shield, and Viton gloves; hard-toe shoes; and safety glasses. Thus, the PPE that were the focus of classroom sessions were site-specific to the trainees, avoiding the abstract nature of generic examples. Using PPE familiar to trainees allowed them to more easily apply what they learned.

#### **Ergonomics**

Plant-specific ergonomics issues surfaced early on in the training and received focus in subsequent sessions, using specially developed table-top exercises. Issues ranged from loading and lifting to the design of work stations that allowed technicians to sit in a comfortable position while working. Resolving some of these ergonomic issues became an outcome of training and subsequent health and safety committee work.

## **Outcomes of Training**

Each class was given a pre- and post-test to assess acquired knowledge. The pre-/post-test protocol (available from the authors on request) was established simultaneously with curriculum development to ensure that data would be accurate and measurable. All trainees received a 24-question pre-test comprised of two questions from each of the six required modules and two questions from each of the six potential electives. After trainees selected their two electives, a 16-question post-test was assembled for each individual class. This 16-question post-test was comprised of the 12 questions from the required modules and two questions from each of the two electives the class actually covered.

At the end of each training course, participants also completed an evaluation aimed at measuring workplace changes that workers expected as a result of the training. Three months after the last class, meetings for 80 of the 739 participants were arranged with ICWUC staff and others involved in delivering the training. The 80 participants were selected to represent every department. To the extent possible, union members and all levels of supervision were equally represented. Through a series of questionnaires and follow-up discussions, this group of 80 identified a list of safety concerns in their jobs. Many of these safety concerns were quickly resolved. This process was deemed possible only because of the common training and the mutual trust that the training had engendered.

Trainees gained significant knowledge during the OSHA 10-hour General Industry course. They learned the prescribed curriculum and also learned about related plant procedures. In eight modules (Introduction to OSHA, Hazard Communication, Walking and Working

Surfaces, Emergency Action and Fire Prevention Plans, Basic Electrical, Ergonomics, Personal Protective Equipment, and Safety Programs) the average pre-test score was a failing 50 percent (Table 1.) For personal protective equipment it was 19 percent. The post-test average scores ranged from 57 percent to 99 percent; in four of the eight categories the scores were over 90 percent. Knowledge increased for all eight modules; for six of the eight modules, the change in knowledge from the pre- to post-test cannot be attributed to chance (see *t*-test scores and *p*-values in Table 1.)

In addition to the acquisition of knowledge, training led to other important outcomes. Reports from participants show an increase in the perceived need for more training, changes in specific practices, individual use of resources such as the OSHA website, and desire to follow safety practices. Specifically, Merck Safety Director Jack Ward reports that "there has been an increase in requests for PPE since the OSHA classes." The training also prompted participants to identify and address problems that needed solving. For example, when floors were identified as slippery and the required paper booties were seen to make them worse, the issue was raised, and dedicated shoes were then ordered to eliminate wearing booties on the floor. To recognize and solve such problems took not only training, but changing the institutional and decision-making structure at Merck, involving leadership from both management and the union, and developing an environment of trust and mutual respect. One element necessary in this trust-building was having both workers and managers receive the same training and receive it together.

# Activation of a Plant-wide Safety and Health Committee, with Near-Miss Reporting and a "Stop" Card Process

A plant-wide safety and health committee had been established prior to delivery of the OSHA 10-hour General Industry training. It was only after plant-wide training, however, that the committee became active and discussed safety and health problems in the plant and successfully sought solutions. Since the trainings, the new, revised Safety Committee meets monthly, as do its six subcommittees. The committee is led by the Senior Leadership Team (SLT) which has eight to 10 members. Under the SLT is the Safety and Environmental (S&E) Steering Council which has six members, who come from both union and management. Each of the six newly reconfigured subcommittees has members from both union and management. The six subcommittees are: 1) Risk Management Subcommittee (with the union trainer a member); 2) Incident Investigation Subcommittee; 3) Communications Subcommittee; 4) Rewards and Recognition Subcommittee; 5) Training Subcommittee; and 6) Sustainability Subcommittee. Union and management leadership attribute plant-wide general awareness and heightened concern with health and safety for the new vitality of the safety and health committee as well as many other safety-related systems and institutions at the Elkton facility.

