

NIEHS Response to the Gulf Oil Spill

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UNC Oil Spill Meeting

July 29, 2010



Worker Education and Training Program (WETP) was created in 1986 by the Superfund Amendments and Reauthorization Act of 1986 (SARA), Section 126(g).

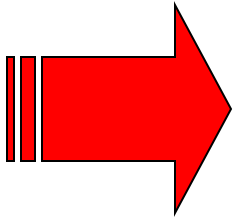
SARA authorizes a competitive grants program for training in hazardous waste removal, containment, and emergency response to events involving toxic substances.



Keeping Workers Safe During Oil Spill Response and Cleanup Operations



Rescue



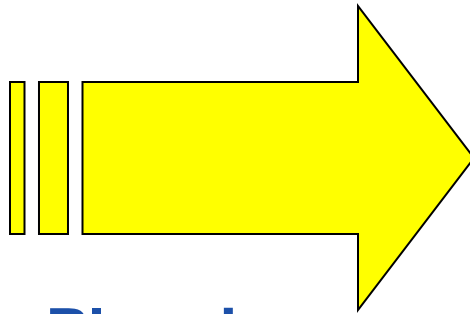
Chaotic

Risk-taking

Short

Frenetic

Recovery



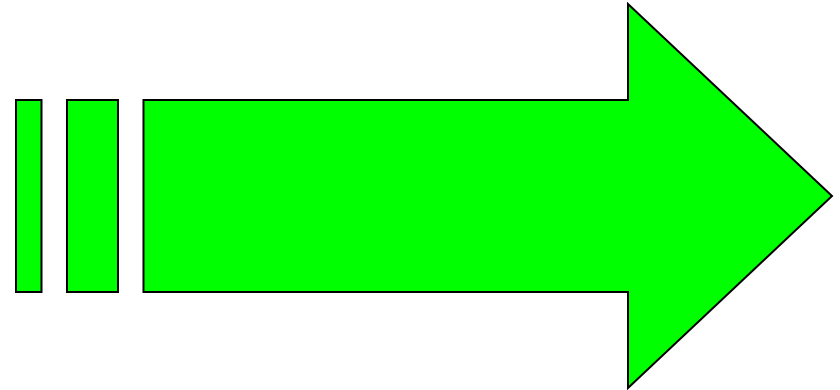
Planning

No risking lives

Longer than rescue

Paced

Clean-up



Normal cleanup

**Risks assessed and
understood**

NIEHS Disaster Response to the World Trade Center

Immediate and sustained supplemental funding to support World Trade Center training response efforts:

- **On-site training for 7,000 response workers**
- **Provision and fit-testing of respirators**
- **Worker exposure monitoring**
- **Responder training course**
- **Consultation on the site safety plan**



- NIEHS developed oil spill response training tool on April 29, 2010 as the spill expands in the Gulf of Mexico.
- NIEHS Staff begin work with OSHA and NIOSH as part of the Unified Command assessing worker safety issues on May 1st.
- NIEHS deployed staff, subject matter experts and awardees for instructor training and worker protection outreach.



BP, USCG, OSHA, NIEHS, and NIOSH meet to assess worker protection issues in the BP Incident Command Center in Houma, LA on Tuesday, May 3, 2010.

- NIEHS, together with OSHA, BP and the Coast Guard, has developed short training courses.
 - Training includes: safe work practices, personal protective equipment, decontamination, heat stress, and other common hazards for cleanup work.
 - As of June 29, per BP, approximately 50,000 people had completed these courses.
- Hazardous Waste Operations & Emergency Response (HAZWOPER) training:
 - 40-hour training for those who will likely have direct contact with oil spill products.
 - More than 1,000 have completed the HAZWOPER training from NIEHS grantees.

