

# NIOSH Response Efforts for Hurricane Katrina:



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# National Response Plan

- Assist the states in meeting public expectations
  - Safe food/water
  - Shelter
  - Health/Medical care
  - Safety
- Organized into 15 Emergency Support Functions (ESFs) - Each has a lead agency
- DHHS is one of the 15 (ESF #8) – Oversees Health and Medical Services Function

# National Response Plan Continued

- ESF #8 specific functions:
  - Preventive Health Services
  - Environmental Health Services
  - Mental Health Services
  - Medical Services
- Worker Safety and Health Support Annex- is one of the roles under ESF#8. OSHA has primary responsibility and NIOSH provides support.

# NRP Says We Must be Prepared

- Natural problems
  - Hurricanes
  - Earthquakes
  - Floods
- Technology problems
  - Chemical spills
  - Radiation
- Terrorism



# NIOSH Emergency Response and Occupational Safety and Health

- NIOSH Industrial Hygienist and Medical Officers
- NIOSH Investigators
  - Hazmat trained
  - Many have prior disaster response experience
  - Assess occupational hazards
  - Provide guidance on PPE/controls
  - Help establish worker site registry
  - Exposure monitoring
- USPHS Officers – On call

# Prior CDC/NIOSH Assistance

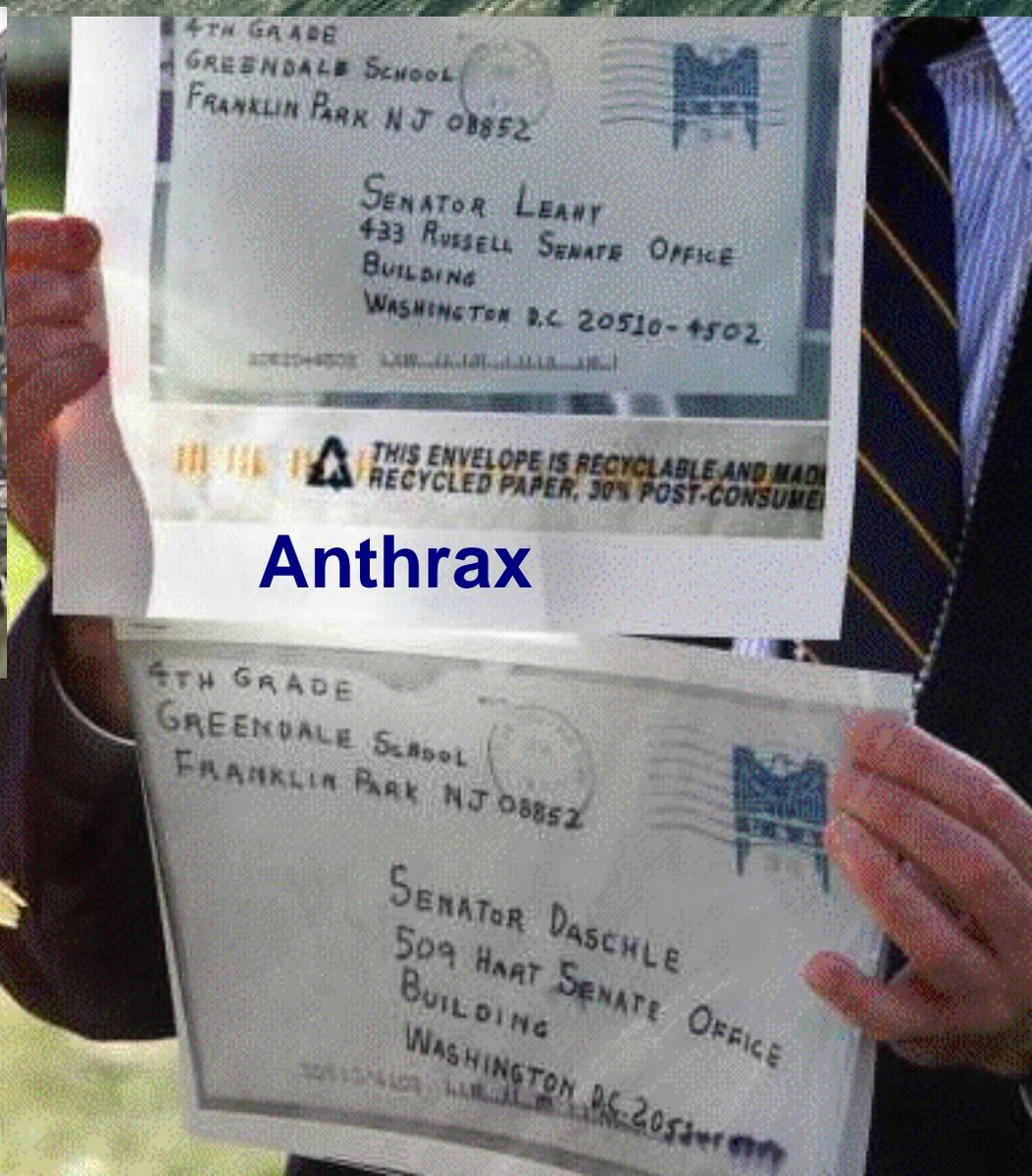
- Many hurricanes – George, Bonnie, Opal
- Oklahoma Bombing
- Anthrax
- Floods/Tsunami
- Salt Lake Winter Olympic Games
- World Trade Center – 1993 and 2001
- SARS