Since the OSHA 10-hour General Industry training program, a Safety Information Management System now communicates near misses across the entire plant, describing the particulars of the incident as well as discussion of the root cause. These near-miss reports sometimes lead to safety bulletins and/or training classes. Maintenance work orders are also generated from many of these near-miss reports. While the information system was created

in December 2006, it was not used widely or often. Only a few supervisors were even aware it existed. Now, post-training, there is recognition of the value of this policy, and the joint labor-management safety and health committee assures that this and other systems are used across the plant and on a regular, institutionalized basis.

There is also a STOP-card process through which all employees have the ability to call a stop to production if they see a serious safety hazard. This too existed before the OSHA 10-hour General Industry training, but was not widely known about or used. As a result of the training, all employees, hourly and salaried alike, are now familiar with this potentially life-saving safety tool.

#### Performance-Level Safety Improvements that Became Possible after OSHA-10 Training

Merck employees documented a long list of measurable safety-related changes following plant-wide training and subsequent discussions. Below is discussion about just three of these changes, as examples of what can happen after leadership, training, trust, and activism provide enhanced safety awareness and a basis for collaboration.

Ergonomic Issues with Laminar Flow Hood<sup>2</sup> in Building 65 Lab—Biologists and chemists who worked in the building 65 lab had long had ergonomic concerns with the laminar flow hood they used on a daily basis. The plant had an old 1970s model hood with a fan motor box on the floor, forcing lab employees to bend over to work because they could not put their knees under the hood to sit. A solution to the ergonomic problem was agreed upon by supervisors, managers, and technicians, but lack of funding had caused purchase of a new hood to be continually delayed or cancelled. During the summer of 2011, after the 2010 OSHA courses, the initiative was again introduced and the discussion finally gained energy. In January 2012, funds were approved and a new laminar flow hood was put in place. Lab techs describe the new hood as creating "a world of difference" because they can now sit down and put their knees under the hood rather than bending over to work. OSHA 10-hour training not only helped facilitate recognition of the seriousness of the problem but also reinforced the knowledge of the hazard and created a basis for collaboration at all levels of decision-making. As a result, the need for a safety and health solution overcame the funding problems and the new laminar flow hood was installed.

Material Handling Issues in Production of the HPV Vaccine—A material handling problem was successfully addressed because training had created an environment of shared concern for safety and a basis for collaboration. In the process of producing the human papillomavirus (HPV) vaccine, operators had to carry 20-kilogram bags of material up several steps. This manual carrying was necessary because a tube in the vessel was not long enough for production to occur otherwise. Hearing that a similar problem had been resolved at another Merck plant, some of the operators went to the other facility to look at that solution. After returning to Elkton the operators discussed what they had seen and decided that the other plant's solution would be more difficult to use and could possibly cause other

<sup>&</sup>lt;sup>2</sup>A laminar flow hood provides an aseptic work area and contains infectious splashes or aerosols generated by microbiological procedures. It is designed to keep contaminants from entering a product by filtering air from the room and directing this "clean air" onto the work surface where the lab technician works with a chemical sample or product.

injuries. After much discussion among workers and managers, the decision was made to reduce the weight of material being carried to 10 kilogram bags. In addition, longer tubes were made and installed to improve the process. Prior to the training, the atmosphere for making such changes had not existed. According to interviews with Merck and ICWUC staff, the joint training brought about a new cooperative atmosphere encouraging the discussion and experimentation that is seen as a crucial link in identifying problems and finding solutions. The solutions not only improved health and safety, but also made the production process more efficient.

**Glass Loading in B5**—For years, operators had been suffering wrist and shoulder injuries while lifting glass, as a result of poor workplace ergonomics. The post-training atmosphere and committee activities led to a work order requesting the plant tinsmith to look at the problem. The tinsmith and operators gathered feedback and the tinsmith made a new tool to help with glass loading. Operators used the new tool and found that it put less strain on their wrists and shoulders, making glass loading safer for them. Use of the new tool was implemented in December 2011.

Other Performance-Level Safety Improvements—Trainees reported a number of additional safety problems that they have been able to identify and resolve as a result of their OSHA 10-hour training. Pedestrian walkways and safety crosswalks were painted throughout the plant to address concerns over foot traffic safety. Tripping hazard signs were purchased to address concerns over temporary safety conditions whenever it was necessary to re-route hoses. At first these tripping hazard signs were in only one part of the plant, but when others saw the signs, they were adopted plant-wide. Extension handles were purchased for hard-to-open valves. A new fork truck was purchased to replace a truck that was not rated for the weight it was transporting.

