

Messages in the DUST

WHAT ARE THE LESSONS OF THE ENVIRONMENTAL HEALTH RESPONSE
TO THE TERRORIST ATTACKS OF SEPTEMBER 11?

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Background

On September 11, 2001, the Chartered Institute of Environmental Health in the United Kingdom was in the middle of its annual conference. Astounded by what had happened in New York and Washington, the Institute took immediate action to assist environmental health in the U.S. in the aftermath of the terrorist attacks. The Institute donated a sum of money to the National Environmental Health Association to use in ways that NEHA saw fit.

NEHA's first idea was to forward the funds to public health agencies affected by these events in the DC, Northern Virginia, and New York City areas. These agencies, however, indicated that they did not need the financial assistance.

The NEHA Board of Directors discussed the appropriate use of these funds at length. A decision was made to have a professional writer prepare a "Lessons Learned" report that would examine the response of environmental health professionals to the events of Sept 11, 2001. A committee was formed to develop the request for proposal (RFP) that would be sent to professional writers and reporters, especially those in the impacted areas. The committee would also evaluate the RFP submissions and select the author. This was done in September of 2002. The writer selected was Francesca Lyman, an independent writer and columnist for MSNBC who had written several articles on the health aspects of the events of 9/11. (Her column, "Your Environment," can be found at http://www.msnbc.com/news/YOURENVIRONMENTH_Front.asp?dm=C303H.) Ms. Lyman's articles have appeared in the New York Times, Sierra Magazine, The Los Angeles Times, Seattle Times, San Francisco Examiner and others. She has a Bachelor of Arts from Bennington College, Bennington, Vermont, and she currently lives in Kirkland, Washington. Her report is entitled "Messages in the Dust."

It is NEHA's intent to see that environmental health professionals throughout the country—and even the world—learn what the lessons from the environmental health response to the attacks were. Hopefully this will help to better prepare this profession so that should anything ever remotely similar happen again, the environmental health response will be the best that it can be.

—Nelson Fabian, Executive Director
National Environmental Health Association
September 2003

Preface

Two years since September 11, 2001, when a terrorist attack leveled the World Trade Center, killing thousands of people, and another hit the Pentagon, killing hundreds more, NEHA is issuing a report to assess what lessons for environmental health can be learned from these disasters—widely regarded as the worst and largest international terrorist events in our nation’s history.

The images of terror are still vivid to most of us but not everyone realized that the nation experienced a new kind of environmental health emergency as well. When the World Trade Center and sections of the Pentagon came crashing down that day, the rubble left for rescuers and cleanup crews was laced with asbestos, heavy metals, diesel fuel, PCBs and dozens of other toxins. New York City was enveloped in a cloud of smoke, soot and toxic ash. Perhaps for the first time, the pivotal role of environmental health in terrorism preparedness was made clear.

“Since we’re all on notice to expect some kind of event, NEHA wants to accumulate a base of knowledge to share with those in all areas of environmental health and public health so that they can be better equipped for the future,” Nelson Fabian, director, says.

The broad outlines of the incidents at the World Trade Center and Pentagon are fairly well known. But the inside story on how environmental health professionals worked behind the scenes to try to make a difference that day and in the months that followed, however, is not well known. These tragic events offer important opportunities to understand how people responded under stress, as well as lasting lessons for emergency and environmental response.

In this age of terrorism, environmental health professionals are now on the frontlines defending public safety.

As is clear to even the least imaginative among us, environmental health professionals are now on the frontlines in defending public safety in this age of terrorism. That is one of the main reasons NEHA took on the task of this report. At one time the worst hazards they confronted were corrosive acids, asbestos and contaminated medical needles, New York’s Environmental Police Unit told *The New York Times*. (1) Today it’s dirty bombs and more.

People working in the environmental health fields are today being joined by a host of other professionals—EMS and health first responders, public health nurses and doctors, epidemiologist, forensic pathologists, police and fire officials, and others.

In fact, the events of 9/11 brought to the fore many issues that have long been simmering—the need for first responders to be more mindful of health and safety, the need for all emergency personnel to be better coordinated and able to communicate with one another, and, of course, the specter of responding to a biological or chemical terrorist attack.

A month after September 11, testifying before the Senate, Jeffrey P. Koplan, MD, Director, Centers for Disease Control and Prevention, stated that "Prior to the September 11 attack on the United States, CDC was making substantial progress toward defining, developing, and

implementing a nationwide public health response network to increase the capacity of public health officials at all levels—federal, state, and local—to prepare for and respond to deliberate attacks on the health of our citizens. The events of September 11 were a defining moment for all of us." (2)

“While not an entirely new issue, 9/11 did bring to the forefront the need to examine how health and safety issues are handled by first responders,” says disaster expert Tricia Wachtendorf. (3)

At the World Trade Center, 450 emergency responders—fully one-sixth of the victims of that attack—perished while doing their jobs, while environmental and medical officials, as well as volunteers, stood helpless to save them. Hundreds of others were seriously injured.

In the aftermath of the attacks, undoubtedly firefighters now will take greater precautions in rushing into burning buildings and carry in more sophisticated hand-held radios. What should be done when it comes to environmental and occupational health?

The mission of this document is to present the facts of responding to a terrorist event as they apply to environmental health professionals of all kinds--be they hazardous waste specialists or sanitarians, air quality technicians or public health department managers. Our considerations in this report cover air and water quality, radiological and bioterrorism threats, hazardous substances and wastes, waste removal, carting and disposal and public health interventions of all kinds, including food handling, sanitation and vector control.

NEHA was interested in describing the important role of assuring environmental health and safety -- and hearing the stories of those unsung 'heroes' whose stories haven't come out--people at the frontlines who did their regular jobs under rather trying and extraordinary circumstances. These stories emerge—as well as healthy debate on such issues as the community’s right to know about environmental hazards in their neighborhoods and the need of public officials to balance the need to weigh top down control versus community response.

What are some of the major issues in addressing a catastrophic health disaster? What were the critical management lessons from the experience? How do public health and environmental health managers need to be better prepared in the future? What was left out last time? What went right and wrong at crucial decision-making junctures?

This document describes: 1) What environmental professionals of all kinds did (and, to some extent, how they might have worked with first responders) and the pressures on them in response from the public and the community; and 2) What they might have done differently—what they learned from the experience.

This report is also written to call forth a variety of new perspectives—like, asking the question: How soon should the government be able to respond to protect public health and what kind of prior coordination is needed among different agencies? What did the public expect of its public interest agencies in such dire circumstances?

Since the events of 9/11, many state and county health departments have started revamping their emergency response and evacuation plans to prepare for potential acts of terrorism, especially chemical and biological terrorism. And many experts see local public health departments as being central to preparedness efforts, rather than peripheral.

“All terrorist incidents start as local events and local incident commanders are key agents for protecting the public, and need to be informed,” says Bruce Lippy, an industrial hygienist and occupational health specialist with the National Union of Operating Engineers.

“Before 9/11 none of this wasn’t really being taken seriously,” says Thomas R. Ward, R.S. Environmental Health Director for the Union County Health Department in Monroe, N.C. “Now we’re getting better prepared, with contingency plans and problem solving along the lines of what is already done in anticipation of nuclear plant hazards or incidents.”

More money is now flowing for local training programs through the Centers for Disease Control, says Ward. Federal agencies are earmarking grants to health departments and environmental health departments for added preparedness efforts as well as emergency response in such areas as insect and vector control.

“All terrorist incidents start as local events and local incident commanders are key agents for protecting the public, and need to be informed.”

It’s vital that some of the billions of dollars spent on counter terrorism efforts at the federal level flow down to the local level. And much more needs to be done to enhance local and state capacities to better identify, prevent, and respond to a host of threats, by rebuilding and modernizing infrastructure.

More important than money, infrastructure and equipment in building preparedness, however, is the value of human resources and knowledge—relationships, institutional history and the lessons of past experience. This report conveys those hard won lessons.

Terrorism by its very nature strikes without warning, as has been said; nevertheless, preparedness is key.

Footnotes:

- (1) *“At one time, the worst things the New York Sanitation Department’s Environmental Police Unit were called to deal with were corrosive acids, toxic asbestos, contaminated needles and medical waste. But in the age of radiation threats from dirty bombs, the 10 men on the team have begun to feel that they are on the front lines in the defense of New York.”*
<http://www.nytimes.com/2002/07/23/myregion/23GARB.html?pagewanted=print&position>
- (2) Committee on Appropriations, Subcommittee on Labor, Health, and Human Services, Education and Related Agencies, United States Senate, October 23, 2001, for Department of Health and Human Services..
- (3) *Tricia Wachtendorf, , field director at the Disaster Research Center at the Department of Sociology and Criminal Justice, University of Delaware in Newark, DE. Retrieved from the Internet:*
<http://www.udel.edu/DRC/tricia/AEM%20Presentation%20July%202002%20DRC.pdf>

Acknowledgments

The author, Francesca Lyman, wishes to thank the National Environmental Health Association (NEHA) and The Chartered Institute of Environmental Health (CIEH) for providing the funds to do this report. Based in London, England, the Chartered Institute of Environmental Health (CIEH), founded in 1883, is a professional and educational body, dedicated to the promotion of environmental health and to encouraging the highest possible standards in the training and the work of environmental health professionals.

In addition, she feels it is important to also acknowledge the contributions of Nelson Fabian, NEHA Executive Director, as well as NEHA's ad-hoc 'Lessons Learned committee,' which comprise NEHA's board of directors, chaired by Thomas R. Ward, R.S., Environmental Health Director, Union County Health Department, Monroe, NC. The members of this committee, i.e. the board of directors in 2003, include Thomas R. Ward, R.S., Environmental Health Director, Union County Health Department, Monroe, NC., Richard Gabriel, Sr. , E.H.S. of the North Central District Health Department in Lewiston, Idaho, James Michael Phillips, of the Combined Health District of Montgomery County, Dayton, Ohio, and Patrick J. Maloney, R.S., M.P.A.H., Environmental Health Director, Brookline Health Department, Brookline, MA. NEHA, a professional society for practitioners of environmental health, today has 5,000 members, and offers a variety of programs that are all in keeping with the association's mission, which is as relevant today as it was when the organization was founded in 1937. The mission of the National Environmental Health Association is "to advance the environmental health and protection professional for the purpose of providing a healthful environment for all."