Tsunami

# NIOSH RESPONSE EFFORTS



9/11



Anthrax



SARs

# 9/11

- Initial assessment of occupational hazards
- Provided PPE guidance
- Provided H&S information
- Provided sampling guidelines
- Conducted biological monitoring of workers
- Reviewed long term surveillance needs
  - medical screening of responders
  - evaluating dust exposure in nearby buildings



# Anthrax

- Developed new environmental sampling procedures (allergy sock)
- Recommended PPE and engineering controls
- Evaluated decontamination procedures and post clean up assessment
- Distributed educational material
- Addressed concerns about irradiated mail
- Addressed post exposure prophylaxis and vaccination



# SARs

- Evaluated isolation wards and rooms
  - Pressure differentials
  - Exhaust ventilation design and configuration
- Conducted field assessments of health care facilities
- Developed written environmental guidelines
- Provided recommendations for protection of health care workers (PPE, infection control)



# Tsunami

- Performed engineering building assessments
- Develop worker care plan for exposures
- Specify PPE use practices
- Control specific site hazards
- Reduce/prevent musculoskeletal injuries
- H&S training for staff/volunteers
- Distribute fact sheets, staff and public



# Hurricane Katrina

- Struck New Orleans and the states of Alabama, and Mississippi on 8/29/05
- Devastation 100 miles from center of storm
- Deadliest hurricane since 1928, killing at least 1604 people
- Breached levee at Lake Ponchartrain, flooding 80% of New Orleans
- Damage est. at \$75 Billion, making it the costliest hurricane in U.S. history



# Planning the CDC/NIOSH Hurricane Katrina Response

- In Atlanta, the CDC Director's Emergency Operations Center (DEOC) and Coordinating Office for Terrorism and Emergency Response (COTPER) coordinated the response
- NIOSH offices in Cincinnati initially organized a team of 8 IH/Medical staff to conduct Hazards/Needs Assessment

# NIOSH New Orleans Team 1

## Deployed Sept 9-21, 2005

### ■ Mission:

#### – Observational evaluations

- Exposures
- PPE use
- Work-rest regimens
- Task analysis
- Access to clean water
- Heat Stress, fatigue, stress
- Interview data on health/safety concerns

#### – Qualitative/Quantitative evaluations

- Potential exposure to contaminants in air/water

# Responders' Concerns

- Infectious disease
- Immunization requirements
- Personal Protective Equipment (PPE)
- Sewage
- Confined spaces/Hazardous atmospheres
- Carbon monoxide
- Dust
- Downed power lines

# Deployment Issues

- Immunizations
- Airport closed
- No rental cars
- Housing
- Food
- Communication
- Security



