



NIEHS

National Institute of
Environmental Health Sciences

Report issued | February 2012



Improving Safety and Health Training for Disaster Cleanup Workers: Lessons Learned from the 2010 Deepwater Horizon Oil Spill



NIH... Turning Discovery Into Health



This report is dedicated to the 11 men who lost their lives on the *Deepwater Horizon* rig explosion on April 20, 2010.

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A report from the National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP)

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EXECUTIVE SUMMARY

When the Deepwater Horizon oil drilling rig exploded on April 20, 2010, in the Gulf of Mexico, the United States faced an enormous challenge as a result of the massive oil release. 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. More than 100,000 cleanup workers were trained to deal with the oil release. 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, Ala., on May 4-5, 2011 that included a broad range of participants who were involved in the Deepwater Horizon response. This workshop report summarizes their views 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 three topics: community engagement and community health, training quality, and monitoring and surveillance of 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, the quality of that training needs improvement. Issues around appropriate pre-incident training need to be addressed by the Occupational Safety & Health Administration (OSHA) and others responsible for worker protection. Finally, plans for monitoring and surveillance of response workers' health as outlined in the Emergency Responders Health Monitoring and Surveillance (ERHMS) document need to be extended beyond traditional responders.

The Deepwater Horizon oil spill was a disaster that called upon the United States 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.¹ The government has taken experiences from previous disasters to revise national disaster response plans. Similarly the lessons learned from the Deepwater Horizon response, as summarized in this report, can be applied to further improve worker

¹ Notes from the May 4-5, 2011 workshop.


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.

Community Engagement Recommendations

1. A process should be implemented to allow for inclusion of local public health officer(s) to the Unified Command to ensure local representation and input from affected communities on potential public health issues and decisions.
2. Response organizations and agencies, including the responsible party and its contractors, must formalize a participatory, transparent process for active community involvement in planning/preparation efforts. The process should provide for open, meaningful participation by all impacted stakeholders.
3. Efforts to improve response activities should focus on redesigning processes for providing assistance in response planning, and utilizing existing local government agencies. Many local government agencies are already charged to perform emergency response-related roles. However, preparation for, and performance of these roles has not been maximized.
4. Cities should create a list of local organizations and resources available to support response efforts. The list should include organizations' capabilities and use keywords to help outside organizations find them. The list should be publicly available so that federal agencies involved in a response can locate and coordinate efforts with them.
Federal agencies and community-based organizations (CBOs) should work to build relationships prior to the next incident. State and local governments should also work to build relationships with CBOs. It is also imperative that CBOs be contacted immediately upon an incident occurrence.
5. Ensure that worker and community educational materials are culturally appropriate.
 - 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 for better engagement.
 - Dissemination strategies must also take into consideration cultural, economic, and literacy issues.

Training Recommendations

1. Participatory training methods that engage participants should be used during disaster worker training.
2. OSHA should encourage employers whose companies provide disaster response services to send their employees to the OSHA Disaster Site Worker course (OSHA 7600). Workers who anticipate participating in disaster cleanup work should be encouraged to attend the OSHA Disaster Site Worker course.
3. Safety and health advocates should consider creative ways to encourage use of the OSHA 7600 course.
4. OSHA should create a database of workers, by state, who have taken the OSHA 7600 and Disaster Site Worker 5600 courses so that a pre-trained workforce can be easily accessed when a disaster occurs. The database should be accessible to all federal agencies that are a part of the National Response Team.
5. Regardless of the size of the disaster, NIEHS WETP should be notified when it occurs. NIEHS has numerous resources (materials and trainers) that can be used by response organizers. NIEHS should be activated to provide quality assessment of the training being provided to responders at the disaster site. Areas to be assessed include training material, effectiveness of provider, worker comprehension, and accuracy as it relates to command guidance.

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6. Any changes to the National Contingency Plan (NCP) should include moving reference to NIEHS' role from section 300.175 to 300.150 Worker health and safety. This will increase awareness of NIEHS' role to responsible parties preparing their Safety and Environmental Management Systems (SEMS).
 7. Pre-incident training requirements need to be specified in SEMS, planning documents, and contracts.
 8. OSHA should withdraw directive CPL 02-02-051 and develop a policy regarding the minimum amount of training that disaster cleanup workers should have (for oil spills and other disasters) before being deployed to work.
 9. Ensure that training is culturally appropriate.
 - 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.
 - Ongoing systematic assessments of materials, interactions, and feedback should be performed to ensure that materials are appropriate and achieving their intended results.
 - When possible, peer trainers should be used to reach members of their own cultural groups. A large body of research supports the idea that people are most receptive to receiving information from individuals of their own cultural group.
 10. Supervisors should continue worker development activities on-the-job with periodic, daily or bi-weekly, after-action-reviews where disaster workers discuss and learn from on-going incidents and actions taken.

Monitoring and Surveillance Recommendations

1. Exposure assessments should be broad-based and include all media (air, water, soil) and all routes of exposure (inhalation, dermal, ingestion, puncture). Assessments should be guided by data and supplemented by qualitative industrial hygiene observations and assessments.
2. The National Institute for Occupational Safety and Health (NIOSH) should ensure that the final ERHMS document expands the reach beyond traditional responders.
3. Safety and health advocates, NIOSH, and other agencies responsible for worker safety and health protection should ensure that the safety and health management practices and processes outlined in the EHRMS guidance, in addition to routinely being carried out by independent agencies, are incorporated into the Incident Command System (ICS).
4. NIEHS, OSHA, and NIOSH should coordinate activities and efforts to ensure proactive and representative surveillance of worker exposures and health effects are being identified and communicated to officials to help ensure appropriate worker protection and timely health-based decisions. Agencies are encouraged to develop pre-incident monitoring and surveillance surveys/tools to quickly utilize and modify for emergency responses.



PREFACE

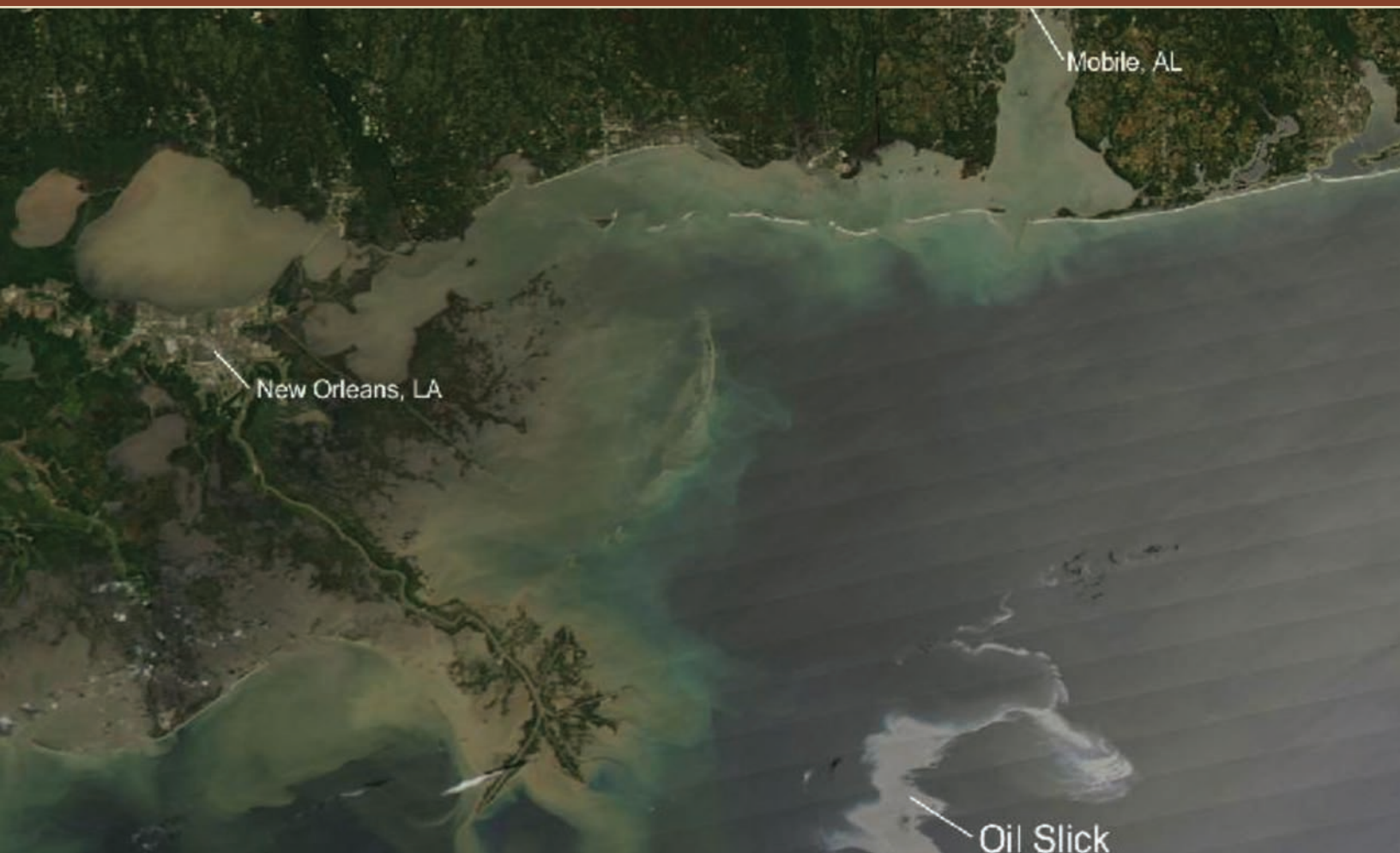
On April 20, 2010, as workers were drilling the exploratory Macondo well in the Gulf of Mexico, an explosion ripped through the Deepwater Horizon drilling rig, killing eleven crew members and seriously injuring others.

“Eleven crew members died, and others were seriously injured, as fire engulfed and ultimately destroyed the rig. And, although the nation would not know the full scope of the disaster for weeks, the first of more than four million barrels of oil began gushing uncontrolled into the Gulf—threatening livelihoods, precious habitats, and even a unique way of life. A treasured American landscape, already battered and degraded from years of mismanagement, faced yet another blow as the oil spread and washed ashore. Five years after Hurricane Katrina, the nation was again transfixed, seemingly helpless, as this new tragedy unfolded in the Gulf. The costs from this one industrial accident are not yet fully counted, but it is already clear that the impacts on the region’s natural systems and people were enormous, and that economic losses total tens of billions of dollars.”²

There will always be another national disaster, another tragedy. Discussing and understanding the lessons learned from this response, and determining how to apply them when the next tragedy occurs, is the only way to make any sense of these tragic incidents.

The National Institute of Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP) held a workshop in Mobile, Ala., on May 4-5, 2011 that included a broad range of participants who were involved in the Deepwater Horizon response (described in more detail under “The Deepwater Horizon Response” below). This workshop report is the NIEHS WETP’s effort to define the lessons learned from the Deepwater Horizon oil spill and determine the best way to apply them to disaster response planning and training before another incident occurs. Specifically, this report examines training for safety and health protection during the response to the Deepwater Horizon oil release in the Gulf Coast as seen by WETP personnel, WETP awardees, community members, and several federal partners who were in the field during the response. Participants in the workshop identified what worked and what did not. They also discussed barriers to training and suggested actions to improve future responses, including actions needed by other federal response entities. This report summarizes their findings.

2 National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *DEEP WATER The Gulf Oil Disaster and the Future of Offshore Drilling*, Report to the President, January 2011.



BACKGROUND ON WETP INVOLVEMENT IN NATIONAL DISASTER RESPONSE ACTIVITIES

The events of the September 11, 2001 World Trade Center (WTC) disaster and subsequent anthrax incidents stimulated the United States to develop and implement a broad range of preparedness and response plans with respect to terrorist attacks and natural disasters. Major results were the creation of the Department of Homeland Security, and the subsequent National Response Plan (NRP), the National Incident Management System (NIMS), the fifteen related emergency support functions (ESFs), in addition to support annexes (such as the Worker Safety and Health Annex) and incident annexes.