The author wishes to express her deepest sympathy and continuing concern for the families of the victims and for survivors of the terror attacks September 11, 2001—including those tens of thousands of workers and residents whose health may have been impaired as a result of smoke and dust inhalation in the New York City metropolitan area.

The following persons were interviewed for this report and/or reviewed it. They are listed in the positions they held at the time they participated.

Richard Cole, Arlington County environmental health specialist; Lauri Boni, Mt. Sinai Medical Center; Richard Jackson, Director, National Center for Environmental Health, Centers for Disease Control and Prevention; Richard Borri, New York City Department of Health; Robert Martin, Legal Environmental Assistance Foundation, Tallahassee, Fla.; Claire Barnett, Healthy Schools Network, Albany, N.Y.; Angela Carter, EPA Region II; Thomas Cahill, scientist and professor, Department of Physics and Atmospheric Sciences, University of California, Davis; Jenna Orkin, 911 Environmental Action Group; Lynn Goldman, Johns Hopkins School of Public Health; Dr. Clifford Bassett, New York city allergy and asthma specialist; Diane Downing, Nurse manager, Arlington County; Steven Markowitz, Center for the Biology of Natural Systems; Hugh Kaufman, chief investigator of the EPA Ombudsman program; Joseph (Chip) Hughes, NIEHS; Kelly McKinney, New York City Department of Health, Environmental Health Division; Jason Bailowitz, office of Mayor Michael Bloomberg, New York City; Val Jefferson, Arlington County Environmental Health Department; Mark Penn, Arlington County Emergency Operations; Glenn Rutherford, Arlington County Health Department; Dodie Gill, Employee Assistance Program, Arlington County, Va.; Joel Shufro, New York Committee for Occupational Safety and Health (NYCOSH); Joe Davis, Society of Environmental Journalists; Dave Newman, NYCOSH; Carrie Loewenhertz; NYCOSH; Jonathan Bennett, NYCOSH; Paul Bartlett, Center for the Biology of Natural Systems; Eric Schmeltzer, Jerrold Nadler's office; Lisette Morton, Jerrold Nadler's office; Howard Bader, Certified Industrial Hygienists; Michele Robinson, NYC DOH; Luz Claudio, scientist; Sam Benson, Office of Emergency Management, NYC; Hugh Kaufman, EPA; Bruce Lippy, the International Union of Operating Engineers; Susan Stranahan, environmental journalist; Susan Huether Harris, Washington State first responder; Alison

Geyh, Johns Hopkins University; Dr. Philip Landrigan, Mt. Sinai School of Medicine; Ron Burger, National Center for Environmental Health at the Centers for Disease Control and Prevention, (CDC); Steve Touw, EPA Region II; Monona Rossol, industrial hygienist, New York City; David Prezant, New York City Fire Department; Rachel Lidov, 9/11 Environmental Action Group; Gene Panhorst, lower Manhattan resident; John Harrald, disaster specialist, George Washington University; Shelley Hearne, director, Trust for America's Health; Amy Kostant, Environmental Media Services; Jim O'Hara, Director, Health-Track; Marcy Gordon, New York city resident; Frederica Perera, professor of public health, Columbia University; Janet Kofer, office of Sen. Hillary Clinton; Vincent Forras, volunteer firefighter; Eric Goldstein, Natural Resources Defense Council attorney; Captain Terrance Revella, New York State Environmental Conservation Department Police; Kenneth Olden, director, NIEHS national toxicology program; Dr. Howard Frumkin, Rollins School of Public Health; Marilena Christodoulou; Kim Todd, Lower Manhattan resident; Paul Edwards, Lower Manhattan resident; Regan Heiserman, New York City resident working in financial district; Diane Miller, Lower Manhattan resident; Charlene Laino, MSNBC Health Editor; Jessica Leighton, NYC DOH; Dr. Paul Liroy, Professor of Environmental and Community Medicine, EOHSI; Thomas Cahill, University of California at Davis; Patrick Meehan, Director, Division of Emergency Director, Division of Emergency and Environmental Health Services, National Center for Environmental Health, CDC; Jo Polett, New York city resident; Pat Dillon, Lower Manhattan resident; Joel Kupferman, attorney with the New York Environmental Law and Justice Project; Joe Martyak, spokesman for EPA in Administrator Christie Whitman's office; Kimberly Flynn, 9/11 Environmental Action Group; Stephen Levin, Medical Co-Director, World Trade Center Worker and Volunteer Medical Screening Program, and Medical Director, Mount Sinai-Irving J. Selikoff Clinical Center for Occupational and Environmental Medicine, Mount Sinai School of Medicine; Steven Markowitz, Director, Center for the Biology of Natural Systems, Queens College; Anthony Sutton, Department of Emergency Services, Westchester County, N.Y.; Sandra Mullin, Associate Commissioner, Office of Public Affairs, New York City Department of Health; Jerrold Nadler, Member, Judiciary Committee, U.S. House of Representatives (D-N.Y.); Dan Weiller, spokesman for New York State Assembly Speaker Sheldon Silver; Julia Sommerfeld, MSNBC Health; Jackie Stenson, MSNBC Health; Steve Swaney, New York resident; Cate Jenkins, hazardous waste division, EPA; Michael Gerrard, environmental attorney, Arnold & Porter; Sgt. David Duffy, New York Police Department; Tom Barnett, New York Police Development; Mary Brosnahan, New York's Coalition for the Homeless; Dr. Neil Schachter, medical director of respiratory care, Mt. Sinai Hospital; Mike Tobia, Port Authority of New York and New Jersey; Dr. Mark Siegel, an assistant professor of medicine at the Yale School of Medicine in New Haven, CT.; Marjorie Clarke, an adjunct professor of environmental science at Hunter College; Bonnie Bellow, EPA Region II; Hans Hallman, a community affairs specialist at the New York State Emergency Management Office; Hallstead Harrison, professor of atmospheric chemistry, University of Washington; Marianne Horinko, EPA Acting Administrator; Molly Masland, Health Editor, MSNBC; Joanne Scigliano, National Environmental Health Association; and Barbara Wilkie, Environmental Health Network. Agencies refusing to comment: Occupational Safety and Health Administration; New York City Department of Design and Construction.

Executive Summary

Two years after terrorists attacked the United States, the target sites have long been cleared away and scraped clean. At Ground Zero, where the twin towers and other buildings of the World Trade Center complex stood, builders are designing memorials and the community has been working at the hard effort of recovery. The Pentagon's damaged Wedge was rebuilt within months.



Satellite image of Manhattan, NY—
September 4, 2002.

Photo: Space Imaging

In the rush to clear away the destruction, agencies at all levels of government had to coordinate their response efforts and make critical decisions quickly to protect health and safety. Environmental health professionals of all kinds stepped in swiftly, in some cases acting heroically and in others making critical mistakes. There are no ruins left behind to mark the history of their actions, except in the areas around Ground Zero where traces of toxic dust still remain. But there are stories and memories—and continuing controversies.

In this report, environment health professionals who were either directly involved in the rescue efforts of September 11, and experienced these powerful events firsthand, or are experts in the field of environmental health, occupational health, or disaster response tell their stories and suggest ways that the environmental health system can better be prepared to respond to large-scale disasters. The report is based on first hand interviews, highlighting responses by officials responsible for environmental health, occupational health and disaster response, as well as accounts in the press and public documents.

This report draws upon lessons learned from the terrorist attacks to equip environmental health professionals to better understand and anticipate the health and safety needs of communities who would respond to terrorist incidents in the future. NEHA wanted to document the stories, experiences and knowledge of these professionals in the hopes of passing on their lessons and understanding the implications for future response.

The report's suggestions from experts recommend:

- *Increased preparedness, on the part of the environmental health personnel, and better coordination of environmental health considerations in terrorism preparedness planning
- *Improved scientific understanding of environmental hazards and standard-setting to meet these needs; better environmental health monitoring systems and tools in place; and more environmental health training.
- * Better communication of hazards with the public, to increase public awareness of environmental health, which can save lives and reduce the public health costs associated with large-scale disasters like the World Trade Center and Pentagon attacks.

Summary of findings from this report:

- The scale of events on 9/11 overextended the abilities of health departments and even federal environmental managers
- The damage to the environment was hard to assess initially and hard to communicate, and in the future hazards needed to be better assessed and communicated; in the effort to make haste with waste cleanup, endangered workers and the public
- 12 “Lessons Learned,” including: Call a hazard a hazard; respiratory protection and other worker protection has to be insisted on from day one; be open in communication with the public, even when there is scientific uncertainty; pay attention to health registries and public concerns, as well as air monitors and sampling; better training and preparedness; improve emergency protocols anticipating toxic pollutants that need monitoring.

Introduction

From the time two hijacked passenger jets crashed into the towers of the World Trade Center, gouging them setting them afire, and another jet crashed into the Pentagon, triggering the closings of airports nationwide and deployment of emergency personnel in the wake of the terrorist attack, the first concern was saving lives and finding clues to the nature of the terrorist attack.

However, it wasn't long before environmental and public health concerns rose to the fore. In fact, September 11 will go down in history not only as the first major act of terrorism on our shores but also as the country's worst environmental health disaster.

The terrorist attacks on the World Trade Center and the Pentagon were attacks on two of the largest office buildings. But the lessons learned there apply to any facility that might be the target



WTC towers at 9:54 a.m.
Photo: Paul Olivier

of a future terrorist attack—airports, hospitals, bridges, tunnels, military bases, amusement parks, electric power plants, theaters, sports arenas, embassies and myriad other locations that have been identified. Close on the heels of the terror attacks, the anthrax scares that followed made us all aware of the need for an early warning system of disease tracking and a well-prepared, effective public health infrastructure that can respond quickly and effectively to any outbreaks in ways that individual doctors and hospitals cannot on their own.

By anyone's reckoning, the World Trade Center disaster moved health experts into uncharted territory.

All of the agencies that sprang into action acknowledged that they were unprepared for it. Such federal agencies as the EPA and CDC were at pains to respond to the disaster, as were the city agencies of health and environmental protection.