Among those interviewed by the authors, these safety and health improvements were made possible by shared OSHA 10-hour training experiences of labor and management, and the relationships that developed from that process. It began with acknowledging the importance of training and gaining safety and health awareness. Then, an environment that promotes safety and health improvements at every level of plant operation emerged. It is now expected that near misses will be reported and problems will be identified and resolved because everyone, workers and management alike, recognizes the importance of the problems and the need to work together to solve them.

#### Creating an Environment that Promotes Safety and Health Improvements

In 2013, an innovative plant-wide safety program brought everyone together in a team effort to improve plant safety. According to a key plant safety person, the collaborative environment, established in large part because of collaborative and universal training, was tested and worked.

We just completed a Safety campaign entitled "Where are the SNAKES". It was designed as if you were in your back yard cleaning up for the summer and moving boards, tires and other debris. The first thing in your mind is "What's going to bite me?" or "What's under here?" We used that the same as if you were at work and

breaking a line or opening a tank. "What is going to spray me?" or "What type of vapor is going to come out?" It worked, and approximately 340 "SNAKES" (hazards) were found around the plant site. Most were minor and a few others needed prompt attention, like isolated safety showers not inspected timely as required. Lots of missing line labels and faded NFPA [National Fire Protection Association] labels were replaced.

Across the entire plant, everyone has completed OSHA 10-hour training, and employees feel more involved in promoting safety. Everyone has the right to stop hazardous work. Union and management leaderships have collaborative and respectful interactions as a result of their shared training. Near-miss reporting is not only encouraged, it is expected. Safety is part of all new-hire orientations. Each new employee is now trained on Emergency Evacuation Procedures (Exit Routes) and Shelter in Place practices. Relevant new employees now receive the entire OSHA initial Fork Truck Operator course (Material Handling)—both classroom and practical—and the training curriculum could expand to more subjects in the near future. Since OSHA 10-hour training and the building of mutual respect between labor and management, health and safety activities have grown and are more consistently practiced.

Are all these changes due to training? It would appear that bold leadership was the first essential element in building a workplace movement toward improved health and safety—leaders from both management and labor who had the vision to try a more collaborative approach. This was followed by universal joint training and the trust-building that came with it. These all became a platform for a reactivated committee structure and more active employee involvement—all key components leading to resolving hazards and improving safety and health in the workplace.

#### Conclusion

This case study demonstrates that positive changes can happen with bold leadership, cooperation between labor and management and site-specific worker-centered training of all hourly plant employees and all managers. Following OSHA 10-hour General Industry training, labor and management were able to work more collaboratively to improve many worksite safety and health problems. The specific steps taken to improve these conditions began with a decision to provide OSHA 10-hour General Industry training plant-wide, to provide off-site training (at the ICWUC Center in Cincinnati) for four workers, and to hold collaborative health and safety meetings between labor and management. This was followed by OSHA 10-hour General Industry training for all facility personnel and having labor and management in the same training sessions. The health and safety committee was then expanded in size and discussions led to identification of problems, and many of these were resolved. The plant hired a rank-and-file union member to become a permanent peer trainer for the company. Respect and collaboration have grown, and new and better outcomes are in progress. An environment for continuous improvement has been created along with structural changes that increase health and safety.

According to ICWUC Local 94C President Donnie Williams who works at this site:

The 10-hour OSHA training and qualification has raised all employees' awareness concerning safety that works at the Stonewall Site. I appreciate the dedication to safety that Vice President and Plant Manager, Craig Kennedy, showed in going forward with this program for Managers and Union members here at Stonewall. Now all employees carry the 10 hour OSHA card in their pockets. The staff of the Chemical Worker Health and Safety Center demonstrated their expertise in this program, keeping with some of the best efforts in health and safety [20].