Based on in-depth participation in the WTC response and the subsequent WETP national technical lessons learned workshop (held in Nashville, Tennessee in April 2002), WETP worked on development of a national response preparedness plan, called the Emergency Support Activation Plan (ESAP). This plan is designed to facilitate more effective responses in future national incidents. In addition, a new grants training program area was established and funded, called the HAZMAT Disaster Preparedness Training Program (HDPTP), within which a large number of grantee instructors and workers have been trained in the OSHA/NIEHS Disaster Site Worker Course (OSHA 5600 and 7600). Furthermore, the WETP Minimum Training Quality Criteria was revised to include Hazardous Waste Operations and Emergency Response (HAZWOPER)-related and All-Hazards trainings.

Hurricane Katrina triggered the NRP and the NIEHS WETP safety and health training support annex response through the OSHA-coordinated NRP Worker Safety and Health Annex. Using the approach laid out during analysis of lessons learned in the September 11th response, WETP explored lessons learned from Hurricanes Katrina and Rita to improve future national disaster responses by the WETP and its sister agencies. Policy recommendations related to training were put forward by WETP, including:

- There is an important role for both site-specific and comprehensive training before and during a national disaster response. Disaster situations encourage short awareness briefings at the expense of more appropriate comprehensive safety and health training needed by response workers. All responsible parties and response agencies must address this internally and with their contractors so that all workers get all of the training necessary to properly prepare them for the risks they may face.
- The nation's preparedness gap in these previous responses points to the glaring need for pre-deployment training for disaster responders. More emphasis is needed on pre-deployment training for all sectors of potential responders. This training is available nationally and should be required for those who respond to incidents of national significance. An ad hoc group composed of Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (USACE), OSHA, and NIEHS should address this matter so that at a minimum, there is always a team leader with full safety and health training certification during recovery operations. More specifically, all workers responding to a disaster should have a minimum of 16 hours of disaster site worker training prior to being deployed to the disaster.
- OSHA's Disaster Site Worker course needs to be widely distributed among national disaster responders.
- Opportunities must be created for training at-risk and vulnerable populations involved in disaster responses.

Through its training activities over the past twenty-four years, NIEHS WETP has established a significant connection to communities, workers, and trainers – people who are on-the-ground during and after disasters occur. In the case of the Deepwater Horizon incident, these connections were particularly focused in Louisiana, Alabama, and Mississippi. Long-standing relationships with these stakeholder groups provide an understanding of their needs and of the critical information they can provide in a response. Groups such as Dillard University's Deep South Center for Environmental Justice, Clark Atlanta's Environmental Justice Resource Center, and Jefferson State Community College's Center for Labor Education and Research (CLEAR) all played a critical role in the aftermath of hurricanes Katrina and Rita and the Deepwater Horizon incident. See Appendix I for additional information on the NIEHS WETP's training programs.



THE DEEPWATER HORIZON RESPONSE

This section of the report details NIEHS statutory authority to participate in the Deepwater Horizon response and outlines the NIEHS WETP involvement in developing training materials and providing other support to the response effort.

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 Framework³ (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.

Typically, in an NRF response that does not involve the Oil Pollution Act, NIEHS is brought in 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 oil product. The use of non-traditional responders (local fisherman 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.

Title 40: Protection of Environment, PART 300—NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN, Subpart B—Responsibility and Organization for Response, § 300.175 Federal agencies: additional responsibilities and assistance.

(b) (8) (iii) Statutory authority for U.S. Department of Health & Human Services (HHS)/National Institutes for Environmental Health Sciences (NIEHS) involvement in hazardous materials accident prevention is non-regulatory in nature and focused on two primary areas for preventing community and worker exposure to hazardous materials releases: Worker safety training and basic research activities. Under section 126 of Superfund Amendments & Reauthorization Act of 1986 (SARA), NIEHS is given statutory authority for supporting development of curricula and model training programs for waste workers and chemical emergency responders.

Under section 118(b) of the Hazardous Materials Transportation and Uniform Safety Act (HMTUSA) (49 U.S.C. 1802 *et seq.*), NIEHS also administers the Hazmat Employee Training Program to prepare curricula and training for hazardous materials transportation workers. In the basic research arena, NIEHS is authorized under section 311 of SARA to conduct a hazardous substance basic research and training program to evaluate toxic effects and assess human health risks from accidental releases of hazardous materials. Under Title IX, section 901(h) of the Clean Air Act Amendments, NIEHS also is authorized to conduct basic research on air pollutants, as well as train physicians in environmental health. Federal research and training in hazardous materials release prevention represents an important non-regulatory activity and supplements ongoing private sector programs.

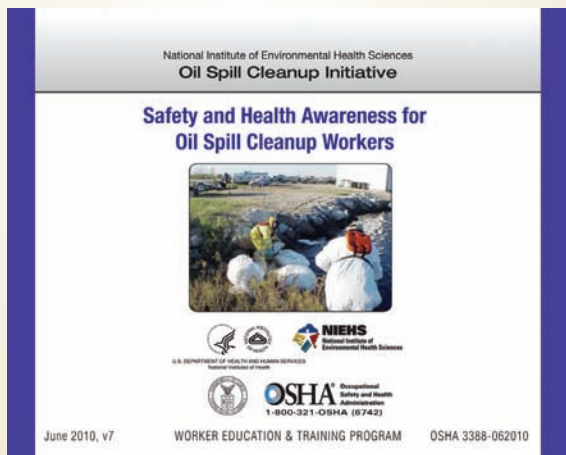
3 In January 2008, the National Response Plan was replaced by the National Response Framework.

NIEHS statutory response authorities under section 126(g) of the Superfund Amendments and Reauthorization Act (SARA) of 1986 (Title 42 U.S.C. section 9660a) are referenced in the National Contingency Plan (NCP) at Section 300.175(8)(iii) and are implemented under mission assignments from the U.S. Coast Guard (USCG) and the U.S. EPA. Section 126(g) includes “involvement in hazardous material accident prevention in a non-regulatory nature which is focused on two primary areas for preventing community and worker exposure to hazardous materials releases: Worker safety training and basic research activities.”

NIEHS WETP Involvement in Worker Safety and Health Training Activities

Training Tools

NIEHS WETP develops training tools for support personnel who will participate in disaster responses. Primarily used by trainers, these tools aid them in the development of awareness-level curricula or other awareness-level materials. Companion booklets are then developed to serve as a resource document that can easily be referenced in the field during the response.



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 Web page with materials pertaining to the hazards related to oil spills (the page was live on April 30, 2010). 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 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 (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.

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 provided the same types of activities that they have in previous disasters, and one could expect the same level of worker protection regardless of the fact that the response occurred under the NCP.

Table 1: *Differences between the National Response Framework and the National Contingency Plan*

Key Feature	National Response Framework (NRF)	National Contingency Plan (NCP)
Types of disasters that are covered	Natural disasters and terrorist attacks	Releases of oil and hazardous chemicals
Government entity that oversees response	FEMA	EPA or Coast Guard
Entities that are involved in worker training	OSHA and NIEHS WETP	Responsible Party, OSHA, and NIEHS WETP
Legislation that mandates procedures and funding	Stafford Act	CERCLA/Oil Pollution Act
Sources of funding	Tax payer funded	Responsible party or Oil Spill Liability Trust Fund pays

The magnitude of the Deepwater Horizon oil release was unprecedented.⁴ Consequently, the response under the NCP involved a large number of federal agencies, state and local governments, as well as a huge number of response contractors, their employees, and BP personnel. At the height of the response, 47,000 workers were employed across 4 states (Alabama, Florida, Louisiana, and Mississippi). At the time of the workshop (May 4-5, 2011), 2,000 people were still involved in the response in some capacity. While worker safety and health training probably received more attention than in previous national disasters, health and safety officials felt that there is still significant work to be done in strengthening the safety and health training systems in place during national disaster responses.

The Numbers

- 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
- More than 4,200 site visits by OSHA
- 17 staging areas

⁴ <http://www.uscg.mil/foia/docs/DWH/BPDWH.pdf> "BP DEEPWATER HORIZON OIL SPILL, Incident Specific Preparedness Review (ISPR)".



WETP Involvement with Gulf Oil Spill (GOS) Training Response

Of the 20 consortia in the NIEHS Worker Education and Training Program, the following awardees have provided resources, trainers, and subject matter experts related to the Gulf oil spill training response:

- **Dillard University Deep South Center for Environmental Justice:** Based in New Orleans, the Deep South Center has played a key role in involving local and Gulf Coast residents and workers in recovery and cleanup efforts related to the oil spill, Hurricane Katrina, and chemical pollutants, particularly along the Mississippi corridor.
- **International Chemical Workers Union Council (ICWUC):** Based in Cincinnati, ICWU represents workers in a variety of fields including the chemical and health care industries. ICWU as part of the NIEHS HAZMAT Disaster Preparedness Program has responded to the oil spill and Hurricane Katrina by providing teams of trainers to impacted locations in Mississippi and Louisiana.
- **Center for Construction Research and Training (CPWR):** Representing the building trades department of the AFL-CIO, CPWR has a strong presence in New Orleans, including a training facility in the Ninth Ward, and has provided trainers and expertise during the oil spill and other disasters. They have been particularly effective in offering intensive forty-hour hazardous waste worker training in the region.
- **International Association of Firefighters (IAFF):** Representing professional firefighters throughout the United States, IAFF sent a number of senior emergency response trainers to the Gulf Coast during the oil spill.
- **United Steel Workers (USW):** Representing oil and chemical refinery workers throughout the Gulf Coast region, USW has provided trainers and resources during the oil spill and during prior disasters. After Hurricane Katrina, USW partnered with the Deep South Center for Environmental Justice in a model neighborhood rebuilding project entitled “Safe Way Home.”
- **OAI, Inc.:** Based in Chicago but with a strong presence along the Gulf coast, OAI has been instrumental in involving minority and Vietnamese workers and fisherman during the Gulf Oil Spill, and Hurricanes Rita and Katrina.
- **University of Massachusetts, Lowell:** Based in New England, the University of Massachusetts, Lowell provided instructors who performed training assessment.

Table 2: Training courses provided by BP contractors (PEC, Parsons, and O'Brien)

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 landfall 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 Vessels Of Opportunity (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

The NIEHS WETP Mobile Workshop

The NIEHS WETP and program awardees led the effort to provide support to the Deepwater Horizon response and recovery plans. Beginning with the development and dissemination of the Safety and Health Awareness for Oil Spill Cleanup Workers materials, NIEHS WETP responded to the challenges that followed the initial explosion of the Deepwater Horizon. In some cases, WETP awardees were brought in to evaluate the incident-specific classes. In other cases, WETP awardees held 40-hour HAZWOPER training classes and saw those trained employed in the response.

The Mobile Workshop, held May 4-5, 2011, was intended to review these experiences, to learn from them, and to look ahead to the types of future responses likely to come so that the NIEHS WETP community may be more prepared in the uncertain future. In order to achieve these objectives, the workshop opened with a general overview of the workshop program, and an overview of the WETP's involvement and key issues in the Deepwater Horizon response. The overviews were followed by a presentation about the difference between an oil spill response, which is subject to the National Contingency Plan, and a more typical FEMA-led response. Several panel sessions covered lessons learned from community partnerships, on-site experiences, and about worker training. Subsequent sessions included a presentation on the training evaluation study that was in progress, a keynote address from NIEHS Director, Linda Birnbaum, Ph.D., and a panel discussion on medical monitoring and surveillance. Three breakout sessions followed: on-site specific training, pre-disaster training, and community involvement. The concluding session included reports from each breakout group and final words about next steps for improved response preparedness.

Detailed information about workshop proceedings, including the agenda, list of participants, and copies of all PowerPoint presentations by speakers are available on the Clearinghouse website at <http://tools.niehs.nih.gov/wetp/events.cfm?id=2499>. Below is a summary of the workshop findings.

Lessons from Previous Disasters that Were Integrated into the Deepwater Horizon Response

As noted earlier in this report, the NIEHS WETP has been involved in a number of national disaster response efforts. There has been enormous change 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. Expectations for training, community involvement, and monitoring and surveillance have grown and, to some extent, federal agencies are developing systems to meet those expectations. This report reflects the evolution in disaster response worker protection that NIEHS has seen from the WTC through this most recent response to the Deepwater Horizon incident.