# Preparing for Departure Atlanta to Baton Rouge to New Orleans

- Personal luggage
- PPE
- Extra fuel



# Temporary Quarters – Baton Rouge



Sleeping Quarters  
Baton Rouge-  
En route to New  
Orleans



# Checkpoint on I-10 entering New Orleans



# Temporary Quarters – New Orleans

## USS Iwo Jima provided accommodations

### ■ Hotels

- No power
- Unsafe water
- No staff
- Mold/water damage

### ■ Food

- Restaurants closed



# Security concerns in New Orleans



# DHHS Escort



13 10:43 AM

# Security

- Military/Police
  - Patrolled streets
- Curfew
- Check Points



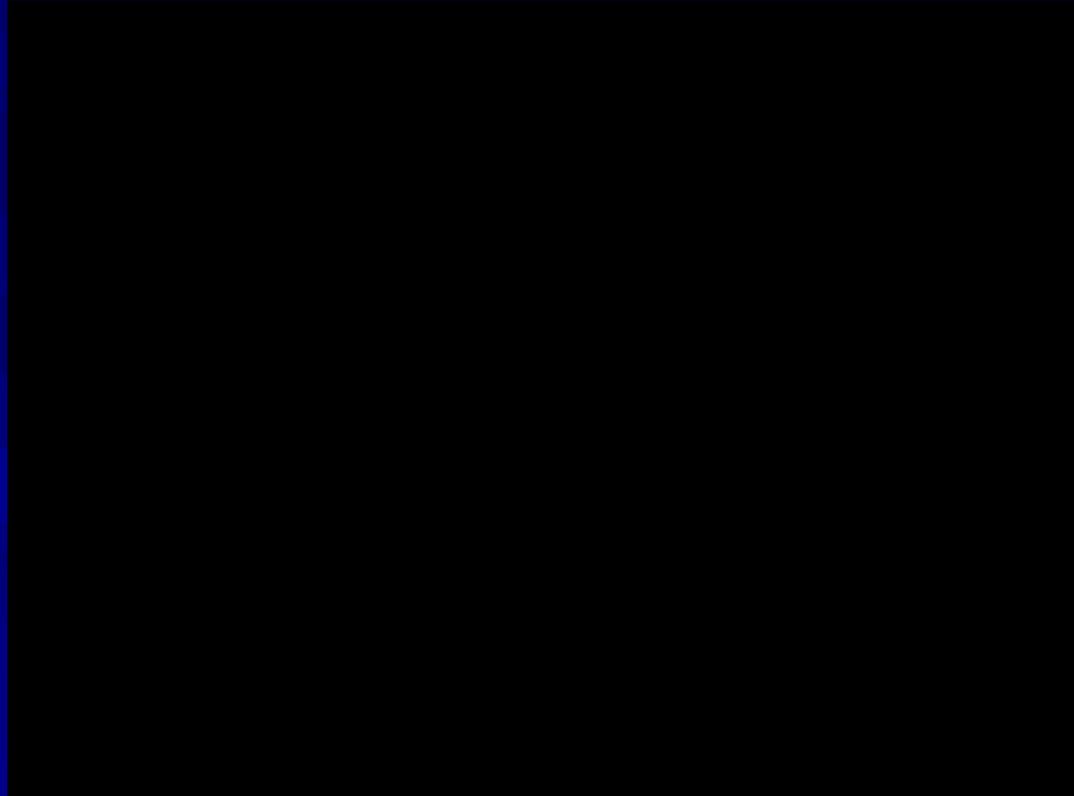
# Mandate

- Be part of CDC team
- Follow-up on leads
- Identify health and safety issues
- Work with other Govt. Agencies



# Feedback

- CDC/Local
  - Meetings
  - Reports
- CDC/DEOC Atlanta
- NIOSH Cincinnati



# Rumors, Concerns & Uncertainty

- Cholera
- E. coli reported by media
- Lead in water
- Flood water – “Toxic Soup”
  - Aerosolization
- Dibrom<sup>®</sup> spraying for mosquitoes
- Mud & Dust
- Bodies
- Animals

# Common Worker Activities

- Building cleaning, remediation, and repair
- Trash & debris removal
- Tree trimming & removal
- Utility line repair
- Street sweeping
- Dewatering of flooded structures