Module 2

 NIEHS Oil Spill Cleanup Training Tool 

Module 2

Oil Spill Cleanup and Health Concerns



22

WORKER EDUCATION & TRAINING PROGRAM

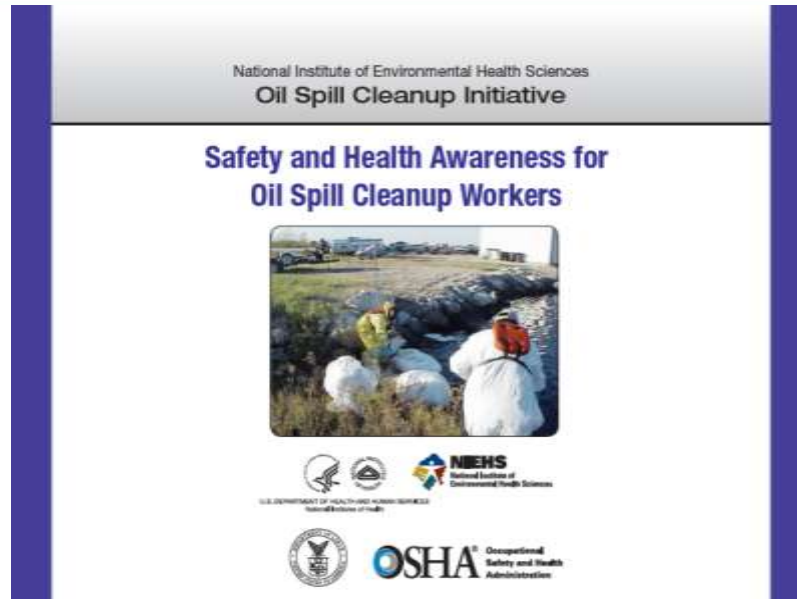
NIEHS Oil Spill Responder Training Tool: Key Health and Safety Messages

- Proper training is a key component of a safe response and cleanup.
- The oil and hazardous materials associated with the cleanup can be hazardous to human health.
- The hazards and issues covered in this training tool are dynamic and require vigilance and flexibility.
- The key to a safe response is attention to the safety issues of your work environment.

Over 8000 guides distributed

Front-line responders, instructors,
safety officials

English, Spanish, & Vietnamese



- NIEHS has established a mission assignment from the US Coast Guard which will include:
 - Enhancement of safety training for fisherman engaging in booming and skimming in the Vessels of Opportunity (VOO) Program;
 - Conducting a training quality assessment process to assure that cleanup workers receive proper training to prepare them for oil spill response;
 - Create additional curricula and modules to cover essential health and safety hazards for oil spill cleanup workers;
 - Develop training to support personal protection equipment for oil spill responders;
 - Integrate safety and health training into an overall responder protection program in conjunction with BP, CG, OSHA, NIOSH and others.

- **Origin**
 - NIEHS & CDC collaboration for research initiated May 28th
- **Current Participants** (> 60 members)
 - HHS: NIEHS, CDC (NCEH, NIOSH, ATSDR), SAMHSA, OS/ASPR
 - Non-HHS: OSHA, EPA, Coast Guard, NOAA
 - Other: State Health, Academia
- **Focus areas / Subgroups**
 - **Toxicology**
 - **Survey tools**
 - **Medical Testing / Biomonitoring**
 - **Health Problem Surveillance**
 - **Stakeholder Involvement**
 - **Exposure Matrix Development**



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ACTIVITY
Assessing the Human Health Effects of the Gulf of Mexico Oil Spill
6/17/2010

Decades later, we still can feel the consequences of the Exxon Valdez oil spill. How will the even larger crisis in the Gulf impact our health? The IOM will hold a meeting June 22-23 to discuss the health issues for those living and working near the Gulf.

Read More »



Key Points (report is pending)

1. Longitudinal human health research is clearly indicated
2. Health studies should begin as soon as possible
2. Mental health & psychosocial impacts must not be overlooked
3. Sensitive populations need to be monitored
4. External stakeholders must be part of the process
5. Data and data systems should be developed to support wider research efforts

Medical surveillance studies and human health exposure assessments related to the spill will be difficult due to the size of the spill area, potentially impacted shoreline area, and number of those responding or exposed.

- **Health Concerns**

- **Acute**

- Dermal, Eye, Respiratory
 - Heat-related issues & Injuries
 - Mental Health / Psychosocial Issues

- **Long-term health effects ?**

- respiratory, neurological, carcinogenic, etc.?