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.** The Unified Command required all workers involved in the response to have a minimum level of hazard awareness training, with additional training required for those whose tasks required it.
- **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 were able to work. PEC Premier maintained a database of those workers who obtained the required training and distributed credentials to those who completed training.
- **As OSHA observed actual tasks being performed, training requirements were adjusted to take into consideration the potential for increased risk from hazardous materials or other hazards.**
- **Assessment of train-the-trainer courses and training evaluation was performed for the first time following a response by NIEHS.** Training was presented to 147,000 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, creating a mechanism to conduct medical monitoring as well as maintaining a record of employment and the potential hazards to which workers may have been exposed.** NIOSH took on 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/can provide 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 may face. In many cases these materials have now been made available in multiple languages, including English, Spanish, Vietnamese, Japanese [most recently] and, in certain cases, Portuguese.
- **Injury and illness data collection was more transparent than in previous events.** OSHA required BP to keep a comprehensive incident-wide log that included cases that are typically considered non-recordable. In addition, BP reported OSHA recordable and non-recordable injuries and illnesses on daily phone calls with OSHA. And BP provided the injury and illness data to both OSHA and NIOSH. (Deepwater Horizon Oil Spill: OSHA's Role in the Response, OSHA, May 2011)

There is an understanding at NIEHS and other agencies that they “Cannot do environmental research without community input.”—Linda Birnbaum

In the table on the next page, a timeline of the Deepwater Horizon event is presented to depict actions of U.S.

Government agencies compared to concerns being raised by safety and health advocates as covered by the national media. See Appendix III for a chronology of Gulf Spill press articles related to health.

Improvements from Previous Disasters

- New emphasis on worker training
- The practice of credentialing trainees
- OSHA-defined updates to course content now required
- Performed training evaluation
- Emphasis on creating and maintaining rosters of workers.
- New OSHA outreach efforts to affected communities
- Materials provided in languages that workers understand
- Now existing cadre of experienced trainers is available
- More structured than previous responses
- Improved collection of injury and illness data collection

Table 3. *Comparison of Multi-agency Activities and Concurrent Press Coverage*

Time Frame (2010)	U.S. Government Actions and Activities	Press Coverage Topics
April 20-30	NIEHS WETP develops oil spill responder training manuals, and posted first booklet on NIEHS website	Volume of oil; BP plans to stop the flow; fishermen concerned about loss of work
May 1-6	NIEHS, OSHA, NIOSH, USCG, and BP discuss responder safety issues and agree on worker safety training plan; new interagency public health response working group meets	Environmental effects; oil rig worker safety in light of the deaths of eleven workers on the rig; increasing seafood safety concerns
May 7-13	Worker training by BP and contractors using NIEHS materials; 5,000 training booklets distributed; materials developed in three languages	The possibility of health effects for responders; Reports on responder health concerns from previous oil spills
May 14-31	Approximately 20,000 workers complete 4-hour required training; additional 900 workers completed 40-hour HAZWOPER training; NIEHS PEPH presents webinar on protecting the responders to over 100 community partners	Report that many U.S. government agencies were involved but BP in charge; worker training started and protective gear delivered; May 25 th letter to USCG expressing OSHA's concerns for worker safety; USCG grounds responders' boats when workers fall ill
June 1-15	NIEHS, USCG, and BP facilitate multi-agency public health assessment of responders to determine needs; NIH announces \$10 million to study and assess the possible health effects of the oil spill	First fisherman response worker speaks to press about worker illnesses; health concerns about dispersants raised; calls for more protection by OSHA and BP; Congress sends letter of concerns to EPA and OSHA; suggestions that worker training is inadequate
June 16-30	NIH representatives participate in an Institute of Medicine meeting held in New Orleans on assessing possible health effects; about 50,000 workers had completed either the 2- or 4-hour trainings; CDC releases its first of several health hazard evaluation reports for cleanup workers;	BP analysis reveals increase in reports of worker illnesses; disputes over jurisdiction of safety rules on oil rigs between OSHA, MMS, and USCG; call for recognition of health hazards; call for worker protection; Dept. of Labor provides \$27 million to help displaced workers
July	The Deep South Center for Environmental Justice, an NIEHS grantee, sponsored a roundtable for BP oil spill workers, local government officials, and the U.S. Secretary of HHS Kathleen Sebelius at Dillard University in New Orleans, LA.; more than 100,000 cleanup workers had completed NIEHS training courses	NIOSH ongoing health assessments of cleanup workers; launch of GuLF Study; Broader health implications for workers and residents; skepticism of efforts to research health effects



Time Frame (2010)	U.S. Government Actions and Activities	Press Coverage Topics
August	NIH hosts an interagency meeting to respond to potential health effects, longitudinal follow-up study of workers; NIOSH issues Report of BP Illness and Injury Data	Report of the first public discussion hosted by NIEHS about plans for the GuLF study; reports of worker health effects from previous oil spills suggest possible effects for Deepwater Horizon workers
September/ October	NIEHS publishes FOA announcing funding for a consortium of researchers to study potential health effects in Gulf region communities, with funding provided by several NIH Institutes	Planning of the GuLF study; NIH asked IOM to generate a report of possible health effects
November/ December	NIH sponsors interagency meeting on "Making the Most of Federal Data on the Gulf Oil Spill;" holds informational meetings on FOA consortium funding	Fishing waters reopened but FDA standards of healthy foods is questioned

NIEHS has learned that each major disaster has its own characteristics and situational truths that can influence the effectiveness of response efforts. During and after the Deepwater Horizon disaster, NIEHS examined worker safety and health training issues across the entire spectrum of the oil spill response in multiple geographic locations, literally on land and on the sea. The overall conclusion is that, while noteworthy improvements have been made, it is clear that more needs to be done in the areas of community engagement, pre-incident and site-specific training, and monitoring and surveillance with the goal to ensure that the workers who respond to disasters are fully protected. The following section, Findings and Suggested Actions, provides recommendations for improvements.



WORKSHOP FINDINGS AND SUGGESTED ACTIONS

The following findings and recommendations have been developed based on the Mobile Workshop plenary presentations and breakout group discussions as well as recommendations and discussions among participants. The information also incorporates feedback and recommendations from WETP responding awardees based on their experiences in previous disasters. Here we discuss findings and recommendations for community involvement, training, and surveillance and monitoring.

Community Engagement/Resilience Findings and Recommendations

Background:

Community engagement is now recognized by FEMA as a major component of any disaster response. 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. 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. There remains a need for a more inclusive approach to disaster response at the unified command level. 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 challenge is to build the capacity of American society to be resilient in the face of disasters and other crises. In this context, individuals, families, and communities must be able to withstand disruption, absorb or tolerate disturbance, act effectively in a crisis, adapt to changing conditions, and grow stronger over time, to minimize the effects of all-hazard incidents.”⁵

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. It is imperative for the public health response to disasters, such as the Deepwater Horizon, to include access to physicians to evaluate and treat health care concerns that arise. These services should be part of a federal-community commitment to treat as well as study the aftermaths of disasters. The responsibility to provide medical monitoring and surveillance or other research efforts should come with the obligation to provide access to health care professionals with general medical

5 Priority 1 from *Charting our Course: The FEMA Administrators' Intent, Fiscal Years 2012-2016*. http://www.fema.gov/pdf/media/2010/fema_intent_fyhs_12_16.pdf



expertise, and with an understanding of the diagnosis and treatment of health effects relevant to the exposures of concern. Additionally, the health care professionals should be trained in understanding and treating the behavioral/ mental health effects issues relevant to the situation.

“FEMA must foster an approach to emergency management nationally that is built upon a foundation of proactive engagement with neighborhood associations, businesses, schools, faith-based community groups, trade groups, fraternal organizations, ethnic centers, and other civic-minded organizations that can mobilize their networks to build community resilience and support local emergency management needs. These organizations have routine, direct ties and established trust with the individuals who live in their communities, and can be incredibly effective agents in helping to engage them in resilience building activities.”⁶

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 needs to 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 agencies with responsibilities for worker safety and health training need to ensure that worker protection is implemented effectively.

6 Ibid.

Need to include the public health community in disaster response.

FINDINGS:

Local community representatives, as well as representatives of the public health community should be included in the unified command. Public health professionals provide a different lens from which to consider the emerging health data from the incident scene(s). And they consider the data's affect on the larger community, rather than on just the responders.

Public health is the practice of preventing disease and promoting good health within groups of people, from small communities to entire countries. The vision of the Association of State and Territorial Health Officials (ASTHO) is "Healthy people thriving in a nation free of preventable illness and injury." The vision for any disaster response should be to prevent illness and injury among responders and the surrounding community during and immediately following the response. The current makeup of the unified command is typically missing someone with this perspective.

Many disasters naturally set off "typical" public health concerns: for instance the Haiti earthquake resulting in a cholera epidemic; or the radiation emergency in Japan following the earthquake and tsunami. However, even if a public health epidemic is not identified during or immediately post-disaster, it is essential to understand the potential public health impacts from a disaster. Disaster preparedness must include public health awareness. Public health officials should convey preventative health information to emergency officials in order to minimize disease and illness from exposures in and around the disaster zone.

RECOMMENDATION:

- A process should be implemented to allow for inclusion of local public health officer(s) to the Unified Command to ensure local representation and input from affected communities on important public health issues and decisions.

Utilize available local resources for meaningful community involvement.

FINDINGS:

Several of the presenters 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. Captain Bob Zales 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.

Another speaker commented that out-of-state trainers did not possess the same level of knowledge about the local environment and conditions as local government organizations. It is important to utilize local knowledge whenever possible. (David Coffey, The New England Consortium-University of Massachusetts, Lowell)

Dave Newman, New York Committee for Occupational Safety and Health (NYCOSH), noted that experience with the WTC disaster showed that impacted communities can rapidly build broad-based coalitions and develop high levels of technical expertise. Despite the importance of frank, timely, and accessible risk communication and fact sheets, they are not sufficient for effective response. Response organizations and agencies must formalize a participatory, transparent process for active community involvement. The process should provide for open, meaningful participation by all impacted stakeholders. This process could include regular, open, participatory public meetings; oversight panels; and advisory boards or task forces with experts and representatives chosen by or from impacted communities. Mary Williams, of Dillard University, noted that listening sessions, focus groups, and webinars are good sources of information to gather and generate community input.

RECOMMENDATIONS:

- Response organizations, agencies and responsible parties must formalize a participatory, transparent process for active community involvement in planning/preparation efforts. The process should provide for open, meaningful participation by all impacted stakeholders.
- Efforts to improve response activities should focus on redesigning processes for providing assistance in response planning, and utilizing existing local government agencies. Many local government agencies are already charged to perform emergency response-related roles. However, preparation for, and performance of these roles has yet to be maximized.

Develop a national registry or directory of resources.

FINDINGS:

Participants from the “Communication and Coordination with the Local Community during Disasters” breakout session suggested that in many areas of the country that may be prone to natural disasters, contact lists of community-based organizations can be put together ahead of time. These organizations should be part of any emergency planning process. This list could be a vehicle to use prior to disasters to provide people in the community with preparedness training in their own languages, literacy levels, etc. so they may safely participate in coordinated cleanup activities as needed.

Beverly Wright, PhD, Dillard University, noted that a persistent disconnect exists between local community organizations and government agencies on all levels. It also exists between government agencies. These modes of communication need to be established prior to an event to benefit from sharing information, resources, and developing a good response plan. Local organizations possess an unparalleled understanding of their communities and conditions in their communities. They also are more in-tune with the resources/networks available to support response efforts. For example, Boat People SOS (BPSOS) was never consulted, not funded, not involved in the official response, but received all the community calls, according to Grace Sciré, Gulf Coast Regional Director, BPSOS.

The “Communication and Coordination with the Local Community during Disasters” breakout session also noted that communities should work to identify other potential barriers to public participation or engagement in planning/preparation efforts.

