

2017-334

NIEHS Oil Spill Health and Safety Training: Learning from Deepwater Horizon to Improve Future Response Training

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AUTHORS:

Joseph T. Hughes Jr., MPH, Director, NIEHS Worker Training Program

Scott Rudolph, President, Safety Software and Consulting Services, LLC

ABSTRACT:

When the Deepwater Horizon oil drilling rig exploded on April 20, 2010, in the Gulf of Mexico, the United States faced an enormous challenge. The massive oil release had significant consequences in the region for the environment and for human health. The U.S. government has plans in place for an emergency response to disasters, and these plans are based on experiences during previous disasters, including the Exxon Valdez oil spill, the World Trade Center (WTC) disaster, and Hurricanes Katrina and Rita. After each disaster, the emergency response was evaluated and analysis of lessons learned led to revised emergency response plans for oil spills and for other types of disasters. In the case of the Deepwater Horizon event, the National Contingency Plan (NCP) was activated. The disaster response was implemented rapidly on a huge scale. Numerous governmental agencies, non-governmental organizations, local groups, and BP employees and contractors were engaged. Over 47,000 cleanup workers were trained to deal with the oil release. (See Table One) Over time, concerns have been raised about the health of cleanup workers, and the monitoring of their health continues.

The National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) held a workshop in Mobile, AL on May 4-5, 2011 that included a broad range of participants who were involved in the Deepwater Horizon response. This paper summarizes findings from the workshop report of what worked and what did not work as the basis for improvements in preparedness for future disasters. Specifically, workshop findings and recommendations focused on two topics: community engagement in the response process and the development of safety training for non-professional cleanup workers.

The dialogue revealed that local community resources were utilized during the Deepwater Horizon response. However, workshop attendees noted areas for improving community engagement. They expressed that communities possess unparalleled knowledge of their local environments and can provide a valuable workforce to support response efforts. Workshop participants also called attention to a need to consider local community health issues in the response plan, so that information, appropriate medical care, and other health needs are addressed rapidly. While worker training was implemented quickly, training quality needs improvement. Issues around appropriate pre-incident training need to be addressed by OSHA and others responsible for worker protection.

The Deepwater Horizon oil release was a disaster that called upon the U.S. to assemble and deploy tremendous resources to address an evolving challenge. The response was rapid, resilient, and in many ways effective.

Workshop participant experience documents areas for improvement. The government has taken experiences from previous disasters to revise national disaster response plans. Deepwater

Horizon response, as summarized in this report, can be applied to further improve worker safety and health training so that emergency responses to future disasters can more effectively address the challenges and needs of those involved in the event.

INTRODUCTION:

Activation of the National Contingency Plan

The Deepwater Horizon incident triggered activation of the National Contingency Plan (NCP).

The NCP, which specifically addresses oil spills and hazardous substance releases, is

different from the National Response Framework¹ (NRF) in several ways (Table 1). In this case with Deepwater Horizon, statutory authority, under the Oil Pollution Act, was held by the

Coast Guard and the responsible party (BP). OSHA was part of the coordinated federal response (under Part 300.150 Worker health and safety) to ensure that workers were protected from

the occupational hazards. When the enormity of the training needs became clear, OSHA invited

NIEHS WETP to join them in Roberts, Louisiana on May 2, 2010 to assess the need for

NIEHS participation. The NIEHS, which is a unit of the National Institutes of Health in the

Department of Health and Human Services (HHS) was given statutory authority to create the

Worker Education and Training Program under the Superfund law in 1987. Typically, in an NRF response that does not involve the Oil Pollution Act, NIEHS is brought in

immediately as a resource for training materials development and delivery. However, in an NCP response, the responsible party typically hires a contractor to provide any necessary training.

This was the case during the Deepwater Horizon response until they realized the potential need

to require thousands of workers to conduct cleanup of weathered oil product. The use of local

fishermen and unemployed workers with little or no experience working with hazardous

materials

prompted the development of curricula that would adequately prepare them for the tasks assigned.

METHODS:

Shortly after the explosion of the Deepwater Horizon oil rig, OSHA and other federal agencies began contacting NIEHS for materials on the hazards related to oil spills. WETP and its National Clearinghouse for Worker Safety and Health Training quickly developed a webpage with materials pertaining to the hazards related to oil spills (the page was live on April 30). At the same time, development of an oil spill training tool was in progress.