# Potential Worker Exposures

## ■ Safety

- Electrical hazards, falls, chainsaws
- Confined spaces

## ■ Health

- CO
- Mold
- Particulate matter, silica
- Heat stress

# Routes of Exposure

## ■ Inhalation

- Dusts
- Bioaerosols

## ■ Dermal

- Skin Infections
- Chemicals

## ■ Ingestion

- Pathogens
- Chemicals

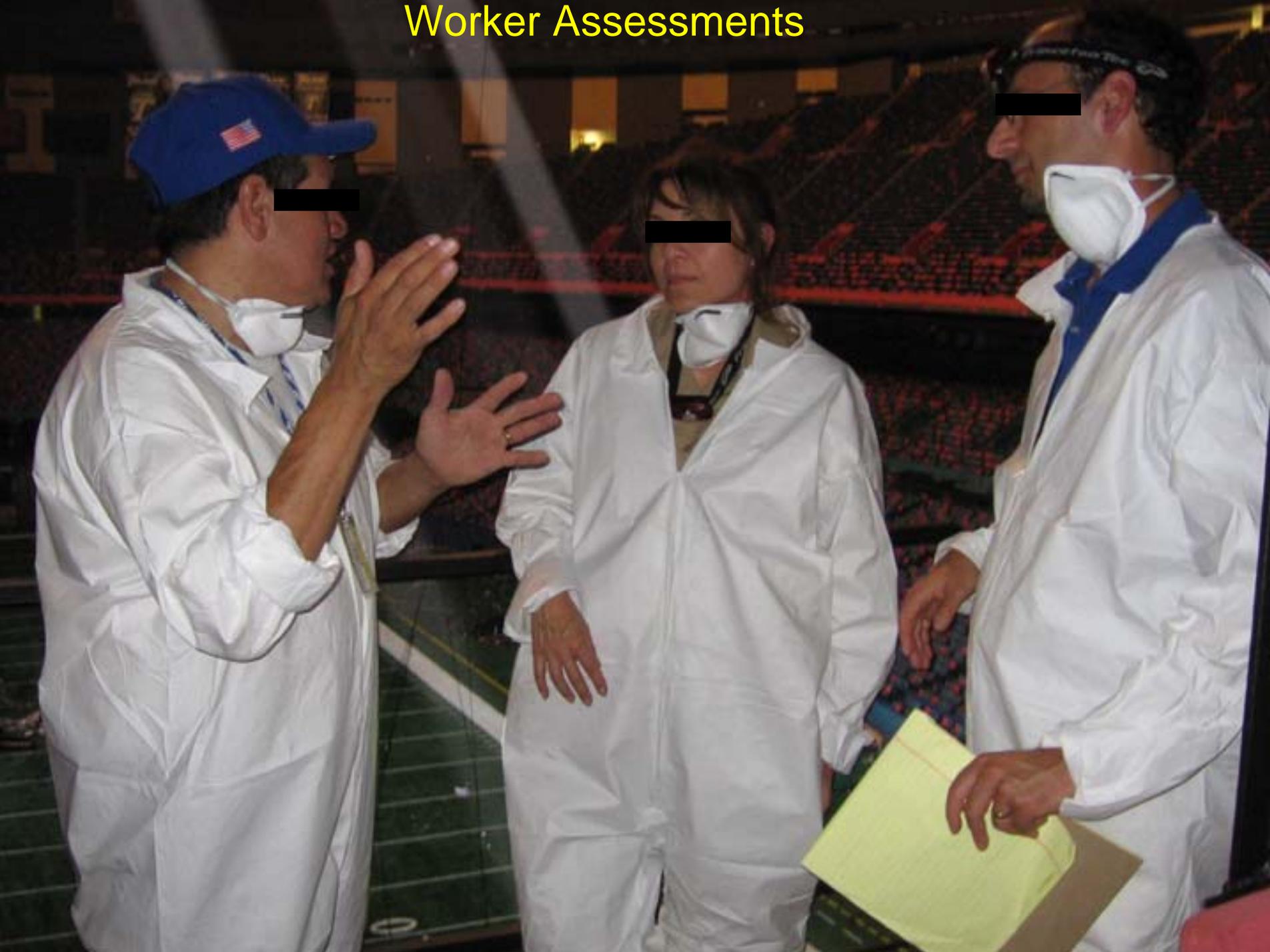


# Worker Assessments



13 2:42 PM

# Worker Assessments





EXIT GATE C



HIBERNIA

ATM



Gate A & Poydras Street  
Club Level

DAIQUIRIS

SWISS  
EATER



A. Sussell

Carbon Monoxide buildup in parking garage – 220 ppm

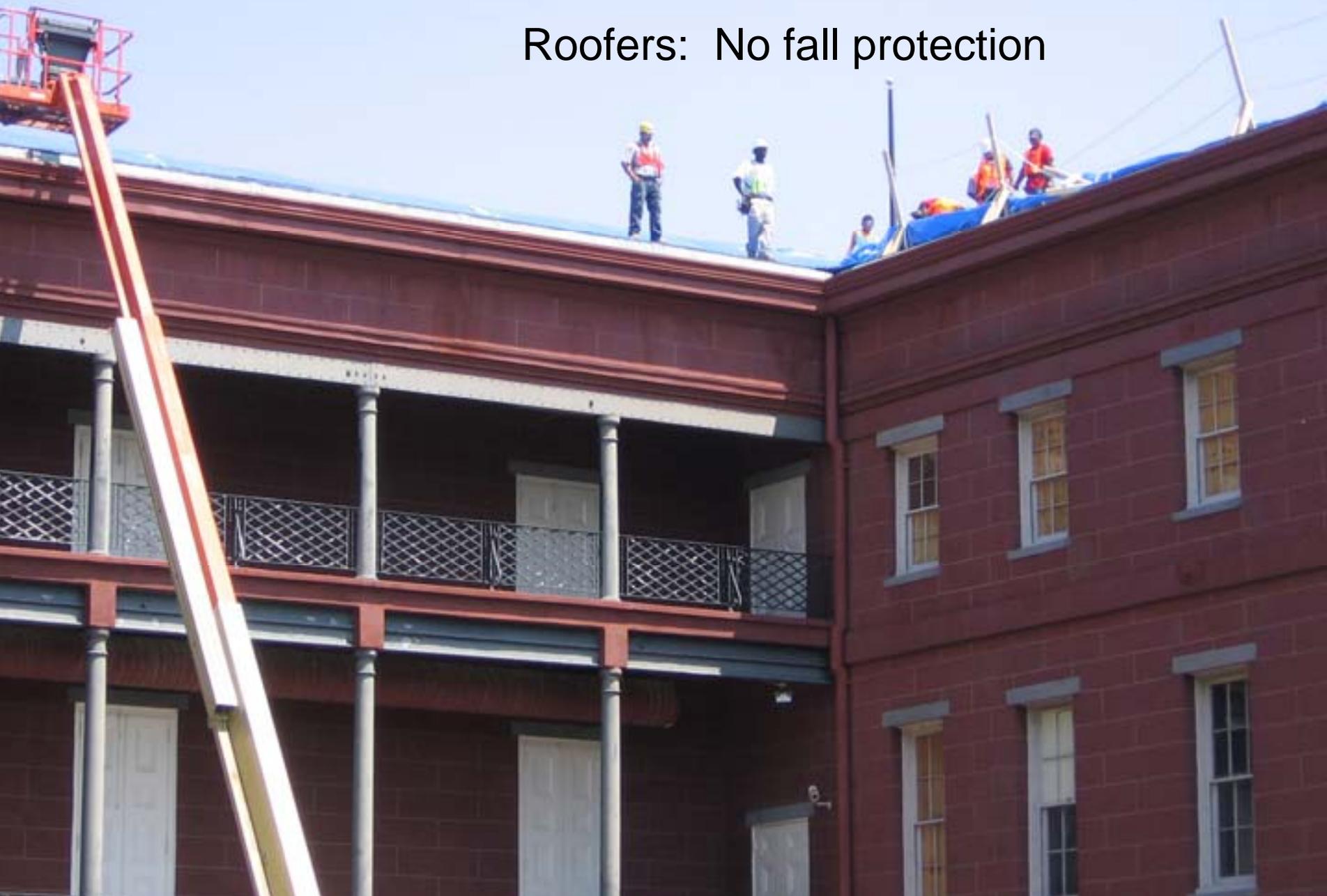


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Confined Space:  
Possible toxic gas accumulation/oxygen  
deficient atmosphere



Roofers: No fall protection



Potential silica exposure during movement of crushed rock and sand





Before arriving on-scene, this area was not cordoned off:  
Workers/pedestrians walked by while glass was falling

Murphy Crude Oil Spill-contaminated many square miles. Clean-up and responders could be exposed to various hydrocarbon compounds.



# Flood Sludge After Katrina



# What would be in the sludge or dust after flooding?

- Anything that is in the environment – fungi, bacteria, and other microorganisms, any metals such as lead or arsenic, pesticides, petroleum products, vegetative materials, sewage, animal wastes, dead animals

# Mold After Extensive Flooding and Enclosure



# Groups at Greater Risk of Developing Symptoms From Mold Exposure

- Infants and children
- Elderly people
- People with respiratory conditions (such as asthma) or allergies
- People with weakened immune systems