The attack on the World Trade Center (WTC) on September 11, 2001 and the subsequent magnitude of the destruction and loss of life at the World Trade Center Complex created "an emergency response, rescue, and recovery effort of enormous proportions," wrote the National Institute of Environmental Health Sciences (NIEHS). "The terrorist attack also created one of the largest waste sites our country has ever seen. New York City (NYC), state, and many federal disaster response organizations in addition to thousands of volunteers and other support organizations quickly responded."⁽¹⁾

But workers who toiled in the rubble of the World Trade Center were injured at "unacceptable" levels because they weren't adequately protected while there, according to Joseph "Chip" Hughes, director of the Worker Education and Training Program at NIEHS.⁽²⁾ The "pile" at the WTC was openly described as a horrific and dangerous place by those who visited and worked there. "The World Trade Center site is potentially the most dangerous workplace in the United States," said John Henshaw, Assistant Secretary of OSHA in a press release. ⁽³⁾

In late November, as fires still burned, Vice Chairman John Cavanagh of AMEC, one of the four contractors at Ground Zero, described the worksite as "longest commercial fire that has ever occurred at a site." What kept the fire burning, he said, was a huge volume of "plastic, carpet and furniture below the rubble," which the New York Fire Department was "constantly wetting down."

The smoldering fire at Ground Zero represented the longest running commercial fire at a worksite in history.

The attack on Washington, D.C. attack differed in size, scale and response needs. And there were some inherent advantages for responders at the Pentagon, where the health impact was far smaller, and more diffuse, because what smoke and dust came off the impact area—far smaller in volume—had a much larger area in which to disperse. Set apart from residential areas, while sitting close to federal military and environmental agencies, the environmental health challenges could be far more easily addressed. Situated at the center of a spaghetti of highways, the disaster at the Pentagon posed a bigger transportation gridlock challenge, however.

The response to the Pentagon was more coordinated and quickly shored up—and they even had an "after-action" report done within several months of the tragedy.

By contrast, the impacts of the terror attacks at the World Trade Center were far bigger in scale than the Pentagon, and presented unique challenges for environmental health officials. The attack at 'Ground Zero' hit in the heart of the city, a very densely populated area, with difficult transportation access.

While there are many differences, both events shared certain challenges that made them different from other health emergencies or disasters.

Both events were much larger in scale than any experienced before, as well as more devastating in impact, with mass casualties, short term and long term health effects, and a greater range of hazards all at once—i.e. worker hazards, respiratory hazards, smoke and dust. In both places, there was an unprecedented array of hazards—air, water, dust, debris, and waste removal. The pollutants presented unique challenges—asbestos, for example. Because the World Trade Center towers were built before asbestos was prohibited in 1980, the material could be found in parts of the building; yet EPA had never regulated it as an outdoor pollutant and therefore had no standard for it.

There were also traditional environmental health concerns and routine public health checks—food handling, sanitation, etc.—that needed to be tended to while managing the crisis. Plus the crisis triggered other secondary threats—like potential rat and vermin problems and infectious disease outbreaks.

Furthermore, both required a much bigger response than heretofore and more coordination among other agencies (some of which weren't used to communicating), as well as more complicated need to communicate with the public.

Both of these incidents required coordination with emergency response officials at EPA and coordination with worker safety departments. But agencies with past experience collaborating in natural disasters or hazardous materials incidents in this case had greater difficulty. At the Pentagon, for example, EPA noted that local responders failed to recognize its crucial role in emergency response.

At the same time, public health professionals in these disasters began working with more law enforcement and military people. Unlike other natural disasters where environmental health professionals would have been called in, the World Trade Center and Pentagon disasters were considered crime scenes.

“When disaster strikes you will be called upon to be there 24 hours a day,” says Ron Burger, Public Health Advisor for National Center for Environmental Health at the Centers for Disease Control and Prevention, (CDC). “What’s different now is that you will have people standing behind you carrying guns.” (4)

While there are many differences, the events at the World Trade Center and the Pentagon shared certain challenges that made them different from other health emergencies or disasters.

While many observers were quick to commend the cleanup effort, environmental health agencies have drawn an equal number of critics. The condition of New York’s environment in the aftermath of the terrorist attacks became the subject of heated debate in Manhattan. EPA maintained that their studies showed the air and water were safe, while the public, local politicians and even EPA’s own ombudsman charged that the environmental health concerns were downplayed in the interests of “getting the nation back to work.”

“A driving force and priority in this crisis was to re-open the downtown area especially Wall Street. Public health was not government's main priority when the Mayor announced that Wall Street would be open the following Monday—only six days after the collapse,” charges Joel Shufro, Director of the New York Committee for Occupational Safety and Health. “These decisions were made at the highest levels—probably at the White House. Politics, not public health, was in command.” (5)

On the eve of the two-year anniversary of the terror attacks, the Environmental Protection Agency released an evaluation of the agency’s response to the incidents that gave credence to critics who said the government downplayed risks and returned people to their homes and offices prematurely.

The Environmental Protection Agency's Inspector General released a headline-grabbing report (6) on 21 Aug 2003, revealing that, at the insistence of the White House, the EPA presented “an overriding message that there was no significant threat to human health” even though there was cause for caution. Specifically, the agency reassured people that the air was safe to breathe when, in fact, it didn't have enough evidence to make that call so quickly.

Today the debate continues, as many New York citizens voice continued concern about the potential toxicity of lingering dust in indoor areas of their apartments, and office workers, too, fear the safety of their indoor environments. Even though the EPA Inspector General, in her report, sided with local critics of the government’s response, EPA now seems reluctant to go any further to meet residents’ demands.

Yet even now, the OIG is urging the EPA to re-launch a new systematic program to make sure the agency’s apartment cleaning does reduce residents’ exposure to indoor pollutants. As in future terrorist events, the EPA is tasked under a 1998 Presidential Decision Directive, according to the OIG, “with the leadership role in cleaning up buildings and other sites contaminated by chemical or biological agents as a result of terrorism.” (6)

“When disaster strikes you will be called upon to be there 24 hours a day,” says Ron Burger. “What’s different now is that you will have people standing behind you carrying guns.”

In the ugly event that we are to suffer another terrorist incident, how well would another city or town respond in conjunction with other government agencies?

We are not trying to lay blame or point fingers but assess the response and the lessons that can be gained. We hope it will help professionals face the multiple-faceted challenge posed by the "War on Terrorism."

Our methodology in this report was to review actions taken by agencies concerned with environmental health in New York City and the District of Columbia as well as reactions from the public at large and other institutions involved.

To do this we interviewed key people in the field about what they did, looked over available public documents and identified basic themes, and surveyed the social history of these events in

the media and among various advocacy groups. From this, we developed a list of issues and critiques generated since these critical events and presented a litany of “lessons learned.”

We also included, where possible, excerpts of other “lessons learned” analyses, since most government agencies reviewed their activities with respect to their September 11th response, including the Environmental Protection Agency and the Worker Education and Training Program at the National Institutes of Environmental Health Sciences (WETP). EPA concluded in a 2002 report, for example, “Although the attacks did not involve weapons of mass destruction (WMD), the results were a series of disasters on a scale greater than EPA had ever encountered in emergency response.” (7)

The report is organized chronologically.

First, we revisit the actual events involved in the terrorist attacks and the immediate emergency actions of first responders, looking specifically at the various agencies charged with health and environmental issues surrounding 9/11—the cleanup, air quality monitoring, communication with the public, etc.—that worked with them.

Second, we review the array of challenges before New York, Washington, D.C. and nation in trying to come to grips with this crisis and in trying to return their cities to normalcy, starting from the initial crisis stage and progressing through to the various phases of recovery. What were the various environmental health challenges and how were they met? What were some of the secondary threats that emerged as a result of the disrupted infrastructure? We also examine environmental professionals’ own assessments of their tasks and challenges and how they met them.

September 11 crystallized the importance of environmental health. It also signaled the rise of this discipline on a par with other emergency response professions.

Third, we examine the response of the community and the public to the government’s handling of the crisis and the controversies over various issues, as well as some expert opinions on gaps and vulnerabilities in the system of assuring public health and environmental protection.

Fourth, we look at ‘lessons learned,’ compiled from the comments of experienced disaster response experts, officials involved in environmental health protection and remediation, private consultants engaged in studying the aftermath and others with firsthand knowledge of the events.

In many ways, September 11 crystallized the importance of environmental health and the various professionals engaged in this field and signaled the rise of this discipline on a par with other emergency response professions.

Yet it encompasses difficult professions to explain because they are obscure—like industrial hygiene. “Nobody knows or understands what you do, and you seldom get to see the real results of your work,” wrote Mike Plagge, an industrial hygiene advisor for American Superconductor in Middleton, WI., in *The Synergist*, the publication of the American Industrial Hygiene Association. “It’s not glamorous like being a firefighter or a doctor. How often does someone thank you for preventing an occupational disease?”

All that has changed since September 11th (8). Most agree that has forever ratcheted up the relative importance of public health and environmental health in relation to other aspects of concern, from real estate and property damage to medical preparedness.

“There is more awareness now about what it takes to protect the public and how important the role of the environment is,” says Alison Geyh, Assistant Professor, Environmental Health Sciences, Johns Hopkins University; one of the key public health researchers who braved fumes and dust to investigate the hazards at Ground Zero. (9)

That has raised the profile for environmental health professionals of all stripes.

As painful as it is to look back to the events of September 11th it is imperative that we do so that we might be better prepared for any comparable act of terrorism or natural disaster in the future,” said New York Congressman Major Owens at a congressional hearing held in April 2002 at Borough of Manhattan Community College, New York City. (10). “The tragedy provides us with a portal to evaluate how well our public health regulatory framework worked to protect workers and members of the public from occupational and environmental hazards posed by the collapse of the World Trade Center.”

Footnotes:

- (1) NIEHS, <http://www.wetp.org/wtc/WETP%20WTC%20Report.pdf>
- (2) Joseph ‘Chip’ Hughes, <http://www.wetp.org/newsbriefs/oct01/nb26oct01.htm>
- (3) Henshaw, John/ <http://www.asse.org/groundzero1.htm#wtc>
- (4) Burger, personal communication.
- (5) Shufro, press release
- (6) Evaluation Report, “EPA’s Response to the World Trade Center Collapse: Challenges, Successes and Area for Improvement,” August 21, 2003, Report 2003-P-00012, by Nikki L. Tinsley

http://www.epa.gov/oigearth/ereading_room/WTC_report_20030821.pdf

(7) EPA wrote in its report (February 2002):

“On September 11, 2002, EPA responded to environmental threat created by three terrorist incidents: at the New York World Trade Center (WTC), at the Pentagon, and in Western Pennsylvania. EPA’s mission was to protect frontline responders and residents from dust and contaminants released when commercial aircraft were deliberately crashed. Although the attacks did not involve weapons of mass destruction (WMD), the results were a series of disasters on a scale greater than EPA had ever encountered in emergency response.”