After a first draft of the safety and health awareness for oil spill cleanup workers training tool was developed, OSHA, NIOSH and NIEHS worked closely together on revisions based on feedback from those working in the Gulf. The document was co-branded (NIEHS and OSHA) and translated into Spanish and Vietnamese. The document was posted on each agency's website and printed for distribution by Petroleum Education Council (PEC) Premier (BP's primary training provider) and at staging areas across the Gulf Coast. By May 3, 2010, OSHA, BP and NIEHS agreed on a worker safety training plan. Training classes began on May 7, 2010 by BP and its contractors (See Table 2). In this instance, BP managed the processes for worker and public safety training and NIEHS deployed training personnel to function under the direction of the BP MC252 Training Lead, reporting through the Unified Command safety officer.

During the workshop, Tammy Joslin, BP, explained how BP performed a safety training needs assessment to develop their training modules. The needs assessment was performed by BP, OSHA, USCG, and NIEHS. The agencies identified key potential hazards, including the

properties of the oil to be encountered at various locations onshore and offshore. The next step defined the various tasks to be performed by workers (such as handling waste on land and water). By identifying the hazards and types of tasks, training modules could be created. A hierarchy of training modules existed which was based on a worker's proximity to oil and the amount of training hours required for the applicable task (See Table Three).

As per its agreement with the Coast Guard and with the support of BP, NIEHS performed the following activities in response to the Deepwater Horizon oil release:

- 1) Assisted with the development of health and safety related course materials, training matrix, and task-level training requirements and personal protective equipment (PPE) assessment;
- 2) Provided quality assurance of course material and delivery of training in collaboration with BP's prime contractors, PEC Premier and Texas Engineering and Extension Service (TEEX);
- 3) Provided qualified, local trainers to the training program managed by PEC Premier in order to expand and augment training resources in the impacted areas to ensure the efficient and timely promulgation of health and safety training.
- 4) Assisted with the distribution of relevant safety training materials through the NIEHS Clearinghouse website and the training distribution network within the impacted area.

While there were statutory differences between this Deepwater Horizon response and responses to previous national disasters, OSHA and NIEHS played roles similar to those they played in previous disasters, and one could expect the same level of worker protection although the response occurred under the NCP.

RESULTS/DISCUSSION:

As noted earlier in this report, the NIEHS WETP has been involved in several national disaster response efforts. There have been enormous changes in the nation's response systems and capabilities since the September 11, 2001 attacks. In time, and with significant effort, the entire system has been overhauled and improved.

Likewise, there have been improvements in worker protection systems that are a component of any national response. National expectations for training, community involvement, and monitoring and surveillance have grown and to some extent, federal agencies are developing systems to meet those expectations, reflecting the evolution in disaster response worker protection from WTC through this most recent response to the Deepwater Horizon incident.

For example, during the Deepwater Horizon response:

- A new emphasis was placed on worker training. OSHA worked to ensure that BP provided safety training to every worker who would be involved in the response activities. OSHA reached out to NIEHS for its expertise in training and materials development, training delivery and training evaluation.
- The training aspect of the Deepwater Horizon response had more structure to it than previous responses. There was one voice, to enforce that all workers have a standard hazard awareness level training.
- A new emphasis was placed on credentialing those trained so that any employer would know that a worker possessed the required training. Only those with training certification cards could work. PEC maintained a database of those workers it trained and distributed credentials to those who completed training.

- OSHA defined required updates to course content. As a result, the training matrices changed over time.
- Assessment of train-the-trainer courses and training evaluation was performed for the first time following a response by NIEHS. Training was presented to 47,000 workers and volunteers across four states. Qualitative and quantitative data was gathered from trainees, supervisors, trainers, and employers to perform a 360-degree evaluation. This evaluation gives all program stakeholders a voice in the process, encourages communication among stakeholders, increased buy-in and coordination to improve the program.
- A new emphasis was placed on creating and maintaining rosters of workers for the purpose of medical monitoring as well as maintaining a record of employment and the potential hazards to which workers may have been exposed. NIOSH was charged with the responsibility for developing the rosters and utilized the training classes as their primary means to provide workers the opportunity to participate. They also went to the various staging sites in an effort to recruit workers who may have had training before the roster form was finalized.
- OSHA undertook an outreach effort to the communities affected by the disaster. OSHA recognized the need for dedicated staff to conduct outreach efforts for training throughout the region. NIEHS has helped to foster connections between government, union, and New Orleans communities. This relationship has taken years to build, but has improved response preparedness. Universities have offered access to radio airwaves, and foot-soldiers to support causes. Foundations have provided funding. States involved were committed to hiring people from the impacted communities.