# NIOSH New Orleans Team 2

## Deployed Sept 27-Oct 13, 2005

- Conduct quantitative exposure assessment
- Conduct qualitative hazard assessments
- Provide recommendations to workers, employers, other agencies regarding:
  - Mold
  - PPE – workers, returning residents
- Identify working populations to assess epidemiologically

# Team 2 Approach

- Follow-up on contacts made by Team I
  - Federal agencies
  - Unions
  - Employers
- Collaborate with OSHA and US Army Corp of Engineers
- Liaise with Joint Field Office in Baton Rouge
- Identify and meet with workers
- Integrate with other CDC crews on site

# Debris Removal

- Sampled For
  - Silica
  - Elements/metals
  - Asbestos
  - Total/Respirable Dust
  - Noise



# Records Retrieval

- Personnel needed to retrieve records at various sites
- Provided information/guidance on
  - PPE
  - Mold
  - Heat stress
  - Work stress



# Noise Assessment at an Animal Shelter



# Sample Results

- With the exception of a few noise exposure measurements all sample results were below applicable occupational exposure limits
- Sampling was limited due to difficulty in identifying and locating workers
- Sample results do not reflect other health concerns such as mold, safety issues, stress, depression, and mental health

# Team 3 and Beyond

- Outreach/Information dissemination
- Police Department Survey (912)
- Fire Department Survey (525)



# Using Available Resources to Disseminate Information

- Firefighters
- Red Cross
- Billy Graham Crusade Team
- Mobile Insurance Vans
- Restaurants
- Churches
- TV Interview



American  
Red Cross

**Thanks for Giving...**the American Red Cross thanks the volunteers and donors who helped deliver relief through a year of unprecedented disasters.