<http://www.greenpeaceusa.org/toxics/lessonslearned.pdf>

Footnote: “Many federal, state and local entities, however, failed to sufficiently recognize and understand EPA’s role, mission and capability as part of an emergency response with environmental and human health consequences.” (p. 61, Draft Report).

(8) Christine Umbrell, The Synergist quotes an IH professional who says, “In the past, a lot of responders were not familiar with industrial hygiene. After Sept. 11, the perspective changed: The value and need for skills the IH provides have become very visible.” For example, Aton suggests, responders need to know the most appropriate detection equipment and PPE for use in the middle of a smoldering pit when another explosion could occur. “The people who can best answer that type of question are in the IH community.”

<http://www.aiha.org/thesynergist/html/featurart2.html>

(9) Geyh, personal communication

(10) Owen, Borough of Manhattan Community College

Part 1. A Day of Disaster

It was America's longest day. Beginning at 8:46 a.m. on September 11, the world stood aghast as jets, transformed into missiles, leveled the highest towers in the nation's capital of finance, one after another, then as another jet an hour later sliced into the Pentagon. In the flames and collapse of steel and concrete, the terrorist attacks left thousands dead, urban landscapes physically devastated, and the country as a whole in a state of psychological shock. People were to witness an unfolding environmental health disaster.



The North Tower as seen from a NYC police helicopter.

Photo: EPA

In the wake of the tragedy, people everywhere marveled at the bravery of those who rushed in to the wreckage to rescue survivors at the disaster sites. Who can ever forget the firefighters, police officers, and volunteers of all kinds who converged on New York and Washington to lend a hand or whatever help they could?

From the beginning, too, experts in environmental health and public health were operating behind the scenes, having been called upon to try to size up the dimensions of the unprecedented disaster and act decisively to protect rescue workers and the general public. Although their actions captured no headlines or documentary photos that day, some of these people also risked their lives that day.

Minutes after the first hijacked plane hit the North Tower of the World Trade Center, New York City Police Captain Terrence Revella, a commander with the New York State Department of Environmental Conservation, was on hand among the rescuers who rushed to the scene and able to employ his several functions and assets as a domestic first responder.

The crushing force of the first building’s collapse was strong enough to literally blow the police captain and several other officers clear across the West Side Highway, a distance of perhaps several dozen feet.

Wearing the second of his two “hats,” he was on duty as a police officer helping evacuate people from the buildings. Thousands of people were streaming past him, terrified as they escaped the burning buildings, he recalls. “Windows were coming down around us and bodies falling out of buildings,” Revella remembers. Outside was sheer terror—people screaming, diving for cover, running dazed, covered in dirt, weeping and gasping for air.

There was a tremendous sucking sound heard by those standing by, just before the first tower started to fall. The crushing force of the first building’s collapse was strong enough to literally blow the police captain and several other officers clear across the West Side Highway, a distance of perhaps several dozen feet.

Even that didn’t stop him from heading back to the South Tower to help evacuate more people. When the second tower came down, he only escaped its collapse by running into one of the standing buildings there, Building 7, as it, too, was teetering on the edge of collapse around him. “None of us ran until the very last second,” he says.

Many have praised the rescue effort that succeeded in safely evacuating so many thousands of people. At the World Trade Centers, an estimated 18,000 people were evacuated in less than two hours between the first plane hitting and the North Tower collapsing—a remarkable achievement; thousands more were evacuated at the Pentagon, the largest office building in the world.

“While the industry still has a lot of work to do with the new reality of terrorist threats, we should also take pride in the knowledge that the emergency procedures in place in the World Trade Center and in the Pentagon on September 11th, and the implementation of those plans by building management, were instrumental in saving tens of thousands of lives when tested against an attack that no one could have foreseen,” wrote the Building Owners and Managers Association. (1)

That first day, the extent of destruction was such that just surviving the immense crash and rescuing as many people as possible was the utmost priority. And in this regard, scholars of disaster dynamics and response agree, New York City got high marks. Office workers, helped by emergency responders, evacuated the building in rapid, orderly, helpful fashion—showing amazing calm. In this they’d had planning, training, and experience with the earlier 1993 bombing. (2)

A veteran responder--of everything from tractor-trailer truck overturns with hazardous materials, to chemical fires and explosions, to West Nile virus sprayings--says 200 disasters didn't come close to equipping him for the impacts of 9/11.

Yet soon local and federal officials would be absorbed with managing the short and long-term environmental and health consequences of the tragedy. When it came to this, New York officials had little past experience to go on.

“It was a long, long day,” says Revella wearily, recalling the sequence of events of what was undoubtedly the most remarkable of his life. A veteran responder of some 200 disasters of all kinds, Revella says his experience with everything from tractor-trailer trucks overturning with hazardous materials, to chemical fires and explosions, to West Nile Virus sprayings didn't come close to equipping him for the impacts of 9/11. “It was phenomenal,” he says.

A ‘pollution event’

The towers, with nearly three thousand people trapped tragically inside, started imploding in a shattering instant, then “pancaking” downwards with a physics that structural engineers struggled to explain afterwards. A week later, construction experts at the U.S. Army Corps of Engineers would describe the pulverized remains of the buildings as amounting to some 1.2 million tons of building materials. (3)

In New York, the collapse of the towers and nearby buildings created a vast, 16-acre disaster zone. The towers were so high and the “pancaking” effect so forceful that extraordinarily destructive forces were unleashed.



Tower One collapsing—9:56 a.m.
Photo: Paul Olivier

First there was the plume created by the initial fire that rose to 1000 degrees C. that sent up a mushroom cloud of some 91,000 liters of exploding jet fuel containing benzene and other toxic chemicals as well as billowing smoke.

Then there was the downward implosion of the building, which shook and toppled nearby structures and spread pulverized cement, glass and other dust for miles in a widely dispersed pattern.

Finally, heated by an intense fire, which was propelled by 180,00 gallons of fuel, the massive buildings became an incinerator that rendered building materials that would not be considered immediately hazardous into flying toxins—volatilized combustion products.

There may be no way to know the exact composition of all the building materials at the WTC site, but some of the major hazards are known, including 2,000 tons of asbestos used in its construction, and countless fiberglass and Freon refrigerants used in air conditioning systems.

There was an estimated 424,000 tons of concrete, sheet rock, gypsum, fiberglass, and glass; that doesn't count everything inside the buildings—an estimated 50,000 personal computers each containing some 4 pounds of lead (adding up to some 200,000 pounds of lead alone); glass, PCBs; mercury from light bulbs and computer parts; 130,000 gallons of transformer oil. The Natural Resources Defense Council, in its report on the environmental impacts of the WTC disaster, called it “an unprecedented environmental assault for lower Manhattan,” involving thousands of toxic components released simultaneously that constituted a “pollution event.” (4)

On Sept. 11, few recognized how profound the implications of these disasters would be on environmental health, even as many federal, state and local agencies and organizations moved rapidly to aid in response and recovery efforts. (5)

Later, Revella and other local rescuers would learn that the heat and energy that led to the subsequent collapse of the buildings created the force of an earthquake totaling 2 on the Richter scale, as a million tons of steel, concrete and plastic were pulverized and imploded downward like a volcanic eruption spewing dust and debris. (6) (Somewhere in there, too, Revella was to learn, he'd suffer two ruptured disks, in addition to surviving a piece of steel jammed into one of his feet! In the process of surviving the explosion, he received two shots with cortisone.) All this, he says, hasn't kept him from missing a day of work in 26 years on the force.

But that was the least of his efforts that traumatic day. Having escaped the collapse of three buildings, hours and hours later, he would go on to don his main “hat” and commitment and responsibility—as an environmental specialist.

In that role, Revella helped to coordinate the health and safety response to the crisis with the city's Office of Emergency Management and other agencies, including the city Department of Health. From day one, Revella would help enlist the aid of ironworkers at the debris piles and set up systems for addressing environmental concerns—air monitoring, removing dust and debris, and reopening a closed landfill to hold wastes.

“Terry Revella was, and is, a passionate advocate for safety and health and the environment,” says Kelly McKinney, Associate Commissioner for Regulatory and Environmental Health Services for the New York City Department of Health and Mental Hygiene, describing how his

team of first responders was indeed first on the scene addressing environmental health on September 11.

Captain Revella posted his staff in the middle of the street at truck routes around Ground Zero and had state Department of Environmental Conservation police stopping and inspecting trucks



and forcing their operators to enclose the truck beds completely with tarp, says McKinney.

“Uncooperative or argumentative drivers, or those who showed up at checkpoints untarped, would get their licenses confiscated by the Captain,” says McKinney. Revella was the first to get an air sample of Ground Zero, finding that the power company Con Edison had an industrial hygiene group downtown. “That was the first air quality data I saw from Ground Zero,” says McKinney.

Moving away from the towers—9:40 a.m.
Photo: Paul Olivier

Sadly, though, the captain was one of the few hazardous material certified experts not lost in the Towers—partly why his expertise as an EPA chemical-safety and hazardous-materials specialist with credentials enabling him to teach first-responders, was called upon that day.

Most of the New York City Fire Department’s hazardous waste teams were lost in the initial collapse of the buildings.

That’s because most of the New York City Fire Department’s hazardous waste teams were lost in the initial collapse of the buildings, as if foreshadowing some of the dramas that would later be played out in terms of the controversy over the hazards of World Trade Center dust. The NYFD had committed some 75 percent of its teams, “nearly all its Special Operations units such as Hazardous Materials and Rescue teams to the World Trade Center.” (7)

It would be months before the full impact of the environmental devastation would be recognized. And many debates would ensue in the community and among workers over whether environmental officials had sufficiently considered the long-term hazards at Ground Zero. Those health impacts—and debates—would trigger controversial hearings at the city, state and even national level, and are still unfolding to this day.