- NIEHS, OSHA, NIOSH, EPA, FEMA, the Coast Guard and other agencies engaged in safety and health activities recognized the need for materials to be in a language that workers could understand. OSHA and NIEHS have produced materials on the hazards disaster site workers will likely face. In many cases these materials have now been made available in multiple languages, including English, Spanish, Vietnamese, Japanese, and in certain cases Portuguese.

- There now is a core of experienced hazmat trainers in the Gulf states that did not previously exist.

- A better system was utilized during the Deepwater Horizon incident for collecting injury and illness data.

This is a much improved activity than during previous incidents.

CONCLUSIONS:

Community Engagement

Community engagement is now recognized as a major component of any disaster response. The Deepwater Horizon response, while an improvement over the Katrina experience, still showed that there is more work to be done to ensure that communities have a full voice in how response activities that impact their lives and health are handled. Empty promises for worker protection can erode trust in the federal government and the Unified Command. It is clear from the World Trade Center and Deepwater Horizon responses, that it is not enough to monitor and study the responders and community members. With the federal government's new emphasis on community resilience in disaster response, it follows that the same paradigm shift should apply

to the safety and health of workers and communities in terms of their being integrated into the unified command. The overarching principle driving the FEMA Administrator's priorities is regional empowerment, with the first priority of strengthening the Nation's resilience to disasters, and the second priority of building unity of effort among the entire emergency team – federal, state, tribal governments, private sector, NGOs, communities, and individuals.

While the move towards community resilience may be a necessary and positive one, it does not eliminate the need for a Federal role. The Federal government still must set the overarching policies and framework for worker safety during incidents of national significance, in this case, a Spill of National Significance (SONS). OSHA's role in ensuring worker protection is critical, particularly for those states that are not covered by their own OSHA plans. Any other agency with responsibilities for worker safety and health training need to ensure that worker protection is implemented effectively.

Local Knowledge and Cultural Sensitivity

Several of the presenters during the workshop expressed the importance of fully utilizing local resources. They noted that workers from outside the geographical area were employed in very large numbers, and that many of them were ill-trained and ill-equipped with improper tools to effectively respond. They were unaware of local oceanic conditions such as tidal activity and current. As a result, they were largely ineffective. One of the captains from the Vessel of Opportunity Skimming System (VOSS) noted that the training provided to all workers, including those from outside the area, would have benefited from utilizing the local knowledge base to gain insight into such conditions and strategies to mitigate site-specific challenges.

As part of the Unified Command, response organizations, agencies and responsible parties must formalize a participatory, transparent process for active community involvement in planning training, as well as response and recovery efforts. The process should provide for open, meaningful participation by all impacted stakeholders.

Cultural competency is imperative to planning, training, and response efforts. Local community leaders need to be aware of the resources and communication pathways available during response efforts to ensure that communication efforts are reaching everyone. Although materials on the health and safety risks of oil spill cleanup were translated into Vietnamese and Spanish, this was done quickly and after the incident occurred - not the ideal way to provide easily understandable materials for these populations.

The methods of developing culturally appropriate and understandable training materials take time and resources. Materials and resources must be available to assist non-English speakers and non-literate responders. Several trainers expressed concern regarding the numerous individuals who did not understand the English-based courses provided. The availability of translators was infrequent; it was noted that many Vietnamese went to four or six trainings and received cards in the hopes of getting work, but they did not understand what they heard.

It is important that members of the intended audience should be involved in the design and development of the materials. At a minimum, materials should be focus group-tested with the target audience. Graphics that are meaningful and relevant to the target audience should be used. For written materials, formats familiar to the target audience should be used such as fotonovelas in which a story unfolds through photos with captions in a dramatic fashion. Dissemination strategies must also take into consideration cultural, economic and literacy issues.

Assuring Training Quality

As mentioned earlier in this report, the Deepwater Horizon response showed improvements over the way training was handled during previous large disaster responses. Unprecedented focus by OSHA and the responsible party (BP) ensured that anyone who worked in the response or cleanup efforts went through BP training. Efforts were made to provide those who spoke only Vietnamese or Spanish with training that they could understand. Still, as the workshop clearly revealed, the efforts fell short. Likewise, efforts to ensure proper training was provided to workers prior to their deployment were very well intentioned.

The issue seems to be a fundamental misunderstanding regarding the appropriate level of training. For instance, is the four-hour general awareness overview of hazards enough safety training for someone who has never been involved in any type of cleanup effort to adequately prepare them for the situations during their deployment? What are the “right” mechanisms for training delivery? How do you know that the class has learned what was intended if there is no engagement of participants during the training? On one hand, it is clear that a trained workforce is needed. There is typically a certain level of skill training and safety training needed in order to avoid putting people at risk. On the other hand, in this case, political realities dictated that in order to help those who were displaced by the disaster, an inexperienced workforce was going to be used. The challenge is to then find a way to ensure that the inexperienced workforce has adequate training to ensure they are sufficiently prepared and protected.