RECOMMENDATIONS:

- Cities should create a list of local organizations and resources available. The list should include organizations’ capabilities and use keywords to help outside organizations find them. The list should be publicly available so that federal agencies involved in a response can locate and coordinate efforts with them.
- Federal agencies and community-based organizations should work to build relationships prior to the next incident. State and local governments should also work to build relationships with CBOs. It is also imperative that CBOs be contacted immediately upon an incident occurrence.

Community Health Findings and Recommendations

Psychological first aid services are needed during a response.

FINDINGS:

Language barriers and loss of livelihood in the Gulf proved to have mental health impacts on the Vietnamese community, according to Grace Sciré, BPSOS. Beverly Wright said local nonprofit organizations know the psyche and mental health state of their communities. Some challenges that exacerbated the psychological impacts include: lack of personal protective equipment (PPE), exposure to toxins, stress, and domestic violence.

NIOSH emphasized that the psychological impact of disasters should be monitored within the community and among response workers. Although mental and behavioral health activities were addressed by several agencies during the response, a void still remains for a comprehensive behavior health evaluation within an integrated framework during a response.

Appropriate communication materials need to be developed in other languages before an incident occurs.

FINDINGS:

Materials on how workers can protect themselves from health and safety risks during cleanup were translated into Vietnamese and Spanish. However this was done quickly and after the incident occurred - not the ideal way to provide easily understandable materials for these populations.

These methods of developing culturally appropriate and understandable materials take time and money, but an effort should be made, for example, in disaster prone areas of the country. Video clips or other visual materials could be developed either by community-based organizations or with their input. David Coffey, from The New England Consortium at the University of Massachusetts, Lowell, expressed concern regarding the number of individuals who did not understand the English-based courses provided. The availability of translators was infrequent. Grace Sciré, BPSOS, noted that many Vietnamese people went to four or six trainings and received cards in the hopes of getting work, but they did not understand what they heard.

Other thoughts noted at the workshop regarding communicating with those for whom English is a not a first language included:

- o “Communication is a two-way street, it’s not about the delivery but about the receipt – It’s about meaningful and not symbolic education, diverse training and addressing literacy challenges.” Dr. Linda Birnbaum, NIEHS.
- o Training/Cultural Differences—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.

RECOMMENDATIONS:

To ensure that materials and training are culturally appropriate:

- 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.

- When possible, peer trainers should be used to reach members of their own cultural groups. A large body of research supports the idea that people are most receptive to receiving information from individuals of their own cultural group.

Training Quality Findings and Recommendations

Background:

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 training can be improved further.

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. This question leads to a discussion of preparedness

Community Engagement: Environmental Justice Listening Session

On May 5, 2011, the Department of Health and Human Services (HHS) hosted its first Environmental Justice (EJ) Listening Session at the Renaissance Mobile Riverview Plaza Hotel in Mobile, Alabama. Top officials from EPA, ATSDR, NIEHS, and other government agencies were present. Community leaders, nonprofit organizations, and local government representatives attended and provided input as to how HHS can better incorporate EJ into their new EJ Strategic Plan.

Community feedback covered an array of issues, and some discussion focused on issues related to the Deepwater Horizon oil release incident. A Gulf Restoration Network representative noted that several people in the Gulf are suffering health ailments, and a member of Gulf Change asked for increased communication between federal agencies and local hospitals to determine if such conditions are oil spill-related illnesses. An individual speaking on behalf of Gulf Change reiterated the need for improved communication between local health practitioners and the federal government. A stakeholder with Rural Communities/Operation Homecare expressed concern over health issues in African American communities, and noted that they seek medical attention far less often than others. She suggested that HHS should acknowledge this difference and other cultural issues in attempting to correct health inequities. Grace Sciré, of Boat People SOS, recommended creating a pro-bono doctors network to help to determine whether illnesses might be correlated with environmental pollutants.

One participant noted that grassroots organizations can be a valuable ally to the federal government, in part because they have an unparalleled level of trust with the communities they serve. However, a Gulf Restoration Network representative commented that representatives often travel lengthy distances to attend meetings that result in little or no action. It was also suggested that government agencies allow for organizations to have regular and frequent interaction in government decision-making.

Note: Other topics of concern were raised at the listening session; however this summary focuses specifically on comments related to the oil spill.

training and site-specific training and why both are needed. Is there a better way to ensure the workers used during responses to national disasters possess the adequate skills to perform the work required of them, and to do so without harm to themselves, their co-workers, or the community? NIEHS WETP has been wrestling with many of these issues since 9/11, and in many ways, since the program's inception.

After the experience of providing 3-hour training classes during the WTC, in 2003 The Center for Construction Research and Training (CPWR) unveiled a training course called Disaster Response: Safety and Health Training for Construction Workers. OSHA then decided to develop its own course, with the help of the Building Trades and NIEHS.

“The Disaster Site Worker Outreach Training Program is a training program for Disaster Site Workers who provide skilled support services, (e.g., utility, demolition, debris removal, or heavy equipment operation) or site cleanup services in response to natural and man-made disasters. Specifically, it is recognized that all workers at disaster sites need to be aware of the differences between disaster sites and regular construction or demolition worksites and be able to inspect, don, and doff air-purifying respirators. Also, the program will make management and labor aware that pre-incident training is essential for ensuring disaster site worker safety and health.”⁷

“This training also intends to raise awareness that pre-incident training is essential to ensure worker safety and health in response to disasters.”⁸

This language comes directly from OSHA's outreach website and outreach documents. In addition, the OSHA Health and Safety Plan states:

“Responder safety and health training needs to be integrated into an overall worker safety and health program; including a Health and Safety Plan (HASP). The goal of the training program is to ensure that it is integrated into all of the elements of the health and safety programs so that workers engaged in response operations have a full understanding of the hazards they are likely to face, and the precautions necessary for protection.”⁹

7 <http://www.osha.gov/dte/outreach/disaster/index.html>.

8 *OSHA Disaster Site Worker procedures document, Program Purpose section, revised April 2011; http://www.osha.gov/dte/outreach/disaster/disaster_procedures.html.*

9 *OSHA Standard Operating procedures for Incident Specific Training under the Worker Safety and Health Annex to the National Response Plan*

NIEHS views quality training as having the following characteristics:

- Proven adult learning techniques are at the core of training development and delivery.
- Peer-to-peer training with activity-based learning is utilized.
- Activity-based learning fills at least one-third of training hours. Training is 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 has learning objectives.
- Instructional materials include, but are not limited to, an instructor's manual with lesson plans and learning objectives, a trainee manual, training aids, and learning technologies
- Worker safety and health training is preceded by a needs analysis to ensure the appropriate knowledge, skills, and attitudes are being transmitted. The training is followed by a proper evaluation to document acceptable transmission, and that the worker possesses the necessary abilities to perform the tasks.¹⁰

While PowerPoint may be a tool used to help an instructor get across some key points, PowerPoint slides alone are NOT training and should not be used as a substitute for curricula with lesson plans and learning objectives.

FINDINGS:

The definition of quality training was reinforced during the workshop. Dan Snyder of Partnership for Environmental Technology Education (PETE), who worked during the Deepwater Horizon as a supervisor, emphasized that trainers and supervisors must have technical competency and authoritative presence. The supervisor is the person in charge; some supervisors possess authority but some cannot identify the risk. Translating risk and communicating that risk to responders in the field can be a challenge. Dan believed the BP Safety team did not have a consistent safety message, and that most supervisors were unaware of general safety concepts. Dan continued to emphasize that supervisors and trainers need to be empowered. David Newman of NYCOSH said that trainers should practice the precautionary principle and utilize it when activities potentially endanger human health or the environment. The precautionary principle assumes risk and takes protective measures for worst-case scenarios until evidence indicates protective measures may be scaled back.

The "Just-in-Time" breakout session revealed that there is a need for qualified trainers. Local groups can train and obtain qualified trainers at a low and reasonable cost. Instructors need to be capable of knowing information that may not be listed in the book and make it applicable in the field. Communication among response teams needs to be in simple basic language; those that did had the best safety records.

In his presentation, Michael Burke, PhD, of Tulane University, informed participants that, from 1971-2008, there have been 113 studies on 24,694 response workers; the studies categorized hazards and the level of training engagement required for each hazard. The studies showed that a high level of training engagement for high hazards produced the greatest performance and knowledge gain by trainees. It also showed that a low level of training engagement on low hazards had little impact on trainees. It implied that training, regardless of the amount of hours, needs to be meaningful and engaging. Burke also described how the notion of the dread factor, a dialogical theory of learning risk associated with different types of hazardous events and exposures through communication and social interaction, contributes to a high level of training engagement. Overall, as the training becomes more engaging, it is more effective. This concept clearly supports the need for participatory training in the disaster realm.

During the Deepwater Horizon event, consistent and timely risk communication was lacking. Dan Snyder recommended increasing practices of real-time communication, or exchanges of information instantly or with negligible latency, between

¹⁰ *Best Practices for Development, Delivery, and Evaluation of Susan Harwood Training Grants and Minimum Health and Safety Training Criteria: Guidance for Hazardous Waste Operations (HAZWOPER), HAZWOPER-Supporting and All-Hazards Disaster Prevention, Preparedness and Response, NIEHS WETP, January 2006.*

response teams and supervisors and health professionals. As Gary Kuka, PETE, noted, even though a continuous training improvement loop was in place (PEC/BP/OSHA), workers in the field did not notice the improvement; additionally, there was little if any incident investigation. Supervisors in the field seemed to lack knowledge of root cause analysis and corrective actions.

Participants also noted that when planning training, people should emphasize that training is based on skills, as well as knowledge and hours trained. During his presentation, David Coffey, TNEC-UMass, Lowell, noted that during the Deepwater Horizon response, one training organization advertised 40-hour certifications in four days. When visited, the organization had no printed materials and lacked other educational resources for students to reference. That scenario does not equate to adequate training and can have significant negative implications for the health and safety of responders.

RECOMMENDATIONS:

- Trainers and safety officers need to emphasize the precautionary principle, utilized when activity potentially raises threats of harm to human health or the environment
- Those training disaster workers should use participatory training methods that engage their participants.
- Supervisors should continue worker development activities on-the-job with periodic, daily or biweekly, after-action-reviews where disaster workers discuss and learn from on-going incidents and actions taken.

Workers need more than just site-specific training

FINDINGS:

“Another theme regarding stressors included the degree of experience and training among response workers. Many of the workers did not come from safety or emergency response backgrounds and were unfamiliar with things such as PPE, safety terminology, marine operations, and emergency response. This lack of knowledge led to frustration over the need for on the job training, particularly for things with which they felt workers should have been trained on prior to arriving on the job site, such as proper PPE use.”

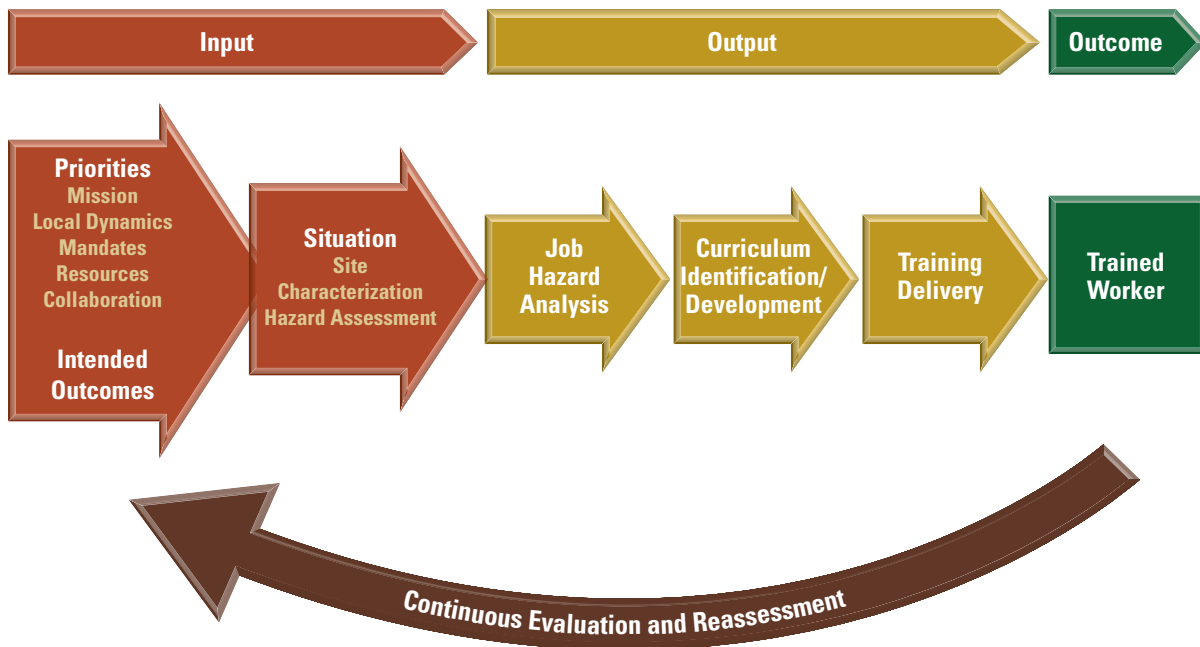
—NIOSH Interim Report # 9C – Assessing Psychosocial and Work Organization Issues among Deepwater Horizon Response Workers in Venice, Louisiana, August 2010. Health Hazard Evaluation of Deepwater Horizon Response Workers HETA 2010-0115.