Fortunately for the D.C. area, the terrorists’ target at the Pentagon, the vast 280-acre reserve in Arlington County, Virginia, across the Potomac River from Washington, D.C., was not geographically situated in the middle of one of the most densely populated urban centers; the disaster there did not leave behind a mountain of toxic dust and debris that covered cars, trucks, building, and people, although fire did overcome many rescuers at the scene. (8)

At the Pentagon, too, huge plumes of smoke from the explosion that damaged the west side of the building also sent hundreds of toxic substances floating into the air, everything from pulverized concrete and glass to burning plastics; but these chemicals quickly dispersed and didn't have effects on local populations. EPA sampled debris from inside the Pentagon for asbestos, lead and other metals. Although a few samples in the ash and soot turned up high concentrations of antimony and arsenic, according to the agency, "short-term exposure and limited routes of contact have minimized any potential for harm." Workers handling the material, which was trucked away to an approval landfill, were required to wear respirators and protective clothing.

Both terrorist incidents provide almost textbook lessons in crisis management. In both situations, the same questions apply: What can be done to best protect environmental health? What can the public expect of health officials charged with protecting their safety?

Emergency response

First to respond in New York City and Arlington County, Va., of course, were local firefighters, police and other rescue workers. Many were lost as the buildings collapsed in New York City; in fact about one-sixth of the dead were themselves those who had gone in to rescue and evacuate building occupants. No first responders, fortunately, were lost at the Pentagon.

Fortunately, as big cities, New York City and Arlington, Va., on the edge of the nation's capital, had an "incident command system" in place that specified a protocol to integrate the many agencies into one coordinated system, to avoid confused, delayed or redundant response efforts. This standardized management system, a paradigm used by the fire service since the 1970s has been adopted by more and more cities, helped to some extent. (9)

But when disaster struck, New York City emergency officials were caught off-guard because critical elements of the safety infrastructure—911 communication systems, emergency management, and the coordinating system for first responders—had been hard hit.

The biggest challenge to that city's overall emergency response was that the city's Office of Emergency Management, which had been well organized and well funded but also headquartered at the World Trade Center, lost its entire command center. The agency intended to coordinate the emergency response among myriad agencies, it was forced to evacuate in the early chaotic hours of the disaster. Many telephone, power and computer lines were down. And because the police had closed lower Manhattan, it was very difficult even for officials to get past checkpoints without badges.

When cell phones didn't work, "email was a bit of a savior for people," says Richard Cole, supervisor at the Arlington County Environmental Health division.

That left the first responders reeling in their initial response--and also affected the environmental health response. Because power had been cut off, some of the air-sampling monitors weren't working; cell phones and communications were spotty, if functioning at all, because suddenly

thousands of people were trying to use their cell phones. Many firefighters may have not have heard the order to evacuate the buildings because of failures of hand-held radios, according to the Kinsey Report commissioned by the New York Fire Department. (10)

Many of the offices concerned with environmental health, such as the Environmental Protection Agency's Region II office, and the city's Department of Health itself, both of which evacuated employees and closed, were within blocks of the World Trade Center. The Occupational Safety and Health Administration, based in the top floor of World Trade Center Building 6, evacuated all its employees before that building collapsed. (11)

In the process, the DOH building was unexpectedly transformed into a "triage" area, as staff and civilians brought the injured into the lobby for medical treatment.

At the Pentagon, as in Manhattan, communications breakdowns were a big problem too. In fact, say experts, "lack of communications was the greatest weakness in this disaster." (12)

Inside the Pentagon, communications couldn't be transmitted out due to security; some of the District's counties didn't have compatible communications frequencies, with Arlington County—the incident commander—and all of Northern Virginia using 800 Megahertz and Maryland using something else, for example. A virus shut down computers in nearby Fairfax County. (13)

When cell phones didn't work, "email was a bit of a savior for people," says Richard Cole, supervisor at the Arlington County Department of Human Services' Environmental Health Bureau. "Unless you had two-way capability, cell phones were ineffective," he adds. That made his job of trying to get staff coverage particularly challenging: "I spent a lot of hours trying to get people because we were so short-staffed," he says.

Nevertheless, here, thanks to pre-planning, many of the agencies had preprogrammed Arlington County's radio frequency in order to communication, and there was a limited supply of other compatible portables on hand to fill in the gaps for other law enforcement agencies in the region. (14)

At the Pentagon, in contrast with New York, the incident command system and the system designed for "all hazard consequence management" worked superbly, say experts. That was partly because the operation was under a single command. The Arlington County Fire Department. Emergency teams worked well together in part due to pre-established relationships, adequate resources and prior experience in emergencies, according to John Harrald, of the Institute for Crisis, Disaster, and Risk Management at George Washington University. In Washington, some of the first responders were seasoned responders at the Oklahoma City bombing as well as a prior tragedy, an airlines crash at National Airport. (15)

By contrast with the Pentagon, New York's response was one of huge "organizational complexity," according to Harrald, who tracked a list of as many as 449 organizations responding to the emergency, including 159 from the public sector alone.

Even the last terrorist attack on the World Trade Center buildings had not prepared New York City for this event. In the last incident, which occurred on February 29, 1993, a bombing in the parking garage of the World Trade Center resulted in the deaths of five people and thousands of injuries. The bomb left a crater 200 by 100 feet wide and five stories deep. (16)

This time around, New York needed all the reinforcements it could get.

Among the more uniquely difficult challenges that responders have named: The sheer scope and scale of the incident, its cause, the number of human lives taken, the environmental destruction, the physical devastation, the financial impact globally and locally, the concentrated geographic area, the involvement of multiple agencies, and the international scope of its ramification.

Environmental and public health touched on a good number of these challenges, as well as many of the key functions involved in the cleanup—firefighting, urban search and rescue, recovery of crime scene evidence, medical emergency care, public works (debris removal, construction and deconstruction), traffic control, public health (sanitation, control of dust inhalation, isolation of dead bodies, or the injured), removal of hazardous materials, and mortuary operations.



It wasn't just the colossal size of the disaster site—16 acres—and the monumental task ahead of moving debris, or that so many offices had been closed, or that the city was in a state of physical crisis. Within hours, the city had to bounce back when it was in a heightened state of grief, mourning and ultimately shock. Police asked for volunteers to direct traffic and move vehicles. Hundreds of people lined up to donate blood.

Expressions of shock and horror on 9/11.
Photo: Library of Congress, Prints & Photographs Division; Don Halasy

At the Pentagon, too, there was extra stress because of being within the 'orbit' of other potential terrorist hijackings—news of the diverted plane to Pennsylvania having just been announced. Because of rumors flying, fire fighters and emergency responders at the Pentagon left the scene at one point when it was believed that another terrorist attack was underway, leading to confusion and worry that rescue opportunities might have been lost. Government buildings, including the Capitol and the White House, were evacuated with officials citing a credible threat of yet another terrorist attack. Soon after law enforcement officials reported that a car bomb had exploded outside of State Department in Washington, D.C., an event that is later proven false.

In many ways rescue workers at the Pentagon were better equipped. Although officials in Arlington County would never ask for a disaster to come their way, many admit that they were equipped with some inherent advantages.

Dodie Gill, director of Arlington's Employee Assistance Program (EAP), was down at the Pentagon soon after the plane crash, "offering critical incident stress management to public safety employees." Months later, she hates to admit that "Arlington was a perfect model" for operating optimally in a disaster situation. Arlington, being at the center of government and the military, was uniquely situated to respond to a major fire and rescue incident of this scale. "You almost couldn't ask for a better scenario," says Gill.

"I turned on my heel when I heard the news of the crashes," she recalls, "and got moving. I thought, 'That's us.'" Because traffic was completely grid locked, she and her staff walked about a mile to the nearest fire station, where they were immediately deployed to an off-site rehab center. By evening, she says, "we were at the Pentagon, doing what they could to provide support and comfort to our fire and rescue people."

(For an interesting interview with Dodie Gill and Capt. Bob Gray)
<http://www.burningissues.com/Wellness%20Week%202003.htm>

The successes the fire department claimed that day Gill credits to EAP's past experience in rendering critical incident stress management, especially its underlying credo and modus operandi of care giving. "We believe in order to perform, public employees, no matter what agencies, have to be protected and cared for," says Gill, who was credited for her extra preparedness and care, arriving on the scene before others, in Arlington County's "After Action Report," completed several months after the attacks. This, report notes, demonstrated "that taking care *to* the firefighter is as important as taking care *of* the firefighter."

That day, says Gill, every effort was made to keep it a safe and healthy work environment. "We kept firefighters and rescue workers hydrated with water and made sure they had clean underwear," says Gill.

Of course, the teamwork didn't begin or end that day, she stresses, but is an ongoing process based on trust and understanding built over years of work and longevity of relationships. Months later, Gill would join an energetic team of her co-workers—firefighters and other responders—in commemorating the lives of those lost on 9/11 with a days' long bike-a-thon ride between New York's Ground Zero and the Pentagon.

Environmental Health Issues at the Pentagon



Ironically, shortly before Sept. 11, Arlington County had just finishing drafting a new disaster plan, begun the year before because of the much-feared potential 'Y2K' computer fiasco. Even though employees had not been fully oriented to the recently approved plan, this was immediately activated after the plane hit the Pentagon, and worked well, according to Val Jefferson, a management specialist with the Arlington County Environmental Health Bureau.

Arlington, VA, September 12, 2001—FEMA Urban Search & Rescue teams evaluate the crash site at the Pentagon.
Photo: Jocelyn Augustino/FEMA News Photo

That didn't make it any less of a shock to the county Health Department, says Jefferson. "It was quite a shock when we got the call, and we were far from prepared," she says, recalling that the Emergency Response protocol at first caught them off guard. Within hours, Arlington County's sanitarians were out at the Pentagon parking lot making sure that the food fed to the first responders was safe, says Jefferson. However, the responsibility would have normally fallen to some of the senior staff.

"Our greatest fear was that there could be a food-borne outbreak in the middle of the disaster."

“All the senior folks were finished with swimming pools and away on vacation or at conferences,” she recalls. When she tried to run down the list of sanitarians on call, she got a wrong number—an automotive supply garage.

Food donations started pouring in almost immediately, as the Red Cross began working to hand out 2,000 meals a day from supply tents set up in the parking lot. So Jefferson immediately sent out two inspectors to check on all the donated food from the many restaurants and hotels, and started setting up a system to insure proper food handling that would continue for two weeks during the crisis.