In order to ensure that safety and health training is embedded in the response for oil spills, the training needs to be delineated in Safety and Environmental Management Systems (SEMS), planning, and contracts to lay out a foundation for safety and health training that are developed prior to incidents.

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) issued a final rule that requires operators to develop and implement SEMS to address oil and gas operations in the Outer Continental Shelf (OCS). The BOEMRE published the Final Rule for 30 CFR Part 250 Subpart S - Safety and Environmental Management Systems, in the Federal Register (75 FR 63610). In 2011, the Interior Secretary created the Bureau of Safety and Environmental Enforcement (BSEE) to oversee compliance with stricter safety requirements for oil spill response and recovery.

According to Tamara Joslin, BP, “When it became apparent that the oil spill response effort was going to require more than just a few trained skimming boats and teams, Command requested that we jump into action to look at what would be needed to provide local communities and workers with knowledge about health and safety issues related to their expected activities. In this case “we” meant BP, as the operations lead, but in collaboration, under the unified command with the USCG, OSHA and NIEHS.”


Quality safety training for oil spill response should be based on proven adult learning techniques at the core of training development and delivery. It is optimal if peer-to-peer training with activity-based learning is utilized. With activity-based learning, training can be provided in a way that workers receiving it can understand. In practical terms, this means that the training must be both in a language and vocabulary that the workers can understand. Training must have learning objectives and instructional materials which include, but are not limited to, an instructor’s manual with lesson plans, a trainee manual, training aids, and learning technologies.

Worker safety and health training must be preceded by a needs analysis to ensure the appropriate knowledge, skills, and attitudes are being transmitted. A proper evaluation follows the training to document acceptable transmission, and that the worker possesses the necessary abilities to perform the tasks. (See Table Four)

Through the post-event workshop process, NIEHS and other stakeholders have acknowledged successful practices and identified areas for improvement following the 2010 Deepwater Horizon incident. Workshop participants noted the Deepwater Horizon incident had an increased focus on worker safety and health training compared to past disasters such as the World Trade Center attacks and Hurricane Katrina. The magnitude of the Deepwater Horizon incident impacted several Gulf States and involved response workers from across the United States. Communities and local environments were dually affected and future health studies are planned to measure the disaster's true impact.

Upon the activation of the NCP, OSHA, NIEHS and BP worked collectively to ensure workers were provided with safety and health training. A primary response goal must be that responsible parties involved in future disasters can minimize worker and community health impacts.

The NIEHS recognizes that communities are one of the best resources of local environment and community information; it is therefore essential that government agencies build relationships prior to the next incident with community-based organizations. It is also imperative that community-based organizations be contacted immediately upon an incident occurrence. Furthermore, in oil spill emergencies, responsible parties, such as oil companies, would benefit from contacting training resource organizations in the early response planning stages.

In regard to training quality, training must include a high level of engagement. Specific information on hazards, environmental conditions, public health conditions, target populations and language barriers must all be considered when developing the training curriculum. The lack of attention to the need for workers to have pre-incident training continues to be a national issue. 

Site-specific training alone is not sufficient and must be accompanied by more in-depth safety and health training. Those responding to a disaster must have some minimum defined level of health and safety training requirements for response workers must be delineated in Safety and Environmental Management Systems (SEMS), planning, and contracts.

As a result, environmental and public health outcomes among workers and within communities will be minimized and the responder groups will be able to lead and live healthy and prosperous lives after the cleanup process.

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Table One: DWH Workforce Metrics

- 47,000 total workers involved in the response
- 42,000 response and cleanup workers employed by BP and its contractors
- 1,600 members of the National Guard
- More than 2,400 federal employees
- 6,400 vessels involved
- 147,000 workers trained
- 150 OSHA professionals involved; 25-40 assigned solely to the oil spill response
- Over 4,200 site visits by OSHA
- 17 staging areas