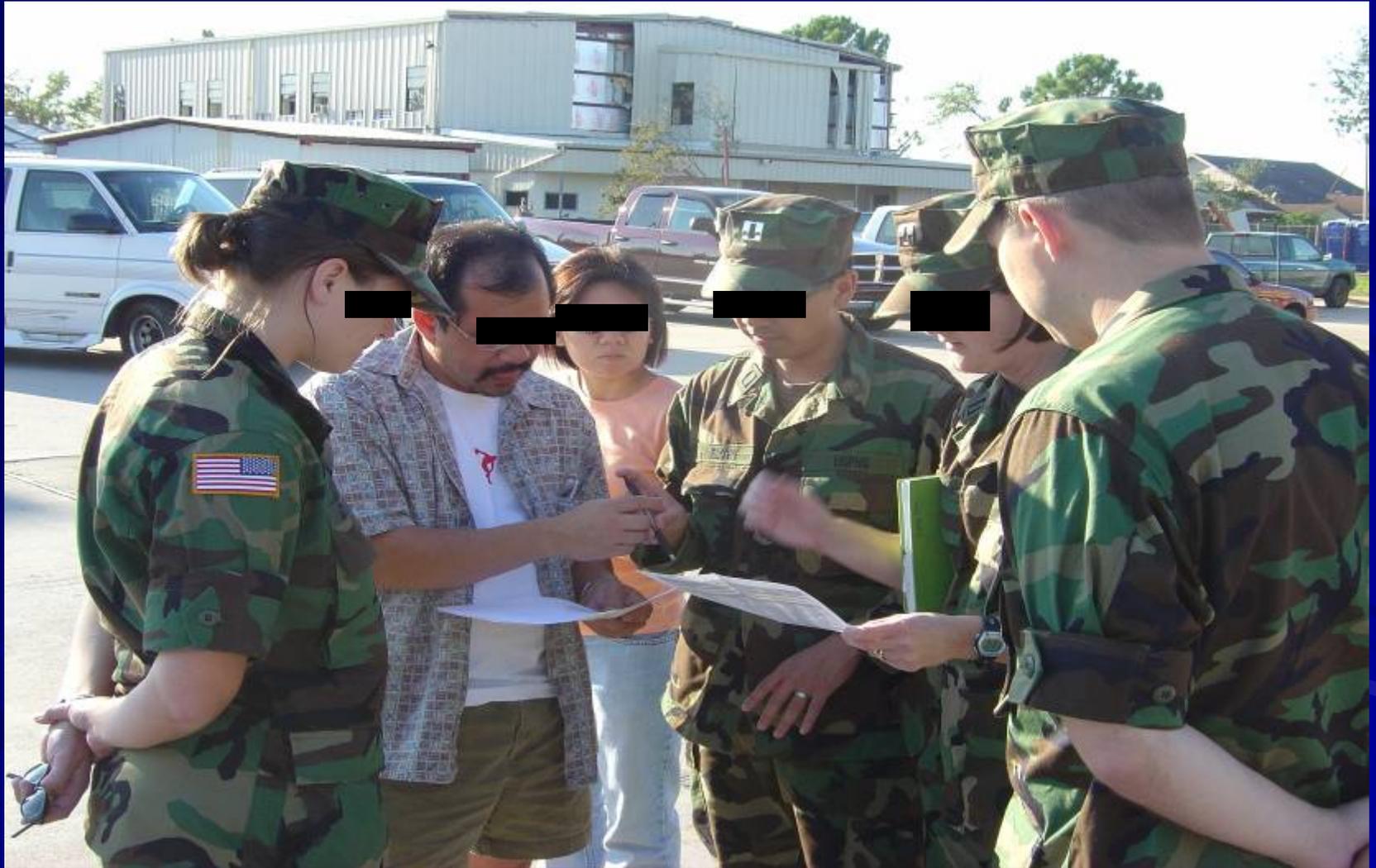
By donating your time, money and blood, you ensure that your local American Red Cross can continue delivering lifesaving services in your community.



# Latino Outreach



# Vietnamese Outreach



# New Orleans Police and Fire Department response to Hurricane Katrina

## ■ Exposures:

- Flood waters
- Search and rescue
- Stress

## ■ Health Effects:

- Diarrhea
- Upper respiratory symptoms
- Rashes
- Depression
- Post-traumatic stress



# Police and Fire Department Surveys

- NIOSH looked at the prevalence of mental and physical health symptoms and their relationship to hurricane Katrina based on reported symptoms not a medical evaluation
  - For both groups an association was seen between respiratory and skin rash symptoms and contact with floodwater
  - Members of both groups presented symptoms consistent with posttraumatic stress disorder and depression, which were associated with hurricane related factors

# Police and Fire Department Surveys

- Factors associated with posttraumatic stress disorder and symptoms:
  - Body recovery
  - Gunshot incidents
  - Assault
  - Concerns about family members
  - Loss of home