Site-specific training is tailored to the specific hazards presented by each disaster, and is revised as often as significant new hazard information becomes available or the stage of the disaster changes.

Those responding to a disaster must have some minimum defined level of health and safety training prior to receiving site-specific training. This defined level of training should be readily available, should be referenced in the ERHMS guidance document and should become guidance that is followed at all disasters. Providing workers with only site-specific training leaves them in a potentially vulnerable position, without the proper tools to address hazards which may not have been covered in a brief training. However, providing workers with pre-incident training is a much more proactive approach that provides workers with a greater knowledge base to draw upon when they face unknown hazards. Pre-incident training topics should include tasks and hazards, and competency should be based on training type. The length of training should be based on tasks, hazards, and competency levels.

On the next page is a model of how the site-specific training process should function.

Deepwater Horizon Response Incident Specific Training



RECOMMENDATIONS:

- OSHA should encourage employers whose companies provide disaster response services to send their employees to the OSHA Disaster Site Worker course (OSHA 7600). Workers who anticipate participating in disaster cleanup work should be encouraged to attend the OSHA Disaster Site Worker course.
- Safety and health advocates should consider creative ways to encourage use of the OSHA 7600 course.
- OSHA should create a database of workers, by state, who have taken the OSHA 7600 and Disaster Site Worker 5600 courses so that a pre-trained workforce can be easily accessed when a disaster occurs. The database should be accessible to all federal agencies that are members of the National Response Team.
- Trainers should be prepared to deliver continuous on-the-job safety training during disasters in response to unpredicted hazardous conditions that arise during cleanup efforts. They should also be adequately equipped with the means to communicate these on-site lessons to other groups of workers.

See Appendix IV for additional information on the OSHA 7600 course.

Clearly identify needs, priorities, and hazards early in the response

FINDINGS:

John Ferris of OSHA stated that response tasks need to be clearly identified from the beginning. The environment also needs to be clearly identified and assessed. There were many complex components in the Gulf environment, such as hot weather, that made health and safety planning difficult in some conditions.

Participants in the “Just-in-Time Training” breakout session noted that it is important to identify priorities in the early stages of the response effort. Participants also noted that during the disaster, the hazards must immediately be identified and classified by type. Local groups know the hazards very well and should be consulted. Public safety should also be included when identifying hazards. Collectively, it is important to know who is in the field, the tasks that are necessary, the hazards associated with those tasks, and how hazards can be mitigated. All involved parties should be integrated and mitigate public health impacts; collaboration is key.

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 potential 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.

Lay out contracting framework for disaster response ahead of time

FINDINGS:

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. During the workshop, Don Elisburg of the Clearinghouse, discussed the need to lay out a foundation for safety and health training in the contracts 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 final rule, which became effective November 15, 2010, applies to all OCS oil, gas, and sulfur operations as well as the facilities under BOEMRE jurisdiction including drilling, production, construction, well work-over, well completion, well servicing, and DOI pipeline activities (http://www.jccteam.com/RegAlerts/SEMS_Final_Rule/). 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). <http://www.boemre.gov/sempl/>.

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.”

RECOMMENDATION:

- NIEHS has numerous resources (materials and trainers) that can be used by response and oil companies. NIEHS should be activated to provide quality assessment of the training being provided to responders at the disaster site. Areas to be assessed include training material, effectiveness of provider, worker comprehension, and accuracy as it relates to command guidance.
- Any changes to the NCP should include moving reference to NIEHS’ role from section 300.175 to 300.150 Worker health and safety. This will increase awareness of NIEHS’ role to responsible parties preparing their Safety and Environmental Management Systems (SEMS).
- Pre-incident training requirements need to be specified in SEMS, planning, and contracts.

OSHA Directive on HAZWOPER

Background:

OSHA's Hazardous Waste Operations and Emergency Response standard requires a minimum of 24 hours of training for those handling hazardous waste. Because the standard was still new when the Exxon Valdez spill occurred, there was not an existing pool of HAZWOPER trained workers. With the Valdez disaster unfolding, Exxon argued that they did not have time to train a workforce and would be forced to shut down the clean up. Then Alaska Commissioner of Labor, Jim Sampson, agreed to a training exception because of the ongoing emergency.

Unfortunately, OSHA later codified that decision in Directive Number CPL 02-02-051 which allows for some workers, under limited circumstances, to have only 4 hours of training. This exception to the HAZWOPER standard has become the rule in disaster cleanup training rather than the exception – not only during the Deepwater Horizon response, but during other disasters. During both the WTC and Katrina, because of the enormity of the disaster and the immediate need for cleanup workers, the incident command allowed for brief training of only a few hours. It is important remember that the exception was originally made for a single incident when there were not enough HAZWOPER-trained workers to use during an oil spill response. That is clearly no longer the case. In the 25 years since the Exxon Valdez oil spill, millions of workers have been trained in HAZWOPER and there are many qualified and certified hazardous materials cleanup workers available. Furthermore, no one can assume that a brief overview of hazards on the ground is enough to prepare someone with little or no experience to perform cleanup tasks in hazardous conditions. That is precisely why the disaster site worker course was developed – to prepare workers for the unique hazards they may encounter on a disaster site.

FINDINGS:

Dave Newman, NYCOSH, emphasized human health is jeopardized, especially for responders and disaster site residents, when there is a lack of regulatory enforcement. During the Deepwater Horizon event, there was a need for proper PPE and for the EPA to enforce HAZWOPER training for public workers. NIOSH provided a series of recommendations after the Deepwater Horizon event, one of which was to develop a decision matrix on biomonitoring that would help answer questions regarding 1) the purpose of biomonitoring and how the results would be used; 2) the likelihood and impact of dermal and respiratory exposure that are not easily assessed by traditional industrial hygiene methods; 3) the efficacy of PPE; 4) the health risk associated with exposure(s); 5) the consideration of future health outcomes; and 6) the existence of feasible biomarkers.¹¹ NIOSH also found that many workers were unfamiliar with the extreme environmental conditions and therefore the agency focused on pre-placement medical evaluations to ensure preexisting conditions did not place individual workers at risk.

Workshop participants in the Just-in-Time Training breakout session said that use of the 4-hour training as the minimum requirement for working on a disaster site needs to stop. Others believe it is time for the directive allowing this exception to be withdrawn. They also suggest that there should be a feedback loop with consistent reinforcement and reassessment of on-the-ground hazards so that it can be included in the training curriculum. Injury and illness data as well as observations of responders should inform safety officers as to whether more training is needed for workers. As with prior disasters, shortcuts in training often results in people getting sick. Don Elisburg stated that PPE should be included in the funded contract even if costly as it's still less costly than the impact of sick workers; and that air monitoring does not replace PPE. The Louisiana Bucket Brigade produced a report called "Self-Reported Health and Economic Impact Survey" that showed 46% of respondents reported being exposed to oil or dispersant, and 72% of those who believed they were exposed also reported experiencing at least one symptom that they believed was associated with exposure.

¹¹ "Protecting Workers in Large-Scale Emergency Responses", *Journal of Environmental and Occupational Medicine*, Volume 53, Number 7, July 2011, American College of Occupational and Environmental Medicine.

RECOMMENDATIONS:

- OSHA should withdraw directive CPL 02-02-051 and develop a policy regarding the minimum amount of training that disaster cleanup workers should have (for oil spills and other disasters) before being deployed to work.

“Because workers need to be trained before they respond, you should train your emergency response workers to the highest level of responsibility they might need to assume. You should train your cleanup workers to the highest exposure conditions they may encounter. You must never expect or allow your workers to perform emergency response or cleanup operation without proper training and certification.”¹²

Post-emergency response is performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun.”¹³

Monitoring and Surveillance of Cleanup Workers

Background:

Monitoring and surveillance of the health of cleanup workers has been a prominent issue since the WTC disaster. In response to concerns about worker health during disaster responses, NIOSH and a consortium of federal agencies, state health departments, and volunteer organizations whose common goal was to create a more comprehensive approach to responder safety and health, developed a guidance document that, if followed, would help ensure that only medically cleared, trained, and properly equipped personnel are selected for deployment, that their work environment and health is effectively monitored and tracked throughout the event, and that provisions are made for post-event health monitoring and surveillance when indicated.¹⁴ The document is called Emergency Responder Health Monitoring and Surveillance (ERHMS). The document goes a long way in addressing issues critical to responder safety and health. However, workshop attendees discussed existing challenges to its implementation. Although the document is planned to be a Technical Assistance Guidance Document for use by the National Response Team, there are currently no plans to require its use.

There is a need for acute /short-term surveillance during the response to help guide Personal Protective Equipment (PPE) use, exposure assessments, etc. and longer-term surveillance for related health effects, including mental health, of involved workers (e.g., GuLF STUDY, see sidebar on the next page). The DWH provides one of the few examples where both elements of shorter and longer-term health effects surveillance and research were blended together for a response and should serve as an instructive example for future situations. Additionally, good short-term and longer-term community-based surveillance and research needs to be performed. The DWH response also serves as a rare example of such simultaneous longitudinal worker and community surveillance and research efforts (see NIEHS Extramural Consortium). Such efforts need to be

12 Training Marine Oil Spill Response Workers under OSHA's Hazardous Waste Operations and Emergency Response Standard, OSHA 3172, last revised 2001

13 29 CFR 1910.120 (a)(3)

14 Ibid.

considered early and appropriately supported in future responses to improve preparedness, understanding of risks, and improved decision-making to protect worker and public health outcomes.

FINDINGS:

Dr. John Halpin (NIOSH), noted the importance of conducting pre-deployment, deployment, and post-deployment phases of medical monitoring and surveillance. He also noted that the ERHMS document drew from the RAND Document “Protecting Emergency Responders” (Recommendation 6.8):

- “To effectively characterize the consequences to responders’ long-term health, it is clear that an accurate registry of involved responders...is a prerequisite to any eventual surveillance or treatment effort.”
- “Understanding where people were and what they were doing during the event is key for post-event intervention...”
- “Tracking of post-disaster health problems is also complicated by lack of baseline data and accountability information for responder activities during the response.”

During his presentation, Dave Newman (NYCOSH) pointed out that, when doing an exposure assessment, sampling results do not tell the whole story and should not be relied upon exclusively. Exposure assessments should include narratives that are informed by the data, and sampling results must be supplemented by industrial hygiene assessments. Also discussed was the need to expand the reach of the ERHMS document beyond traditional responders. “Non-traditional” responders operate outside ICS but encounter similar risk factors, exposure scenarios, and health impacts and so it is important to ensure that they too are protected.