Table 2: Training courses provided by Unified Command and BP contractors

Course Title	Length	Description	Required for
Module 1 – BP HSE Basic Orientation	30-45 minutes	Basic HSE Orientation. No contact with hazardous material, pre oil land fall beach cleanup	<ul style="list-style-type: none"> • Volunteers – Non-contaminated beach cleanup • Pre-cleaning of beaches –pick up trash and debris
Module 2 – Contractor Expectations (Includes Module 1)	45 minutes on site briefing	Site Health, Safety and Environment orientation	Contractors – conducting work on behalf of BP in the field <ul style="list-style-type: none"> • Any labor/work not involving spill contaminated materials
Module 3S – Post Emergency Spilled Oil Cleanup Shoreline (includes materials from Modules 1 and 2)	4 hours	Beach cleanup workers post oil	Those picking up tar balls and other oil-contaminated debris on beaches and along shoreline
Module 3M – Post Emergency Spilled Oil Marine Vessel Health and Safety	4 hours	Marine cleanup workers post oil	For captains or crewmen working on a VOO involved in skimming, oiled boom, or controlled burns

Module 4 - Marine Vessel Health and Safety	4 hours	Added on July 19, 2010. Additional information for marine cleanup workers post oil	For captains or crewmen working on a VOO involved in skimming, oiled boom, or controlled burns
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Table Three: DWH Training Matrix

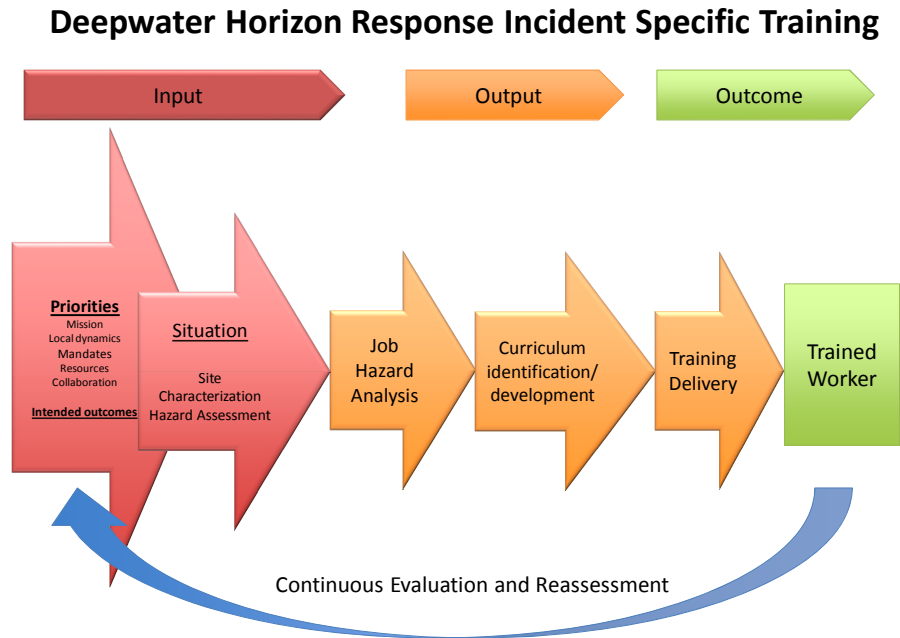


Table Four: DWH Responder Training Requirements

MC252 Minimum Training Requirements for Response Workers

TRAINING MODULES	Type Work									
	Volunteers working at a site and no contact with oil	Working at a site and no contact with oil	Working at operations sites with potential <i>weathered oil</i> (oiled beaches or shoreline)	Cleaning wildlife, environmental sampling in <i>weathered oil</i> or government site assessments (Individuals who have already met US Fish and Wildlife requirements)	Shoreline/Staging Area: Decontamination, Handling Oily Boom, Vacuum Trucks, High Pressure Hot Water, etc.	Vessel of Opportunity: Marine Vessel Operations for skimming, absorbent boom, and insitu burning - captains and crews	Vessel of Opportunity: Marine Vessel Operations with minimal contact with <i>weathered oil</i> for logistics support, defensive booming, etc. - captains and crews	Working on a marine vessel and potential to come in contact with <i>fresh oil</i>	Supervising Mod 3/4, and Hazwoper 40 workers in <i>weathered oil</i> *	Supervising Hazwoper 40 workers in <i>fresh oil</i>
Module 1 Basic HSE Orientation 30 Minutes	X									
Module 2 or Equivalent Site HSE Orientation 45 Minutes		X			X			X	X	X
(Shoreline) Spilled Oil Response 4 Hour			X							
(Shoreline) Spilled Oil Response Computer Based Training (CBT)				X						
Module 3 (Marine) Spilled Oil Response 4 Hour						X	X			
Module 4 (Marine) Spilled Oil Response 4 Hour						X				
24 Hour HAZWOPER								X (Env. Sampling only)		
40 Hour HAZWOPER					X			X	X	X
Supervisory Training - 8hr										X