# NIOSH Recommendations

- For NOPD and NOFD managers
  - Provide clinical evaluation and medical follow-up for employees involved with the hurricane
  - Establish a joint employee-management committee to discuss health and safety concerns
- For NOFD managers
  - Provide specific safety and health protective measures for fire fighters during and after natural disasters

# NIOSH Recommendations

## ■ For NOPD Managers

- Develop a plan for periodic medical evaluation and use a surveillance or incident reporting system to document and respond to patterns of injuries and illnesses
- Provide employees opportunities for social support and counseling

## ■ For employees

- Report work related physical and physiological symptoms to management and seek proper medical attention
- Use appropriate personal protective equipment when responding to disasters

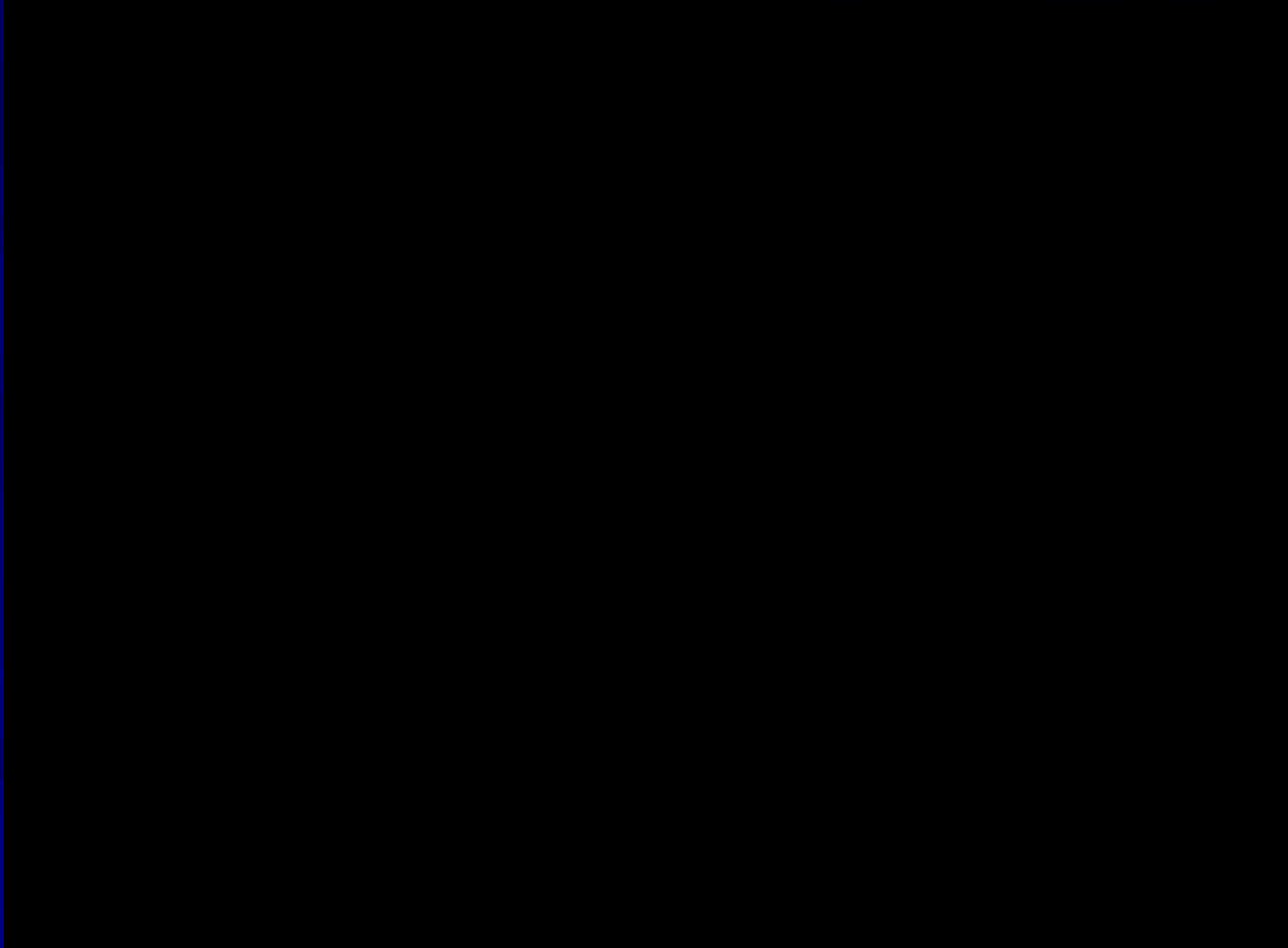
# Other Agencies Responding

- Rescue: Coast Guard, USAF, Navy, Police, Firemen
- Security: Police, Army, National Guard
- EHS: CDC/NIOSH, OSHA, EPA
- Food, water: ICS, Red Cross, others
- Tree trimming, food: Forest Service:
- Clearing roads: Marines, Army Corp
- Cleaning, repairing damage: Contractors