“Our greatest fear was that there could be a foodborne outbreak in the middle of the disaster,” she says. That, and a fear of intentionally adulterated food prompted her and her agency to carefully monitor the rapidly mounting pile of food to volunteer soup kitchens and other food service vendors that set up around the perimeter of the Pentagon after the attack.

At the Pentagon, as at Ground Zero, there was little to keep volunteers from throwing themselves into the fray to help rescue any remaining survivors.

One example is that of Pentagon Police Officer Michael Benedict, who was conducting a training class at the nearby Navy Annex Building on the morning of September 11, 2001, when he heard a plane fly closely overhead, and then ran to the window to witness the effects of the crash. His supervisor, Pete Donaldson, wrote: "Showing no concern for his own safety, Benedict successfully escorted personnel to safety and retrieved wounded personnel in need of assistance to the triage area. After a short time, [he] became overwhelmed by the fire and smoke, and was forced to leave the building." (17)

But whereas firefighters who volunteered at Ground Zero weren't taken off the site, at the Pentagon volunteers without sufficient respiratory protection were *thrown off* the site, say officials in the Emergency Management division.

Nevertheless, according to the After-Action report, “Arlington County, like most other jurisdictions, was not logistically prepared for an operation of the duration and magnitude of the



Pentagon attack.” The county fire department was unequipped logistically and did in fact lack enough stock of personal protective equipment (PPE), critical high-demand items (such as batteries and breathing apparatus), equipment for reserve vehicles, and medical supplies for EMS units.” (18)

Arlington, VA, Sept 14, 2001—FEMA Urban Search & Rescue enter the Pentagon site.
Photo: Jocelyn Augustino/FEMA News Photo

The September 11 attacks spurred a crisis of unparalleled dimensions, striking America's population in its most densely populated centers. Undoubtedly hundreds of thousands of people were present in Lower Manhattan that day from the tri-state area of New York, New Jersey and Connecticut, places all visible from the viewing platform of the World Trade Center before it fell. And none of the 20 million in that metropolitan area escaped breathing the air during the days that smoke and dust swirled around inevitably.

September 11th was the first time that New York City was physically shut down, with all of its bridges and tunnels closed and military troops mobilized. For the first time ever, signs read "New York City closed to all traffic." That day, too, roads were closed in Washington, D.C., and the mayor gave the order to evacuate the city of Washington, D.C. ten minutes before the American Airlines flight 77, a Boeing 757 out of Newark, N.J., striking the Pentagon. (19)

Email messages from that day, preserved on the Internet, described a city in a state of crisis. Sidewalks were crowded with people covered in cinders and dust from head to foot. Streets were lined with cars driving with inches of dust on their hoods. "Trucks with spools of cable wiring are coming, and ambulances going. Sirens everywhere," wrote one person. (20)

With banks and stores closed, and even small delicatessens running out of food, people retreated to their apartments and homes. Most restaurants shut their doors with notes posted saying they'd closed in light of the tragedy. Mayor Rudy Giuliani and other city leaders urged people to stay home and stay calm.

Many are aware of the heroism of the fire fighters and other first responders but few know about the challenges placed on environmental health people that day and in months to come.

Responding to such an event would require an unprecedented level of coordination and cooperation among agencies and departments not accustomed to working together. (And some say that in the future public health professionals need to better understand, communicate with and work within the broader context of emergency management.)

Many are aware of the heroism of the fire fighters and other first responders that day but few know about the challenges placed on environmental health professionals—decisions they had to make that day and in the days and weeks to follow.

Springing into action

Kelly McKinney, Associate Commissioner for Regulatory and Environmental Health Services for the New York City Department of Health and Mental Hygiene, had just gotten off the subway, just after the first plane had hit the South Tower. He was heading to his office at 125 Worth Street, four blocks away from the stricken building when he saw the gash left by the plane, then stood looking up at the towers when the second plane hit.

“I saw the scar—that black hole on the gleaming building—and I was in complete shock, thinking it was a bomb,” says McKinney. “Do I run down and help? But then I thought, ‘we’re not first responders.’” Like thousands of other people, McKinney reached for his cell phone. And like others, he found it didn’t work.

That would be his first ‘lesson learned’: “The technology you rely on most will fail first!” says McKinney, who got to work to find the building being evacuated.

An emergency response meeting was convening at his office, which would bring together every division of the department. Although their offices would soon close officially, as federal workers fled their offices to join loved ones, staff heads would brace for weeks of 18-hour days.

“We were there all day, setting up 24/7 operations,” he said, crafting a schedule of who would be on hand to cover the full range of around-the-clock public health demands set off by the disaster—everything from coordinating with hospitals to surveying illnesses and injuries (being ever-mindful that a bioterrorism event could be in progress) to making sure they had enough personnel, medical supplies and equipment.

His division of environmental health, one of five or six, would be right in the thick of things -- overseeing monitoring of the air for toxic and radiological substances as well as the water; inspecting of restaurants and food establishments, and seeing to the health and safety of rescue workers, as well as surveying the crater of Ground Zero for any infestations of insects or rodents following the blast. The attacks had hit in the middle of West Nile season, so the DOH had to continue its ongoing sentinel system to test for any suspicious cases of that deadly virus.

That would be his first ‘lesson learned’: “The technology you rely on most will fail first!”

He, like other health and safety professionals, was left reeling from the disaster, as:

- Telephone lines and power lines were knocked out
- The master television transmitting antenna that served most broadcasters as well as other radio transmitters fell to the street
- The city’s Office of Emergency Management headquarters was destroyed.
- City offices like the Department of Health, ten blocks away, were closed.
- The headquarters for the Occupational Safety and Health Administration was destroyed.

From the first day until the last truckload of debris was hauled off the site of Ground Zero, in a ceremony held May 1, 2002, McKinney would be a key part of the effort by the Office of Emergency Management to oversee environmental health coordination efforts at the wreckage of what were once the world’s tallest high-rise buildings. “It was a very intense scene, with a tremendous assortment of people at work, from National Guard to construction workers to Red Cross to random guys jumping off pickup trucks to help,” he recalls.

Once the event had been declared an act of terrorism, the first response was to send in inspectors to check the air and debris to make sure there were no signs of radiation or radioactive cargo, says McKinney.

Tests for a ‘dirty bomb’

A major concern was that terrorists could have unleashed a so-called “dirty bomb,” an explosive device containing radioactive compounds like cesium.

Within minutes of the crash, McKinney sent a radiological health inspector to check the site for any radiation sources. He reached Richard Borri, a senior scientist in the department’s office of Radiological Health, who like most people from DOH, was on his way to work when the first tower was hit.



People flee and look back at the dust cloud from the fall of the towers—11:10 a.m.

Photo: Paul Olivier

“While I was walking down Church Street, with all my instruments, I came within 1000 feet of the South Tower, and unfortunately the building came down,” says Borri, sounding every bit the unruffled scientist. “It’s a good thing I walked slowly.”

How does one continue on one’s mission without getting distracted by such details as a 110-story building comes down in front of you? “You concentrate on what you need to do,” says Borri, who simply walked amid the vehicles and victims covered with layers and layers of soot, “taking samples off the people coming out of the building.”

The high-tech gadget he carried, one of the few available in the United States, is far more precise than its century-old cousin, the Geiger Counter.

Borri checked the World Trade Center site for signs of radiation before and after the collapse of the buildings. Radiation could have originated in industrial radiology sources, such as the installing beams of the huge office buildings, which may have contained some radioactive elements from x-rays taken, and from depleted uranium used in ballasts in aircraft wing tips (such counterweights in airplane wing tips give the most weight for least volume, says Borri). It might also be left from any medical or dental offices.

The far more serious threat, of course, was the chance that one of the hijackers might have carried a suitcase of radioactive materials or a dirty bomb, a conventional bomb spiked with radioactive material. Such a bomb has been compared to TNT, strapped to a container of plutonium or plutonium-contaminated waste. This kind of a device would not produce a nuclear explosion, but it could spread deadly radioactive matter across a swath of city.

According to Borri, the fear with a dirty bomb is that hundreds, maybe thousands, could die from radiation poisoning and cancer, and the area could be poisoned for years. (Plutonium-239 has a half-life of 24,000 years, says Borri.)

That was fortunately not the case, Borri found, using a portable liquid scintillation counter, which measures radioactivity like a Geiger counter. The high-tech portable gadget he carried, one of the few available in the United States, is far more precise than its century-old cousin, the Geiger, counter with a much more refined ability to detect any kind of radioactivity.

“If you’re creative you can get what you need to without getting in another agency’s way pulling samples,” says Borri, who was dodging fire trucks and police vehicles and hordes of people streaming out of the building. “It’s not a good idea to walk into the center of the action. Some of the people weren’t walking as slowly as I was.”

Although Borri didn’t turn up any problematic radioactive readings by the end of the day, his work would be supplemented by the federal Department of Energy, whose technicians remained on site and continued to sample. [Only during the last days of the Ground Zero cleanup would radioactive testers find any evidence of radioactive emissions, from a pharmacy laboratory located within one of the buildings.]

The city’s Health Department also sent several other trouble-shooters to the scene immediately, says McKinney. Unlike inspectors with particular specialties, trained to adhere to a set of detailed protocols in specific situations (sanitary inspections of restaurant, for instance, or safety inspections at swimming pools) and unlike Borri, a radiation specialist, these seasoned trouble-shooters were trained to identify and analyze unknown hazards in virtually any setting. “Their primary direction was to be the Department’s eyes on the scene, and to communicate to us detailed descriptions of emerging health hazards,” says McKinney.

“We heard the first boom in this office,” says Angela Carpenter, an environmental scientist working in the EPA Region II office. “Looking south to the tip of Manhattan, we had a direct view of the Trade Center, and there were some people who got a direct view of their family being killed.”

He dispatched two public health sanitarians including Inspectors Mojgan Keshtgar and Yolanda Brooks, from the Office of Environmental Investigations, to the scene. “Keshtgar and Brooks drove the few blocks to the scene in a DOH Jeep Cherokee,” McKinney remembers.

“When Tower 2 came down they joined the fleeing crowd and ducked into a building a couple of blocks north of the Trade Center. Several other people followed them and they took cover behind the first unlocked door they could find, an electrical closet on the first floor of a Church Street office building. They stayed for about twenty minutes and then made their way out onto the street and back up to DOH headquarters.” The Cherokee, however, McKinney adds, was lost.