- **Target Groups**

- Workers
 - Volunteers
 - Exposed Community

- **Exposure Complexity**

- Chemical mixtures including raw and weathered crude oil, dispersants, and combustion by-products.
 - Exposure measurements from various sources and methods



- Limited health studies: about 40 supertanker spills last 50 yrs, only 8 studied
 - Exxon Valdez , USA, 1989 (270,000 barrels)
 - MV Braer, UK, 1993 (620,000 barrels)
 - Sea Empress, UK, 1996 (525,000 barrels)
 - Nakhodka, Japan, 1997 (>44,000 barrels)
 - Erika, France, 1999 (146,000 barrels)
 - Prestige, Spain, 2002 (460,000 barrels)
 - Tasman Spirit, Pakistan, 2003 (270,000 barrels)
 - Hebei Spirit, South Korea, 2007 (73,000 barrels)
 - **Deepwater Horizon, USA, 2010 (est. 2M barrels as of July 6)**
- Designs: typically cross-sectional designs without controls or follow-up
- Exposure Assessment: except for one study, none had quantitative measurements & used surrogate measures such as distance from spill



- **PAHs & Petroleum Distillates**
 - Cancer from long term skin contact- PAHs
 - Neurologic effects including seizures, vertigo- petroleum distillates
 - Chemical pneumonia following aspiration- petroleum distillates
- **VOCs**
 - Cancer, anemia- benzene, naphthalene
 - Spectrum of neurologic effects, leukoencephalopathy- toluene, xylene, hexane
- **Heavy Metals**
 - Cancer, neurotoxicity, dermal sensitization- cadmium, nickel, lead
- **Detergents**
 - Skin, eye irritation, and effects on absorption of other chemicals- dispersants
- **Solvents**
 - Anemia, renal injury- 2-butoxyethanol, propylene glycol

- **Crude Oil**
 - Polycyclic Aromatic Hydrocarbons (PAHs)
 - Volatile Organic Compounds (VOCs) (benzene, naphthalene, toluene, xylene)
 - Heavy Metals (cadmium, nickel, lead, zinc)
- **Dispersants**
 - Detergents (sulfonic acid salts)
 - Solvents (2-butoxyethanol, propylene glycol)
 - Petroleum Distillates (paraffins, PAHs)
- **Burning**
 - PAHs, respirable particulate, hydrogen sulfide, sulfur dioxide
- **Other:** Heat Stress, Physical Hazards, Psychosocial / Mental Health

To study potential short-and long-term health consequences of exposure to oil and oil byproducts

- 21,000 paid community clean-up workers & volunteers exposed to burning oil, weathered oil, dispersants, and crude oil
 - Currently employed and newly hired over time
 - Vessels of opportunity, shoreline clean-up, decontamination, and disposal
 - Coast Guard and National Guard (?)
 - BP oil rig workers and contractors
- Community exposed recreationally etc. Not included as this time ?

*Working title: **Gulf Long-term Follow-up Study**

- Baseline health history and symptom data, clean-up work & exposure history
- Blood and urine sample collected at enrollment
- Periodic follow-up via health questionnaires
- Prospectively collected work and acute symptom diaries
- Passive follow-up via record linkage
 - cancer, vital status, electronic medical records
- Exposure reconstruction using available worker information and exposure measurements (EPA, OSHA, BP, CG, NOAA)

- **1,000 workers (highly exposed, controls) for intensive follow-up**
 - Blood, urine, saliva collected at baseline and at ~18 month follow-up
 - Pulmonary & neurobehavioral function testing at baseline and at follow-up
 - Subgroup for studies of male reproductive effects
- **Vanguard subcohort (~350) for biomarker studies**
 - Baseline collection of blood and urine
 - including some from workers enrolled before employment (?)
 - Repeat collections (daily, weekly or bimonthly)
 - up to 15 urine samples and 4 blood samples over 6 months
 - Changes in biomarkers over time; assay quality control

- **Data coordinating center:** compile environmental and personal environmental sampling data, acute event reports, and ancillary datasets for exposure modeling and assigning exposure levels
 - Collaboration with local university with access to community groups
 - Facilitate communications with affected groups
- **Biorepository:** facilitate biomarker and health studies
 - Collaboration with CDC or Gulf region university
 - Urine, whole blood, clots, blood spots, RNA tubes, serum
 - Saliva and semen for targeted subcohort members
 - Cryopreserved lymphocytes for vanguard subgroup

- Genotoxicity
- Changes in immunological response and immune function
- Adverse reproductive effects (male factors, fertility)
- Chronic respirator effects
- Neurobehavioral effects (symptoms and test performance)
- Depression, other mental health changes
- Biological aging (telomere shortening)
- DNA damage and repair, other biomarkers of exposure & effect
- Cancer, Mortality

In remembrance of the eleven Deepwater Horizon drilling rig workers who died at MC252. May they not be forgotten.