NIOSH found that industrial hygiene sampling data from the Deepwater Horizon event was difficult to interpret by other agency scientist and stakeholders. The agency stressed that the ICS ensure that that exposure assessment data is collected and produced in a consistent standard form to eliminate misinterpretation of the data. Additionally, for the ERHMS document to be truly effective, NIOSH found that the safety management practices outlined in the document must not only be incorporated by involved agencies, but must also be incorporated in the ICS.

RECOMMENDATIONS:

- Exposure assessments should not be based solely on the environmental sampling data. Assessments should be guided by data and supplemented by qualitative industrial hygiene observations and assessments.
- NIOSH should ensure that the final ERHMS document expands its reach beyond traditional responders.
- Safety and health advocates, NIOSH and other agencies responsible for worker safety and health protection should do what is needed to ensure that the safety and health management practices and processes outlined in the EHRMS guidance, in addition to routinely being carried out by independent agencies, are incorporated into the ICS.¹⁵

The NIEHS GuLF STUDY

The GuLF STUDY (Gulf Long-term Follow-up Study) explores potential health effects from the 2010 oil spill in the Gulf of Mexico under direction of NIEHS. NIEHS is studying workers who were directly or indirectly involved in different types of oil spill cleanup work. In all, about 55,000 people will be included in the GuLF STUDY.

The study will compare the health of cleanup workers to others who did not do clean up in order to learn whether some health problems are more common in workers, and will also explore factors that might explain why some people are more likely than others to get sick. NIEHS will also research how stress and job loss from the oil spill affects health, including mental health.

To find out more information about the GuLF STUDY, call toll free 1-855-NIH-GULF (1-855-644-4853) between 9 a.m. and 9 p.m. (Eastern Time) Monday through Saturday and 12 p.m. to 6 p.m. on Sunday. You may also visit www.nihgulfstudy.org.

15 Ibid.



CONCLUSIONS

The NIEHS WETP Mobile Workshop acknowledged successful practices and identified areas for improvement following the 2010 Deepwater Horizon oil spill. 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 oil spill 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. Based on their experiences in several national disasters, the workshop participants offer the following recommendations so that responsible parties involved in future disasters can minimize worker and community health impacts.

Recognizing that communities are one of the best resources of local environment and community information, it is 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 uncontrolled chemical release emergencies, responsible parties, such as oil companies, would benefit from contacting the NIEHS in the early response planning stages.

In regards 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 biggest frustration among the workshop participants continues to be the inattention to the need for workers to have pre-incident training. Workshop participants strongly recommend that OSHA directive CPL 02-02-051 be withdrawn. Additionally, we must find a way to make greater use of OSHA's Disaster Site Worker training course. 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 prior to receiving site-specific training.

NIOSH should ensure that the final ERHMS document expands its reach beyond traditional responders. The minimum defined level of health and safety training prior to receiving site-specific training should be defined in the ERHMS document. Training requirements need to be delineated in Safety and Environmental Management Systems (SEMS), planning, and contracts.

Organizations involved in disaster response efforts should take action and implement the recommendations developed during this workshop. As a result, environmental and public health outcomes among workers and within communities will be minimized and these groups will be able to lead and live healthy and prosperous lives long into the future.



APPENDIX I

Background on WETP

NIEHS WETP was given major responsibility for initiating a training grants program under the Superfund Amendments and Reauthorization Act of 1986 (SARA). The primary objective of this Program is to fund non-profit organizations with a demonstrated track record of providing occupational safety and health education in developing and delivering high quality training (governed by comprehensive Minimum Quality Criteria) to workers who are involved in handling hazardous waste or in responding to emergency releases of hazardous materials. Since the initiation of the WETP in 1987, the NIEHS has developed a strong network of non-profit organizations that are committed to protecting workers and their communities by delivering high-quality, peer-reviewed safety and health curriculum to target populations of hazardous waste workers and emergency responders. Since 1987, over 2.5 million workers have received NIEHS-supported safety and health training. More information on the NIEHS WETP can be found on the Internet at <http://www.niehs.nih.gov/careers/hazmat/>.

The NIEHS WETP provides support through the following program areas:

Hazardous Waste Worker Training Program (HWWTP)

This program provides model occupational safety and health training for workers who are or may be engaged in activities related to hazardous waste removal, containment, or chemical emergency response.

Minority Worker Training Program (MWTP)

This program is focused on delivering comprehensive training to disadvantaged minority inner city young adults in order to prepare them for employment in the fields of environmental restoration and hazardous materials.

NIEHS/DOE Nuclear Worker Training Program (DOE)

This program is focused on training workers engaged in environmental restoration, waste treatment, and emergency response activities at sites in the Department of Energy's nuclear weapons complex.

Hazmat Disaster Preparedness Training Program (HDPTP)

This program enhances the safety and health training of current hazardous materials workers and chemical responders, trains skilled support response personnel, creates materials, and delivers training to weapons of mass destruction response workers. The program also augments prevention and preparedness efforts in a wide variety of high risk settings.

Advanced Training Technology Program (ATT)

This program focuses on the development of Advanced Technology Training (ATT) products for health and safety training of hazardous materials (HAZMAT) workers, emergency responders, and skilled support personnel. This includes the Small Business Innovative Research and Small Business Technology Transfer (SBIR/STTR) program.

National Clearinghouse for Worker Safety and Health Training

The National Clearinghouse supports the work of WETP by facilitating national workshops on safety and health topics and by maintaining a website, which contains all of the important documents developed by WETP as well as curricula created by its awardees. These curricula are focused on OSHA's hazardous waste worker standard (1910.120) and are available at no cost to other training organizations. The Clearinghouse website also contains a database of important worker protection documents organized by subject matter, along with downloadable materials such as the Safety and Health Awareness for Oil Spill Cleanup Workers training tool and the printed formatted booklet based upon the training tool.

NIEHS WETP Model Program and Role

The NIEHS WETP training grants program is, and has been since its inception, a "model program" with respect to development and delivery of the highest quality HAZWOPER and HAZWOPER-related training programs on a national basis. While the Program does provide, within its capacity, boots-on-the-ground training, it is not intended for NIEHS WETP to become the safety and health training agency for the federal government. Rather, NIEHS WETP can and does provide model curricula, training standards and methods, and guidance such as the minimum quality control criteria that can benefit public and private responders and recovery workers and their employers. The validity of these activities is field tested, evaluated and modified during responses such as to the Deepwater Horizon incident, through lessons learned workshops such as Mobile, Birmingham and Nashville, and in WETP Trainers' Exchanges conducted on a regular basis. One of the Program's greatest challenges is how to communicate these insights to our federal partners thereby leveraging WETP's limited resources and role as we seek improved safety and health practices during responses to incidents of national significance.

Emergency Support Activation Plan

The NIEHS WETP and selected grantees were significant participants in the response to the World Trade Center disaster. In the spring of 2002, the WETP hosted a National Technical Workshop (termed the Nashville Workshop) to develop lessons learned from the WTC response in order to improve future disaster support responses. Among many recommendations arising from the workshop was the development of an Emergency Support Activation Plan (ESAP). The ESAP was developed over the following months, implemented, and coordinated with OSHA to serve as the WETP Worker Safety and Health Training Support Annex to the NRP Worker Safety and Health Annex. In addition, the grantees incorporated appropriate lessons learned in their individual training programs, and WETP worked with OSHA to develop the Disaster Site Worker Training Course and related Instructor Course. The ESAP is a living document in that it is continually updated as we learn lessons from previous disaster responses.

Up to this point, the NIEHS WETP, its awardees and the constituencies they represent have been involved in the World Trade Center and anthrax responses, in the Pentagon and Oklahoma City disasters, in the natural disaster of Hurricanes Katrina and Rita, and now in the Deepwater Horizon oil spill. The program and its stakeholders have gained an enormous amount of experience.



APPENDIX II

Assessing the Effectiveness of the Gulf Oil Spill Training: A Systematic Comprehensive Training Evaluation Process

Interim Report

Sarpy, S.A., Rabito, F.E., & Goldstein, N.B.

The health and safety training community has long recognized the need for comprehensive, systematic evaluations of the effectiveness of training with respect to increasing both safety knowledge and exhibiting safe work behaviors, while reducing outcomes such as accidents, illnesses, and injuries. The Sarpy and Associates, LLC (hereafter Sarpy and Associates) research team has established a rigorous process for objectively evaluating program effectiveness of various health and safety and emergency preparedness and response training efforts.

The Sarpy and Associates evaluation process is an integrated programmatic assessment that incorporates elements of both process and impact evaluations as outlined by the NIEHS. Impact evaluations are those that measure *what* effects the program has with respect to its intended goals and objectives. Process evaluations, on the other hand, are evaluations that are designed to measure *how* and *why* a given program achieved these effects. Therefore, impact evaluations tend to involve quantitative/numerical data (e.g., number of participants successfully trained) whereas process evaluations tend to involve qualitative data (e.g., a narrative describing the specific strategies that are used for training and perceptions regarding how and why those strategies are employed). In order to gain a comprehensive representation of *what* practices or strategies are utilized, *why* and *how* those particular strategies have been implemented, as well as the relative effectiveness of the strategies for achieving program goals and objectives, a combination of process and impact measures are collected and analyzed.

The Sarpy and Associates evaluation process also implements a multi-source evaluation system that is associated with a 360 degree feedback system. This type of evaluation system involves ratings of a particular target, such as the GOS training, from various sources, which may include on-shore and off-shore volunteers, technical specialists, trainers (including the Petroleum Educational Council members), grantees, and customers (including BP, federal and state governments that had their employees trained; contractors). Obtaining information from these multiple sources, experiences, and perspectives imparts a more thorough and accurate analysis of the effectiveness of the training itself. This multi-source evaluation is particularly relevant for evaluating GOS training given the key role each of the stakeholders play in the training programs' success. Further, gathering information from the various stakeholders lends greater perspective and thereby more credibility to the evaluation process, particularly regarding feedback and utilization of the results. To gain a comprehensive depiction of whether the GOS training programs and goals were attained as well as

the relative effectiveness of the instructional activities and components for achieving these program goals and objectives, a combination of both quantitative and qualitative data will be collected and analyzed. Further, because data is collected across program stakeholders, a multi-method approach is necessary in which various methods of data collection are incorporated into the evaluation design. That is, both qualitative and quantitative data will be gathered using a combination of complementary methods that include questionnaires, focus groups, and structured interviews. In order to integrate this information, content is standardized across survey methods and sources. In this way, direct comparisons can be made across stakeholders and training offered.

The Sarpy and Associates evaluation process was designed to assess the GOS health and safety training program effectiveness with respect to each of the NIEHS identified worker training program criteria. Additionally, information from the evaluations will be used to identify Best Practices for the GOS training in achieving the NIEHS criteria. Importantly, these best practices typically include appropriate use of adult education techniques and adherence to principles of adult learning for effective direct training and quality assurance. Finally, the GOS training also will be evaluated according to overall performance and impact on their respective trainees, communities, and the field of environmental work.

The Sarpy and Associates evaluation process meets the following specific objectives: (1) to develop and implement an integrated programmatic assessment, which incorporates elements of both process and impact evaluations; (2) to create a multi-source system that provides 360 degree feedback on the relative effectiveness of the GOS training program; (3) to utilize multiple methods in gathering qualitative and quantitative data from program stakeholders; (4) to identify the Best Practices of the GOS training program; and (5) to provide a standardized process and documentation of the GOS training program effectiveness with respect to each of the NIEHS training program criteria, including overall programmatic effectiveness and impact on the trainees, communities, and the field of environmental work. In this way, the evaluation process will be generated such that it can be applied to other related health and safety training programs in disaster response.

Therefore, an important value-added feature is that the Sarpy and Associates evaluation process includes assessment of the impact of the program on worker safety-related performance. Moreover, the collection of contextual information (i.e., factors that are external to the students, but affect the acquisition and transfer of the training-related information) is included. These contextual factors can either enhance or inhibit the knowledge and performance gains of the individual and have an indirect effect on the impact of the training on the trainees' performance subsequent to training. The results of this analysis can be used to better evaluate the impact of the program on the participants post-training knowledge, skills, behaviors and subsequent health and safety related outcomes.