As further evidence that the Merck-ICWUC process has been successful, Afton Chemical in Sauget, Illinois, has recently developed a similar relationship with ICWUC. That plant, in mid-2012, began the process of training all its employees in OSHA-10. ICWUC is, in conjunction with ICWU Local 871C and the company management, providing manuals that meet OSHA requirements and are also site-specific. The first training there showed significant learning and yielded a list of dozens of safety issues that need to be addressed. In addition, talks are in the early stages with other ICWUC locals and the companies they represent for plant-wide OSHA 10-hour training programs and development of OSHAauthorized site worker trainers, along with an evaluation project similar to the Merck project. This case study is an example of health and safety progress that can be made in companies where management is willing to cooperate with a union that has made a long and strong investment in promoting the health and safety of its members. Management and labor alike took bold initiatives, cooperated, and trained all 739 employees with a specially crafted OSHA 10-hour General Industry course. The result was not only a more educated workforce, but also a workforce poised to solve problems and improve workplace safety and health.

## **Acknowledgments**

Research reported in this publication was supported by a collaboration between the International Chemical Workers Union Council/UFCW Center for Worker Health and Safety Education, and Merck. It was also partially funded the National Institute of Environmental Health Sciences of the National Institutes of Health under Award Number 5U45ES006162. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. All authors have research interests in the value of health and safety training and the merits of labor-management cooperation. Funding for the paper was from the International Chemical Workers Union Council/UFCW, Center for Worker Health and Safety Education.

Thanks to all those at the International Chemical Workers Union Council, Center for Worker Health and Safety Education, who supported this research and evaluation. The authors thank Darrell Hornback, Keith Mundy, and Rich Smith for their comments and suggestions. Thanks, too, to the trainers and hourly and salaried trainees of the Merck Stonewall plant in Elkton, Virginia. Congratulations to those in both labor and management who found a path toward working together so that all employees at the plant have a safer place to work.

## **Notes**

- Becker P, Morawetz J. The Impacts of Health and Safety Education: Comparison of Worker Activities Before and After Training. American Journal of Industrial Medicine. 2004; 46:63–67.10.1002/ajim.20034 [PubMed: 15202126]
- McQuiston T. Empowerment Evaluation of Worker Safety and Health Programs. American Journal of Industrial Medicine. 2000; 38:584–597. 10.1002/1097-0274(200011)38:5<584::is-JIM11>3.3CO;2-8. [PubMed: 11025500]
- 3. U.S. Environmental Protection Agency, Merck & Co., Inc. [accessed August 2012] Stonewall Plant, Project XI, Final Project Agreement. 2011. http://www.epa.gov/projctxl/merck/011697.htm

4. U.S. Department of Interior, National Park Service. [accessed August 2012] MERK Project XL. 2005. http://www.nps.gov/shen/naturescience/upload/SHEN\_NR\_046\_Merck.pdf