# Marines at Work



# Disaster Medical Assistance Team (DMAT) giving shots



# Lessons Learned

- Most large contractors were well prepared.
  - Written S&H plans, PPE, environmental monitoring capability, etc.
- Some contractors/sub contractors presented multiple challenges.
  - No written S&H plans, insufficient PPE.
  - Lack of experienced IH's to conduct environmental assessments.
- Problem locating worker groups
  - Large area impacted by the hurricane.
  - Multiple private companies and governmental agencies contracting workers.

# Needs

- Documents in Spanish, other prevalent ethnic languages
- Easy to read documents.
- Liaison to Army Corps of Engineers, OSHA, EPA on the ground
- Effective risk communication / media
- Outreach to working groups for occupational safety and health (e.g., faith groups)

# Accomplishments

- 28 new guidance documents regarding workers and hurricane risks
- CDC/NIOSH reworked existing guidance documents into more useful 1 pagers, with a lower literacy level
- 18 documents were translated into Spanish, 10 into Vietnamese

# Acknowledgements

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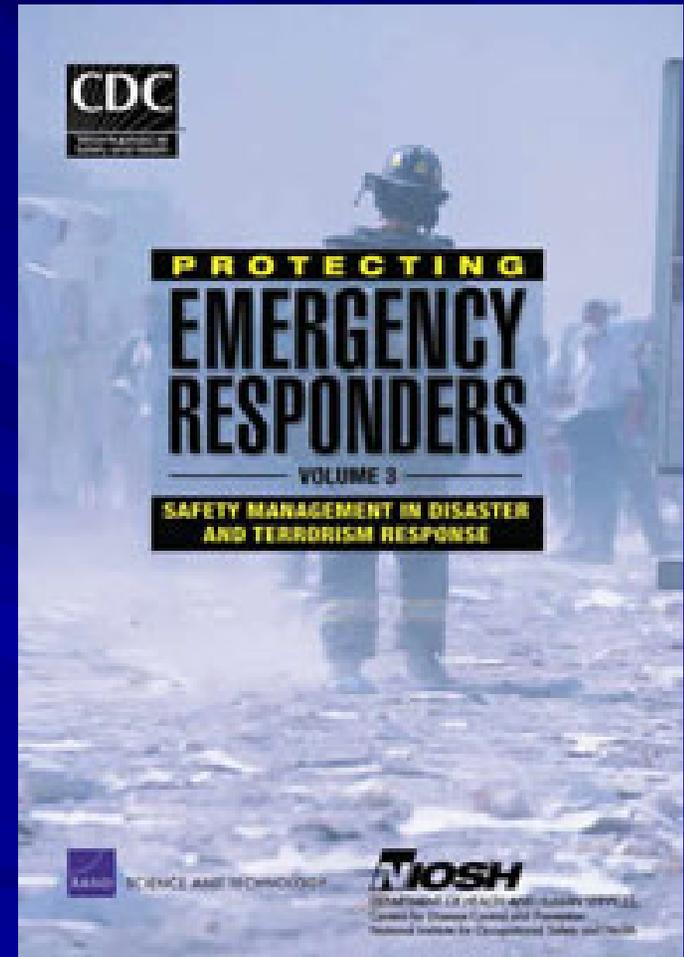
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- Angela Warren - EPI
- Steve Martin - Eng
- Ken Linch - Eng
- Laura Lynn Taylor - Eng

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<http://www.cdc.gov/niosh/topics/flood/>
- What Services Can CDC/NIOSH Provide to Workers Involved in Hurricane Katrina Recovery?  
<http://www.cdc.gov/niosh/topics/flood/services.html>



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- **MMWR:** Mold Prevention Strategies and Possible Health Effects in the Aftermath of Hurricanes and Major Floods. Vol 55, No RR8; June 9, 2006
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[http://www.dhs.gov/interweb/assetlibrary/NRP\\_FullText.pdf](http://www.dhs.gov/interweb/assetlibrary/NRP_FullText.pdf)
- NIOSH HHE report for response to Hurricane Katrina is in draft form and should be available on our NIOSH web site in the near future. Fire Department and Police Department HHE reports are now available at <http://www.cdc.gov/niosh/hhe/>
- NIOSH Interim Guidance for Post Exposure Medical Screening of Workers Leaving Hurricane Disaster Recovery Areas  
<http://www.cdc.gov/niosh/topics/flood/MedScreenWork.html>



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# For More Information

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