Preliminary Results

In the management and organizational behavioral literatures, several general recommendations are advanced for designing and executing training evaluations. Noteworthy, the Sarpy and Associates evaluation has followed each of these steps in their evaluation process for the Gulf Oil Spill training as detailed below.

Background:

Sarpy and Associates research team established a rigorous process for objectively evaluating the GOS health and safety training program effectiveness. Pilot testing was conducted on the surveys to make needed revisions

and refinement to the survey instruments, the administration process including evaluation partners and survey participants, as well as to obtain preliminary results on the training-related performance of the worker population. The pilot study was conducted on workers who were trained at the Deep South Center for Environmental Justice at Dillard University and at the Boat People SOS community group at Bayou La Batre, Alabama.

FINDINGS:

The results of the pilot studies revealed several relevant findings. It should be noted that a relatively small (n=30; Ntrained ≈ 147,000) convenience sample was included in the pilot study. Results revealed primarily univalent responses for the quantitative items from the Vietnamese sample due to cultural issues. Only those results from workers trained at the Deep South Center (n=13) are discussed below with respect to performance ratings. These results should be interpreted with caution and provide only preliminary evidence of training effectiveness.

Noteworthy, for the vast majority of the training-related performance statements, workers trained at the Deep South Center indicated that they “Always” or “Almost Always” performed these behaviors safely. The workers reported the highest ratings of effectiveness for those behaviors associated with personal protective equipment (I put on all personal protective equipment correctly; I remove all personal protective equipment correctly) and taking appropriate action (e.g., drink water, stay in the shade, wear loose-fitting clothes) to prevent recurrence of accidents, injuries, illnesses and/or near misses (e.g., heat related illnesses, pinches, puncture wounds, sun exposure).

On the other hand, the respondents trained at the Deep South Center indicated relatively lower ratings for behaviors associated with communication with safety personnel (Contacts appropriate safety personnel when faced with questions and/or issues regarding environmental cleanup). Further, respondents reported less frequency in engaging in behaviors associated with employees’ rights and responsibilities (Takes the appropriate steps if prevented from or punished for exercising one’s rights under OSHA policies and procedures).

Qualitative responses supported and clarified these findings. That is, respondents indicated that the training was effective (“safety training was good”; “course became useful for my safety effort”; “all materials were valuable”). The Vietnamese training contingent stressed the importance of using Vietnamese instructors to enhance training effectiveness. Both groups did not feel that the large group training sessions were an effective method in conveying the training information. It was also suggested that as new conditions arise (use of dispersants) that these chemicals should be addressed in onsite worker meetings. The respondents stated that the work sites were “safe for the most part” and that safety issues were appropriately stressed for certain working conditions (the need to stay hydrated). However, lack of supervisory support, including lack of sufficient supervisor training, was cited as an issue that occurred across worksites as well as the treatment of certain worker groups (Vietnamese workers; workers from correctional institutes).

RECOMMENDATIONS:

The preliminary results suggest that overall, training was effective in improving worker safety and health performance. Issues specific to the emergency event, community, and worker population were cited. Related, the survey administration revealed that the worker and community in which they reside should also be given consideration.

However, these results should be interpreted with caution due to the nature of the sample that was utilized (convenience; small sample). It is recommended that a two-pronged approach to data collection should be conducted; one in which both the worker population and community involvement are considered. For example, it was revealed that the Vietnamese sample required written translation of the survey instrument and either small group or individual administration of the survey with interpreter present. It is also recommended that a multi-method, multi-stakeholder approach to training evaluation be conducted in which workers, instructors, employers, and community groups be involved. Further, qualitative and quantitative data should be collected to include safety climate and culture issues that may influence the effectiveness of the training. Finally, it is recommended that the results of the evaluation be incorporated into broader training efforts for emergency response to future disasters.

Stakeholder Participation. It is recommended that the program stakeholders be engaged in during the various phases of the evaluation development process to account for the multiple perspectives and varying needs among program stakeholders. The Gulf Oil Spill training program stakeholders have been involved in each major phase of the evaluation development process and have provided feedback and suggestions on all aspects of the evaluation plan and resulting activities including its implementation.

1. Dr. Sarpy attended an introductory meeting at NIEHS to review study design with NIEHS staff and the GuLF study research team to coordinate research efforts, including use of the PEC and NIOSH databases, development of sampling frame for the study, recruiting study participants, and identifying relevant control groups and cohort groupings (e.g., language, location, extent of training).
2. Drs. Sarpy, Rabito, and Golstein attended the NIEHS Gulf Oil Spill Response Town Hall meeting at the Deep South Center for Environmental Justice at Dillard University. Dr. Sarpy presented the proposed evaluation plan and general background information of the evaluation effort to community groups. In this way, the overall scope and design of the project was presented to the community members to seek broad community input and support in recruiting study participants and identifying evaluation methods for relevant stakeholders.
3. Dr. Sarpy attended the spring grantee meeting and technical workshop in Mobile, Alabama. This meeting, “Deepwater Horizon Lessons Learned Workshop: Improving Safety and Health Training for Disaster Cleanup Workers,” examined the training-related response activities to develop consensus among WETP program staff, WETP awardees, Federal partners, community-based organizations, and workers, about the proper elements of pre-incident and deployment-phase training for support personnel performing cleanup work. Dr. Sarpy presented an overview of the evaluation process to this group to further engender buy-in and support among the major program stakeholders.

Developing and Refining Evaluation Methodology and Measures. Several steps were followed in developing the methodology, design, and related measures for the evaluation process. These steps, including resulting evaluation instruments are detailed below.

1. An initial review of the extant Gulf Oil Spill and emergency response training evaluation literatures was conducted. In addition to using recently validated evaluation instruments, the evaluation team created survey items to evaluate the major goals and objectives highlighted in the Gulf Oil Spill training logic model. Based on this information, preliminary evaluation surveys were constructed. Various versions of the measures were created for each grouping of major program stakeholders. These measures were then reviewed by subject matter experts for content, clarity, feasibility, accuracy, relevance and any needed revisions were made. The resulting surveys were then converted to both electronic and written formats.
2. Pilot testing was conducted on the employee version of the survey. More specifically, a pilot study was conducted on workers who were trained at the Deep South Center for Environmental Justice at Dillard University as well as at the Boat People SOS at Bayou LaBatre. The results of these pilot studies indicated that minor revisions to the surveys were needed. In addition, the sample of Vietnamese workers from the Bayou LaBatre study indicated that translation of the survey was needed for the non-English speaking workers and that smaller one-on-one administrations were needed for this subgroup.
3. Pilot testing was conducted on the instructor version of the survey. More specifically, a pilot study was



conducted on instructors who attended the NIEHS WETP spring awardee meeting. The result of this pilot study indicated that minor revisions were needed to the survey. In addition, it was noted that the most efficient method for gathering data from instructors was using an electronic version of the survey via emails.

4. Along with development of the evaluation measures, the evaluation method and design were developed. First, the NIOSH and PEC databases were reviewed. Based on stakeholder meetings and evaluation objectives, a sampling frame was created. In sum, the workers' sampling frame includes all Vietnamese workers, and then only remaining workers living in Florida, Alabama, Louisiana, Mississippi or Texas. We further restricted the dataset to include those who attended either training module 1,2 or 3. The original NIOSH/PEC combined dataset contained 146,762 records. After applying the exclusions above, the resulting data set contains 28,136 records. All instructors who provided training to these workers will be included in the study.
5. It was determined that a two-pronged approach to data collection was needed. The evaluation surveys would be administered electronically to the workers and instructors identified by the database. In addition, due to anticipated low response rate of the electronic administration, written (i.e., paper and pencil) evaluation surveys will be administered to workers via personal contacts in the community (e.g., Josephina Menende with access to the Hispanic and Islenos workers) as well as through the NIEHS grantees.

Collectively, the results of the Sarpy and Associates evaluation process can be used to ensure continuous quality improvement of the NIEHS GOS training program as they strive toward program excellence. These type of training evaluation studies are important for making quality improvements in such health and safety training efforts, identifying best practices that can be used by others, and making better use of available resources and strategies. In short, the findings from training evaluation studies can be used to strengthen worker health and safety programs and guide related policy development.



APPENDIX III

Chronology of Gulf Spill Articles in the Press Related to Health

June 7, 2007

Prolonged Respiratory Symptoms in Cleanup Workers of the Prestige Oil Spill

<http://ajrccm.atsjournals.org/cgi/reprint/176/6/610>

May 6, 2010

Clarifying Questions of Liability, Cleanup and Consequences

<http://www.nytimes.com/2010/05/07/science/earth/07questions.html?scp=7&sq=deepwater%20horizon%20health&st=nyt&pagewanted=2>

May 9, 2010

Fast-Growing BP Also Has a Mounting List of Spills and Safety Lapses

<http://query.nytimes.com/gst/fullpage.html?res=9405E5DB1339F93AA35756C0A9669D8B63&scp=8&sq=deepwater+horizon+health&st=nyt>

May 10, 2010

The Pump Handle: Sequestered Science: Oil Cleanup Workers' Health

<http://thepumphandle.wordpress.com/2010/05/10/sequestered-science-oil-cleanup-workers-health/>

May 14, 2010

The Pump Handle: As We Rush to Protect the Gulf Coast Environment, Are Responders Being Protected?

<http://thepumphandle.wordpress.com/2010/05/14/are-gulf-coast-responders-being-protected/>

May 25, 2010

OSHA Letter from David Michaels to Admiral Allen about BP's Lack of Worker Safety

<http://www.scribd.com/doc/32617998/OSHA-Letter-to-Admiral-Allen-about-BP-s-Lack-of-Worker-Safety>

May 27, 2010

Coast Guard Grounds Ships Involved in Spill Cleanup After 7 Fall III; BP Reportedly Preventing Fishermen from Wearing Respirators

http://www.democracynow.org/2010/5/27/coast_guard_grounds_ships_involved_in

June 2, 2010

Speaking Out to Protect a Way of Life

<http://pagingdrgupta.blogs.cnn.com/2010/06/02/speaking-out-to-protect-a-way-of-life/>

June 3, 2010

Contradicting BP, Feds Lay Gulf Illnesses to Cleaning Fluid

<http://www.mcclatchydc.com/2010/06/03/95318/contradicting-bps-ceo-feds-say.html>

June 3, 2010

Letter from Charles D. Connor to Hilda Solis, Secretary of Labor; re: Worker Protection in BP Oil Spill in Gulf of Mexico

<http://www.lungusa.org/get-involved/advocate/advocacy-documents/worker-protection-in-bp-oil-spill.pdf>

June 3, 2010

Letter from James Oberstar and John Mica to Administrator Jackson and Secretary Solis

<http://www.scribd.com/doc/32617944/Oberstar-Nadler-Letter-to-EPA-OSHA>

June 6, 2010

Spill Raises Concerns of Health Effects

http://www.usatoday.com/news/nation/2010-05-05-oil-health_N.htm

June 6, 2010

OSHA fronts for BP after Congressman Press for Worker Safety

[http://workinprogress.firedoglake.com/2010/06/06/osha-fronts-for-bp-after-congressmen-press-for-worker-safety/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+firedoglake%2Fwork+\(Work+in+Progress\)](http://workinprogress.firedoglake.com/2010/06/06/osha-fronts-for-bp-after-congressmen-press-for-worker-safety/?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+firedoglake%2Fwork+(Work+in+Progress))

June 7, 2010

William Subra Testimony

(PDF. DOC)

June 7, 2010

How BP Generates Its “Clean Bill of Health” in Gulf

(PDF. DOC)

June 7, 2010

Skeptical Public Fears Oil-spill Health Issues

http://www.msnbc.msn.com/id/37520064/ns/disaster_in_the_gulf/

June 7, 2010

Oil Spill Stories from Around the Gulf Coast

<http://www.npr.org/templates/story/story.php?storyId=127538663>

June 7, 2010

Louisiana Locals Worry about Oil Spill’s Health Effect

<http://abcnews.go.com/Health/Asthma/gulf-oil-spill-potential-health-effects-people-louisiana/story?id=10849577>