- Walter, L. Michaels: Focus on Workplace Safety Culture, Not Enforcement. EHS Today. 2009. http://ehstoday.com/standards/osha/workplace-safety-culture-not-enforcement-8275/
- U.S. Department of Labor, Occupational Safety and Health Administration. [accessed August 2012] Creating a Safety Culture. http://www.osha.gov/SLTC/etools/safetyhealth/ mod4\_factsheets\_culture.html
- Ardern, J. [accessed August 2012] WorkSafe, Creating a Safety Culture. http://www.commerce.wa.gov.au/worksafe/PDF/Forums/safety\_culture-Jane\_.pdf
- 8. Hughes J. The Critical Role of Training in Protecting Workers. New Solutions: A Journal of Environmental and Occupational Health Policy. 2012; 22(3):253–254.10.2190/NS.22.3.a
- 9. Burke M, et al. Relative Effectiveness of Worker Safety and Health Training Methods. American Journal of Public Health. 2006; 96(2):315–324.10.2105/AJPH.2004.059840 [PubMed: 16380566]
- Weinstock D, Slatin C. Learning to Take Action: The Goals of Health and Safety Training. New Solutions: A Journal of Environmental and Occupational Health Policy. 2012; 22(3):255– 267.10.2190/NS.22.3.b
- Roelofs, C. Evaluation of the Implementation and Impact of a Massachusetts Construction OHS Training Rule. The Center for Construction Research and Training; Silver Spring, Maryland: 2012.
- 12. Jajuga, H. M Obando (Lazo), Evaluation of the US Department of Transportation Hazardous Materials Instructor Training Program. Senior Project, National Labor College; Silver Spring, Maryland: 2009. Rail Workers Hazardous Materials Training Program Needs Assessment.
- Christensen, T.; Roelofs, C. The Center for Construction Research and Training; Silver Spring, Maryland: Jun. 2012 Evaluation of the Implementation and Impact of a Massachusetts Construction OHS Training Rule; p. 25http://www.cpwr.com/pdfs/ RoelofsReportOHSTrainingweb.pdf
- Deutsch S. Building a Trainers' Community: Innovations in Worker Health and Safety Training. New Solutions: A Journal of Environmental and Occupational Health Policy. 1996; 6(3):68–72.10.2190/NS6.3.i
- National Institute of Environmental Health Sciences (NIEHS)—National Clearinghouse for Worker Safety and Health Training. NIEHS Worker-Trainer Programs: Suggested Guidelines for Success. Research Triangle Park; NC: 1998.
- 16. U.S. Department of Labor; Occupational Safety and Health Administration. [accessed March 2009] Susan Harwood Training Grants. n.d.http://www.osha.gov/dcsp/ote/sharwood.html
- Fernandez J, Daltuva J, Robins T. Industrial Emergency Response Training: An Assessment of Long-Term Impact of a Union-Based Program. American Journal of Industrial Medicine. 2000; 38(5):598–605.10.1002/1097-0274(200011)38:5<598::AID-AJIM12>3.3.CO;2-T [PubMed: 11025501]
- 18. Hilyer B, et al. A Union-Initiated Safety Training Program Leads to Improved Workplace Safety. Labor Studies Journal. 2000; 24(4):53–66.10.1177/0160449X0002400403
- 19. U.S. Department of Labor. [accessed August 2012] Occupational Safety and Health Administration. http://www.osha.gov/dte/outreach/generalindustry/generalindustry\_procedures.pdf
- 20. Email from Donnie Williams to Bruce Mahan, September 10, 2012

## **Biography**

**Bruce Mahan** is an Instructor at the International Chemical Workers Union Council (ICWUC) Center for Worker Health and Safety Education. He has been on staff at the Center since July 1988. He has held the positions of Instructor, Field Training Director and Education Director. He has a B.S. in Business Administration from Franklin University. He was co-chair of the Evaluation Sub Committee on the ANSI Z490 Standard Committee.

(Acceptable Practices for Health and Safety Training) and has been involved in numerous evaluation projects in his career at the Center.

**John S. Morawetz** is the founding Director of the ICWUC Center for Worker Health and Safety Education since it began in 1988. The Center is operated by the ICWU and works with 7 other unions to train participants from these unions in a range of Chemical Emergency Response and Disaster Preparedness and has an extensive Worker Trainer development program. Mr. Morawetz has a ScM from the Harvard School of Public Health and can be contacted at JMorawetz@icwuc.org.

**Rick Workman** is a chemical operator (ICWU), currently serving as a safety trainer for Merck & Co., Inc. He trains all employees, both management and union, and has worked for Merck for 18 years. His email is phillip\_workman@merck.com.

**Ruth Ruttenberg** is president of Ruth Ruttenberg & Associates, an economic consulting firm since 1986 and is also a professor at the National Labor College, Silver Spring, Maryland. She has worked in the occupational safety and health field for nearly 40 years. She has a BA from the University of Wisconsin and Masters and Ph.D. From the University of Pennsylvania. Her email is rruttenberg@tds.net.

 $\label{thm:continuous} \textbf{Table 1} \\ \textbf{Pre- and Post-Test Results for OSHA 10-Hour Training at Merck's Stonewall Plant,} \\ 2009-2011$ 

Topic	Pre-test percent correct	Post-test percent correct	t-value	Probability due to chance <sup>a</sup>
Introduction to OSHA	46	81	8.882	.0000
Hazard communication	43	93	12.901	.0000
Walking and working surfaces	41	91	13.140	.0000
Action plans	50	96	11.192	.0000
Electrical	76	99	4.800	.0000
Ergonomics	76	83	1.511	.2622
Personal protective equipment	19	64	15.443	.0000
Programs	52	57	1.303	.3856

<sup>&</sup>lt;sup>a</sup>One-tailed *t*-test of significance of differences between percentages. (N = 739, df = 738).