Two other Office of Environmental Investigations inspectors, Supervisor Peter Stallbohm and Inspector James Scullin, rushed downtown, in the absence of orders to the contrary, and found themselves in similar circumstances. They fled the scene as well. Although Scullin survived the episode, he would later learn that the tragedy would take his own father, Arthur Warren Scullin, a Vice President at MMC who worked in Tower 1, says McKinney.

Within several hours, Revella, McKinney and several other key people in city government would have set up several temporary command posts and systems for monitoring the air and removing dust and debris. That included:

- Setting up Pier 25 for a barge that would move debris to Fresh Kills landfill
- Getting legal authority for the Department of Sanitation trucks to move debris toward the barge
- Securing permission from the city and state to re-open the landfill, closed for months.

From the very beginning, Revella helped enlist the aid of ironworkers to begin taking apart the charred remains of the World Trade Center and other buildings downtown. The cleanup needed anyone available who could cut steel. (21)



September 13, 2001—Ironworkers look at the WTC site.
Photo: Andrea Booher/FEMA News Photo

“Do you have torches?” he remembers asking the union that day. “Of course, we’re ironworkers,’ they told me. ‘Well, get on the pile, and start cutting,’ I told them.”

That first day, Capt. Revella was able to get some air samples through Con Edison, but many environmental monitors were simply clogged by the high-particulate dust. (22)

From the federal Department of Environmental Protection offices, which looked on the Trade Center towers, employees watched as people leapt to their deaths—some of them presumed loved ones. “We heard the first boom in this office,” says Angela Carpenter, an environmental scientist working in the EPA Region II office five blocks north of the WTC. “Looking south to the tip of Manhattan, we had a direct view of the Trade Center and there were some people who got a direct view of their family being killed.”

Reinforcements

That first day, in response to what appeared within less than an hour to be terrorist-inspired events, the U.S. Federal Emergency Management Administration (FEMA) activated its Federal Response Plan, bringing together 28 federal agencies and the American Red Cross to assist local and state governments in responding to national emergencies and disasters.

Within a few hours, according to its press release, the agency “deployed eight Urban Search & Rescue teams (US&R) to New York City to search for victims in the affected buildings. US&R teams are specially trained teams that include engineers and other technical experts as well as specially trained search dogs. Another four teams have been deployed to the Pentagon, for search and rescue efforts there.” Its search and rescue response was the largest deployment in U.S. history. (23)

Each FEMA-sponsored task force member was highly trained for search-and-rescue operations in damaged or collapsed structures, hazardous materials evaluations and damaged structure stabilization. The team also can provide emergency medical care to the injured. Teams include: firefighters, structural engineers, paramedics/physicians, hazardous materials specialists, technicians, logistics specialists and canine/handler teams.

The Federal Emergency Response Plan was implemented immediately after first attack, according to White House. And at the same time all U.S. embassies and U.S. forces around the world were put on “high alert.” (The highest alert is THREATCON DELTA.)

The federal order to ground all aircraft, stopping all flights nationwide at their departure airports, was also issued for the first time.

That same day, Governor Pataki asked the President for a federal disaster designation for New York State; that request granted, the New York National Guard also deployed for the first time the federal Civil Support Team. The CST arrived in New York City with a mission to assist first responders in identifying hazardous materials related to disasters. An additional 2,490 National Guard troops were mobilized and readied for deployment. The Governor also directed all state government offices south of 14th Street (in a thereafter designated “frozen zone”) closed for several days. (24)

Besides all these agencies, the National Oceanic and Atmospheric Administration had a vital role in the disaster response with its mapping and remote sensing technical capabilities. It coordinated a “highly detailed mapping mission at both disaster sites using high resolution aerial photography and light detection and ranging technology” (LIDAR), which can scan terrain elevations. (25)

The federal response was of course not limited to the scene of the disasters but all sorts of installations that might be at risk of terrorism—nuclear power plants, chemical plants and more.

Federal environmental help

How soon was it clear that, besides being a catastrophe on many levels, it was also an environmental disaster? “It was obvious from the very beginning,” says Sam Benson of the New York City’s Office of Emergency Management.

“City health officials were out there before anyone—before OSHA.”

Since this was the first time a New York Governor had deployed the federal Civil Support Team to assist first responders in identifying hazardous materials related to disasters, Governor Pataki also suspended some of the regulations regarding transportation and handling of hazardous waste to expedite the removal of debris. The barge set up to remove toxic debris would later set off a huge community controversy, as it sat very close to Stuyvesant High School and several large apartment complexes.

There was plenty of federal help, but many of the decisions ultimately affecting public health fell to the local government. Jessica Leighton, Assistant Commissioner for Environmental Disease Prevention, says she is proud of the speed with which her department responded.

“City health officials were out there before anyone—before OSHA,” she says. “Over 200 people in DOH were at work, particularly the sanitarians, because in the first few days, there were more concerns about environmental health than anything.”

And in the first 24 hours, it was the local environmental health department professionals who faced unprecedented challenges, including mountains of dust and debris containing mostly pulverized cement, fiberglass, glass, and building materials but as yet unknown and varying amounts of toxic metals, plastics and other compounds, and burning plastics and fuels as well as smoke and fumes from the building fires.



Dust fills the city—11:03 a.m. Photo: Paul Olivier

“When the towers came down our only thought was the safety of those below and living and working in the area,” says McKinney.

Although the city took the lead in the crisis, many state and federal agencies stepped in to help coordinate. That was particularly helpful, as New York City officials had no reason to be well versed in the chain of command operating for federal emergencies.

EPA Region II would be joined by responders from all 10 regions, all dispatched immediately to New York City, says Carpenter, as well as Coast Guard strike teams, because it was a potential coastal emergency.

But EPA's entrance into the emerging crisis would come from Washington, D.C., where the Agency's emergency coordinator, Jim Makris were ironically engaged in a meeting with the agency Administrator about EPA's emergency management capabilities.

They received a call and were told to turn on the television to see the attack details. The officials then ended their meeting and opened the emergency operations center (EOC) immediately thereafter to begin disaster operations, according to Ed Terry, manager of EPA's EOC. Shortly thereafter, EPA headquarters established links with all of its east coast regional offices to begin coordination and support of the New York City response efforts.

One of the city Health Department's greatest assets, says McKinney, was Ron Burger of the federal Centers for Disease Control and Prevention. Within hours, he was one of the first CDC personnel to travel to New York City aboard a chartered private aircraft that had been granted flight clearance by the Federal Aviation Administration, shortly after it had grounded all commercial planes.

Burger, the Senior Emergency Response Coordinator leading the CDC assistance to the New York City Department of Health's public health response to the World Trade Center attack he says, essentially "taught us the Federal Response System. He showed us that a variety of federal and state assets were available to us, and how to request them and how to follow up to ensure delivery," says McKinney.

The federal "Syndromic Surveillance" system compares prevailing health care data—hospital admittance rates, patient complaints, physicians' diagnoses, and even sales of cough syrup—to rates in the past.

Burger helped the city health department pull together its broad scale emergency medical efforts. He helped the city watch for signs of possible secondary diseases, including infectious diseases and the effects of dust and other debris and assisted rescue workers who had been injured or exposed to health-threatening materials, carrying out the the federal "Syndromic Surveillance" program. This system compares prevailing health care data—hospital admittance rates, patient complaints, physicians' diagnoses, and even sales of cough syrup—to rates in the past. If there is too much of a difference between them, flags are raised, signaling public health officials of an unusual trend.

Burger, who arrived on the afternoon of the 11th was also among those charged with making sure that the national pharmaceutical stockpile "push package"—an array of equipment and supplies needed by hospitals and emergency medical service people, such as sutures, bandages as well as antidotes in the event of bioterrorism—would safely arrive, which it did by early afternoon.

The cargo came on a plane when all others had been grounded, says Burger, and it "was the size of a football field."

But many of the preparations made by CDC, like assuring adequate supplies of tetanus vaccine, would tragically not be needed.

As health officials were sadly to realize, however, no survivors were discovered in the wreckage after the morning of September 12th. “For several days, we all kept thinking there would be hundreds of survivors,” he adds. [Only four or five firefighters were found buried and rescued on the second day]

As a big city, too, New York had a large medical “surge capacity,” a large number of hospitals prepared to handle an abnormally large influx of patients. Tragically, in the case of this mass-casualty event, there were many more beds and doctors available than survivors in need of medical care.

Medical triage

That is not to say that the terrorist attack didn’t tax the hospital and healthcare system’s resources. The NYU Downtown Hospital, a few blocks from WTC, suffered power failures on September 11, as did others. And even the city’s Department of Health, close to the disaster site, was turned into a triage area for the hordes of people suffering from smoke inhalation, minor cuts and bruises and respiratory ills.



Consoling one another after the attacks—10:18 a.m.
Photo: Paul Olivier

At the Pentagon, too, Army nurses and medics needed all the help they could get and even used civilians. For example, Lt. Col. Patty Horoho, assistant deputy, personnel and health management policy office of the assistant secretary of the Army for manpower and Reserve affairs, at the Pentagon, sped to the area of the crash site and was successful in being one of the first healthcare providers to respond, quickly setting up a safe area to triage and treat patients. She gave an interview to the Office of the Army Surgeon General regarding Sept. 11, 2001 published a year later. (26)

“Nobody panicked. Nobody screamed. Nobody ran. It was very, very orderly.”

Having heard the boom when the plane hit, and the building shake, Lt. Horoho evacuated with others. “Nobody panicked. Nobody screamed. Nobody ran. It was very, very orderly,” she related. “I knew right where the crash site was that there were going to be victims, and I knew that’s where I needed to be.” She went to the front of the building to take care of patients, and recruited civilians on hand in helping her with triage.”

“Those that were physically able would help carry those out. I mean it was wonderful how quickly people pitched in and just started working.” Suddenly she was provided with an added aid bag. “An aid bag showed up, and I found out later, that a young, off-duty medic ran two miles from his house to the scene to help and to bring that bag. His actions truly saved lives.

Horocho described the response of medical people as “tremendous,” telling how physicians from throughout the area converged on the site. “They saw the smoke and the explosion near the attack and drove as far as they could, parked the car and then ran all of the way until they got there to offer their support. So the stories were absolutely amazing,” Horocho said. “You had an outpouring of people assisting in every way they could.