June 9, 2010

Louisiana Reports 71 Oil Spill Related Exposure Illnesses To Date

http://www.thegovmonitor.com/world_news/united_states/louisiana-reports-71-oil-spill-related-exposure-illnesses-to-date-33091.html

June 11, 2010

Letter to Secretary Solis, Assistant Secretary Michaels, Director Howard, and Director Birnbaum from Multiple NY Health Officials

(PDF. DOC)

June 11, 2010

Experts: Gulf Workers' Levels of Chemical Exposure May Be 'Perfectly Legal', but Not Safe

<http://www.propublica.org/ion/blog/item/experts-gulf-workers-levels-of-chemical-exposure-may-be-perfectly-legal-not>

June 15, 2010

38 more report oil spill ailments; most from chemical exposure

http://www.nola.com/news/gulf-oil-spill/index.ssf/2010/06/38_more_report_oil_spill_ailme.html

June 15, 2010

Toxins in air from evaporating oil may pose greater threat to Gulf residents than oily water

<http://www.examiner.com/x-38220-Orlando-Independent-Examiner~y2010m6d15-Toxins-in-air-from-evaporating-oil-may-pose-greater-threat-to-Gulf-residents-than-oily-water>

June 15, 2010

BP's records on ill workers tell only part of the story

<http://www.miamiherald.com/2010/06/15/1682561/bps-records-on-ill-workers-tell.html#ixzz0r2vNmggT>

June 16, 2010

Cleanup crews working with tenuous safety net

http://www.msnbc.msn.com/id/37689831/ns/business-us_business//

June 17, 2010

Experts: Safety Training for Gulf Workers May be Inadequate

<http://www.propublica.org/ion/blog/item/experts-safety-training-for-gulf-workers-may-be-inadequate>

June 17, 2010

Gulf Cleanup Training Ignores Advice From Health Agency, Official Says

<http://www.propublica.org/feature/gulf-cleanup-training-ignores-advice-from-health-agency-official-says>

June 17, 2010

Health Impacts of the Oil Spill Studied

<http://www.ibtimes.com/articles/29190/20100617/oil-seafood-health.htm>

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OSHA Head Agrees, Gulf Cleanup Workers Need More Training

<http://www.propublica.org/ion/blog/item/osha-head-agrees-gulf-cleanup-workers-need-more-training>

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Feds Probe Gulf Spill Health Risks

http://www.sciencenews.org/view/generic/id/60373/title/Feds_are_probing_Gulf_spill%E2%80%99s_health_risks

June 17, 2010

BP Agrees to Oversee Safety Issues for Fishermen, Letter Says

<http://www.cnn.com/2010/US/06/17/gulf.bp.letter/>

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Uncharted Waters: The Spill and Human Health

<http://www.pbs.org/wnet/need-to-know/environment/unchartered-waters-the-spill-and-human-health/1604/>

June 19, 2010

New Efforts Aim to Keep Cleanup Workers Safe

<http://www.houmatoday.com/article/20100619/FEATURES12/100619093?Title=New-efforts-aim-to-keep-cleanup-workers-safer>

June 19, 2010

The Pump Handle: An Inconvenient Truth – Respirators Needed in the Gulf Cleanup

http://scienceblogs.com/thepumphandle/2010/06/an_inconvenient_truth_-_respir.php

June 22, 2010

Gaps in Health Data, Suspicions about BP Worry U.S. Panelists at Hearing

<http://www.bloomberg.com/news/2010-06-22/gaps-in-health-data-suspicions-about-bp-worry-u-s-panelists-at-hearing.html>

June 23, 2010

As BP Works Through Backlog, Cleanup Worker Illness Stats Triple Since Prior Report

<http://www.propublica.org/ion/blog/item/bps-worker-illness-numbers-tripled-since-prior-report>

June 23, 2010

How Will the Gulf Oil Spill Affect Human Health? (Audio Interview Too at Link)

<http://www.npr.org/templates/story/story.php?storyId=128008826>

June 23, 2010

MMS Moving to Mandate Safety Standards for Rig Workers

<http://www.nytimes.com/gwire/2010/06/23/23greenwire-mms-moving-to-mandate-safety-standards-for-rig-57025.html>

June 23, 2010

Doctors Call for Help Protecting Gulf Oil Spill Workers

<http://www.mcclatchydc.com/2010/06/23/96434/doctors-seek-help-protecting-gulf.html>

June 29, 2010

BP's Gulf Oil Cleanup Harms Workers

<http://www.socialistworker.co.uk/art.php?id=21682>

June 30, 2010

US Labor Department Provides \$27 Million to Help Workers Displaced by Oil Spill in Gulf of Mexico

<http://www.prnewswire.com/news-releases/us-labor-department-provides-27-million-to-help-workers-displaced-by-oil-spill-in-gulf-of-mexico-97487374.html>

June 29, 2010

RAE Systems Posts Educational Resource for Gulf of Mexico Spill Recovery Workers

http://www.marketwatch.com/story/rae-systems-posts-educational-resource-for-gulf-of-mexico-spill-recovery-workers-2010-06-29?reflink=MW_news_stmp

July 2, 2010

Another Gulf Mystery: Who's in Charge of Oil Spill Research?

http://www.bradenton.com/2010/07/02/2408072_p2/another-gulf-mystery-whos-in-charge.html

July 4, 2010

Sunday Forum: Oil Spills Are Bad for Our Health

<http://www.post-gazette.com/pg/10185/1069977-109.stm>

August 23, 2010

What Next: Assessing Deepwater Horizon damages and what we have yet to learn about the oil spill's impacts

http://scienceblogs.com/thepumphandle/2010/08/what_next_assessing_deepwater.php

August 23, 2010

Oil-cleanup Workers May Face Lung Trouble

<http://www.cnn.com/2010/HEALTH/08/23/oil.workers.lung.problems/index.html>

September 22, 2010

Experts Craft Study of BP Oil Spill Health Effects

<http://www.businessweek.com/ap/financialnews/D9ID4QC02.htm>

October 25, 2010

NIOSH Evaluates Health Effects of BP Oil Spill Response Workers

<http://ohsonline.com/articles/2010/10/25/niosh-evaluates-health-effects-of-bp-oil-spill-response-workers.aspx>

December 26, 2010

Panel Challenges Gulf Seafood Safety All-Clear

<http://powerwall.msnbc.msn.com/politics/panel-challenges-gulf-seafood-safety-all-clear-1670409.story>

APPENDIX IV

15-Hour Disaster Site Worker Course #7600 - Designated Training Topics.

http://www.osha.gov/dte/outreach/disaster/disaster_procedures.html#2

1. Completion of the 10- or 30-hour OSHA Construction or General Industry Outreach Training Course is a prerequisite to attending this course because course #7600 does not cover in detail the safety and health hazards that occur on a daily basis on a normal work site.
2. The goal of Course #7600 is to provide Disaster Site Workers with an awareness of the safety and health hazards they may encounter as well as of the importance of respiratory and other personal protective equipment and proper decontamination procedures that may be used to mitigate the hazards. Participants will support the use of an Incident Command System through the safe performance of their job responsibilities. They'll be able to show awareness of effects of traumatic incident stress that can result from working conditions and measures to reduce this stress. Of primary importance is the participant's ability to perform the following specific tasks correctly:
 - Inspection of an air-purifying respirator;
 - Donning and doffing an air-purifying respirator; and
 - Respirator user seal check.
3. The intended audiences for this course are Disaster Site Workers who provide skilled support services or site cleanup services in response to a disaster. Most of this audience are members of the construction trades, therefore this is the focus of the curriculum.
4. OSHA recognizes that other skilled support personnel, such as utility workers and public works employees, may not have a construction background. Trainers for the Disaster Site Worker Course will need to assess their audience and modify the course materials as appropriate to provide visual materials, examples, scenarios, case studies and lessons learned from actual events that will engage these workers and facilitate accomplishing the overall course goal.
5. With the exception of the lesson on CBRNE (chemical, biological, radiological, nuclear, and explosives) agents, the curriculum for this course applies equally to natural and man-made disasters. If this course is given to workers who are expected to respond primarily to natural disasters, trainers should supply additional material relevant to the specific type of disaster that is anticipated. In all cases, the objectives listed in the manual for each lesson must be met.
6. This course emphasizes knowledge, precautions and personal protection essential to maintaining a worker's personal safety and health at a disaster site. Workers will perform an inspection of an appropriate air-purifying respirator, don the respirator and perform a user seal check, and doff the respirator. This training provides students an opportunity to practice their new knowledge, skills and attitudes through discussion, planned exercises, demonstrations and presentations.
7. Trainers must cover all of the following Disaster Site Worker topics. OSHA has provided the typical length of each topic necessary to fulfill the objectives of Course #7600, Disaster Site Worker Course. Although time spent in each topic may vary from our recommended length, the total course time must be at least 15 hours. Participants will complete a "Theme Worksheet" throughout the course as reinforcement of the learning. A discussion of notes made to complete the "Theme Worksheet" will be facilitated at the end of the course to enhance the retention and transfer of their new knowledge back on the job. The course will conclude with a final assessment in the form of an exercise that will measure the participants' mastery of all of the course objectives.

TYPE WORK

TRAINING MODULES	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 contact with minimal weathered oil (oiled beaches or shoreline)	Cleaning wildlife, environmental sampling in weathered oil or government site assessments (individuals who have already met U.S. 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 in situ burning—captains and crews	Vessel of Opportunity: Marine Vessel Operations with minimal contact with weathered oil for logistics support, defensive booming, etc.—captains and crews	Working on a marine vessel and potential to come in contact with fresh oil	Supervising Mod 3/4, and Hazwoper 40 workers in weathered oil*	Supervising Hazwoper 40 workers in fresh oil
Module 1 Basic HSE Orientation 30 Minutes	●									
Module 2 or Equivalent Site HSE Orientation 45 Minutes		●			●			●	●	●
Module 3 (Shoreline) Spilled Oil Response 4 Hour			●							
Module 3 (Shoreline) Spilled Oil Response Computer-based Training (CBT)				●						
Module 3 (Marine) Spilled Oil Response 4 Hour							●			
Module 4 (Marine) Spilled Oil Response 4 Hour							●			
HAZWOPER 24 Hour								●		
HAZWOPER 40 Hour					●			●	●	●
Supervisory Training 8 Hour										●

(Env. Sampling only)

ACRONYM LIST

ASTHO	Association of State and Territorial Health Officials
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BPSOS	Boat People SOS
CBO	Community-based Organization
CLEAR	Center for Labor Education and Research
CPWR	Center for Construction Research and Training
EPA	Environmental Protection Agency
ERHMS	Emergency Response Health Monitoring and Surveillance
ESAP	Emergency Support Activation Plan
ESF	Emergency Support Functions
FEMA	Federal Emergency Management Agency
GOS	Gulf Oil Spill
HAZMAT	Hazardous Materials
HDPTP	Hazardous Materials Disaster Preparedness Training Program
HMTUSA	Hazardous Materials Transportation and Uniform Safety Act
IAFF	International Association of Firefighters
ICS	Incident Command System
ICWUC	International Chemical Workers Union Council
NCP	National Contingency Plan
NGO	Non-governmental organization
NIEHS	National Institute of Environmental Health Sciences
NIOSH	National Institute for Occupational Safety and Health
NIMS	National Incident Management System
NRF	National Response Framework (formerly the National Response Plan)
NRP	National Response Plan
NYCOSH	New York Committee for Occupational Safety and Health
OCS	Outer Continental Shelf
OSHA	Occupational Safety and Health Administration
PEC	Petroleum Education Council
PETE	Partnership for Environmental Technology Education
PPE	Personal Protective Equipment
SARA	Superfund Amendments and Reauthorization Act
SEMS	Safety and Environmental Management Systems
SONS	Spill of National Significance
TEEX	Texas Engineering Extension Service
USACE	United States Army Corps of Engineers
USW	United Steel Workers
WETP	Worker Education and Training Program
WTC	World Trade Center



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This publication was made possible by contract number HHSN273201000083U from the National Institute of Environmental Health Sciences (NIEHS), NIH to MDB, Inc.