In New York, that first day, however, the WTC disaster would overwhelm the public agency but not in ways that they traditionally do—by putting demands on hospitals, medical workers, hospital bed capacity and the like. In fact, doctors clamored to the site to try to help, only to discover that there weren’t enough victims to help.



Ash covers bystanders.

Photo: Library of Congress, Prints & Photographs Division; Don Halasy

Far more important, says Burger, would be everything to do with environmental health—from the smoke and dust affecting air quality to the potential problems of rodents and rotting food in the neighborhoods affected the buildings’ collapse.

“The biggest vacuum was getting protection for the rescuers,” remembers Burger. “Because many of the rescuers weren’t wearing much of anything.”

Environmental health gaps

Yet environmental health didn’t get the respect, and resources, it needed, Leighton feels. Many other officials agree that the environmental health implications of the disasters weren’t accorded enough attention at the time.

As the EPA Inspector General’s report concluded, the crucial role for environmental and health expertise was deliberately removed, as the White House downplayed any perception of a health crisis.

Before that, however, EPA concluded in its first “Lessons Learned” report, that the agency was hamstrung by the perception that it wasn’t a public health agency. “Many federal, state and local entities, however, failed to sufficiently recognize and understand EPA’s role, mission and capability as part of an emergency response with environmental and human health consequences,” the report stated.

At the World Trade Center, according to this report, New York City directed the response, and EPA was responsible for the health and safety of site workers. Many non-EPA responders did not recognize EPA’s authority in decisions involved protective equipment.” And at the Pentagon, the FBI excluded EPA’s On-Scene Coordinators from being fully brought into the emergency response.

Perhaps that is a symptom of an uneasiness between public health and environmental professionals and the military. (27) Dr. Patrick Meehan, Director, Division of Emergency and Environmental Health Services at the National Center for Environmental Health at CDC, says

that working with enforcement agencies like the FBI, as it did during the anthrax incidents, was a new experience for many in the public health establishment.

“One of the lessons learned from the World Trade Center,” Meehan told NEHA, “is that local Health departments need a lot more robust capability, to provide trusted health based interpretations of hazards to the public.” Although the New York city Health department took many responsibilities upon itself – everything from managing traditional public health to tackling occupational health with respirators – “the dilemma,” says Meehan, “was enforcement.”

All this may have led to a vacuum in environmental health leadership. Not everyone blames EPA or the city exclusively.

“I wish that the public health leadership had stepped up and added some health perspective during the first few months, when there was so much uncertainty about the dangers in the dust,” says Dr. Steven Markowitz, a professor of Community Health and Social Medicine at the City University of New York Medical School, in Flushing, N.Y. “It should not have just been left to the environmental experts to communicate the need for precautions.”

Markowitz helped fill that vacuum by providing free respiratory screenings to more than 400 undocumented immigrant workers at Ground Zero who were not otherwise being checked by local unions or other agencies. The physician and epidemiologist, joined with the New York Committee for Occupational Safety and Health (NYCOSH) and the Latin American Workers Project to give out free respiratory screenings, with an \$80,000 grant from the United Way's September 11th Fund.

Officials of the fund were looking for causes to support, so getting the money was not difficult. Money was used to rent a van that was already equipped to perform occupational screenings and hire a staff of seven.

The difficulty was trying to reach the largely immigrant workers, thousands of whom did piece work for the big office building companies, cleaning near Ground Zero, but lacked health insurance or even access to a doctor.

Markowitz supervised the medical monitoring van near Ground Zero for two months, from January through March 2002, offering free health exams, which included breath tests, collection of urine and blood and interviews about their work history. Workers told the medical workers that they were given mops and rags and told to remove inches of dust coating floors, walls and furniture in office buildings.

"Few of these people we saw were given respirators or taught how to use them," Markowitz says." In fact, some workers cleaning dusty offices were even told not to wear their own respirators for fear that this might deter them from taking these jobs, he says. Many of these cleaners proved to have symptoms four to six weeks after they stopped working, says Markowitz.

“Someone in the public health leadership should have said, ‘let’s err on the side of caution.’”

It's understandable, Markowitz says, that the firefighters were overcome by grief and might have been less inclined to comply with the need to wear their respirators, but there should have been some third party agency or official looking at preventable errors in those workers, in residents, and among anyone who came in touch with the dust.

“Given the health risks here, someone in the public health leadership should have said, ‘let’s err on the side of caution,’” he adds.

Lack of preparedness

Despite the heroic images in the media, a deeper look reveals that New York City was largely unprepared in basic ways even though the World Trade Center had long been a target for terrorism. Much of the lack of preparation is understandable—the failure of communications, the loss of key emergency coordination functions.

“We’re prepared now, but we really weren’t then,” says Revella.

Among some of the major criticisms: The city should have been prepared with respirators and safety equipment at the time. Of course, some of that problem was due to the tragic loss of firefighters with hazardous materials expertise. Many remember the mad scramble to get respirators on the first day. But critics also blame fundamental lack of coordination among agencies and little regard to environmental health and safety.



Dust pervades the southwest tip of Manhattan—9:57 a.m.
Photo: Paul Olivier

As a result there were many, many casualties on that first day. Vincent Forras is one.

Forras answered the call for help as a volunteer firefighter on the morning of September 11, driving down from upper Westchester country north of the city.

“My first sight upon arrival on the scene was seeing Ladder 3 totally crushed by a large block of the building and twisted into pieces.”

Inspecting the side compartment where the crew’s names were listed, he and his fellow volunteers determined that their buddies had to have been in the building.

“We spent the better part of the next 48 hours trying to find Jeff [Giordano] and three others and anyone else that might still be alive.”

However, because Forras and thousands of others were largely unprotected in those first hours and days, they are still suffering from a long list of ailments.

“It took at least two weeks to get properly equipped. By then we were pretty well cooked.”

Forras continues to be severely ill from a host of respiratory ailments, some stemming from sinus surgery, as well as severe headaches.

“All we had was paper masks, and there weren’t enough respirators,” he recalls. “It took at least two weeks to get properly equipped. By then we were pretty well cooked.”

Footnotes:

(1) <http://216.239.57.100/search?q=cache:Aif6iJnSCKkJ:www.msnj.org/pdfs/NJMJulAugust02/ForumZiskin.pdf+%22world+trade+Center%22+%2B+preparedness+plans&hl=en&ie=UTF-8>

http://www.boma.org/pubs/property_gep_INTRO.htm

(2) http://www.ssrc.org/sept11/essays/tierney_text_only.htm

(3) The U.S. Army Corps of Engineers has completed its mission assignment to provide debris estimates and reports that 1.2 million tons of steel, concrete and glass were left on the ground following the World Trade Center attacks.

<http://www.nrdc.org/cities/wtc/wtcinx.asp>

http://www.fema.gov/nwz01/nwz01_139.shtm

(4) *The Environmental Impacts of the World Trade Center Attacks
A Preliminary Assessment*

<http://www.nrdc.org/cities/wtc/wtcinx.asp>

(5) <http://www.noaaneews.noaa.gov/magazine/stories/mag2.htm>

(6) Earthquake/ richter scale

<http://www.cnn.com/2001/US/09/12/seismic.impact/>

(7) http://www.nyc.gov/html/fdny/pdf/mck_report/executive_summary.pdf

(8) http://www.ourpublicservice.org/staff_name3761/staff_name_show.htm?doc_id=139998

(9)

http://bcsia.ksg.harvard.edu/BCSIA_content/documents/Homeland_Security_Domestic_Preparedness_after_September_11_2001.pdf

(10)

http://www.justiceworks.unh.edu/Research/B_B_Vol_5/justiceworkspub.pdf

(11) OSHA

(OSHA's Manhattan Area Office was based in the top floor of the World Trade Center's Building 6. Tower 1's collapse completely destroyed OSHA's Area Office)

<http://www.osha.gov/as/opa/911/>

(12)

http://www7.nationalacademies.org/ndr/1Harrald_Presentation.pdf

(13)

http://www.pswn.gov/admin/librarydocs8/pentagon_release_2_1.htm

(14)

http://www.justiceworks.unh.edu/Research/B_B_Vol_5/justiceworkspub.pdf

(15)

http://www7.nationalacademies.org/ndr/1Harrald_Presentation.pdf

(16)

<http://www.fema.gov/hazards/terrorism/terror.shtm>

(17) Michael Benedict

http://www.ourpublicservice.org/staff_name3761/staff_name_show.htm?doc_id=139998

(18)

<http://www.geocities.com/cureworks2/lisa.htm>

(19)

<http://www.co.arlington.va.us/fire/edu/about/docs/aar.htm>

(20)

<http://www.geocities.com/cureworks2/lisa.htm>

(21)

<http://www.dodgeconstructionpublications.com/Group/Features/feature02nov01.htm>

(22)

<http://everest.hunter.cuny.edu/~mclarke/Problems%20with%20EPA%20scopes%20Oct%202002.htm>

(23)

<http://www.fema.gov/about/mediausr.shtm>

(24)

http://www.state.ny.us/governor/press/year01/sept11_5_01.htm

(25)

<http://www.noaanews.noaa.gov/magazine/stories/mag2.htm>

(26) U.S. Army Medical Department

<http://history.amedd.army.mil/booksdocs/opnoble/nurse911.htm>

(27)) “Only recently have U.S. military leaders begun to regard a clean, healthy environment as a critical national interest worth fighting to protect,” noted Peter Lee Miller of Vermont Law School discussing the school’s symposium on the environmental impacts of war. “A Pentagon office is now tasked exclusively to protect the environment from military activities that would unnecessarily degrade it.”



Satellite image of Manhattan, NY—Sept 12, 2001.
Photo: Space Imaging

Part 2. The day after: How officials responded

A day after the tragedy, New Yorkers were in a state of shock and mourning. An eerie silence had fallen over the city, which was still obscured by smoke and blanketed in dust. Part of the World Trade Center was still in a raging fire—and another building, #7, had just collapsed. FEMA declared the city a federal disaster area and had sent a dozen urban search and rescue teams, four to Northern Virginia to the Pentagon, and eight to Ground Zero.

As many as 10,000 were believed dead, since it was estimated that some 30,000 to 50,000 people might have been in or near the Trade Center’s towers when they were hit. (1) At the Pentagon, meanwhile, hundreds were believed dead, but here, too, it would take months to complete a full, forensic investigation.

Down on the vast, charred remains of the World Trade Center, rescue workers like Vince Forras and ironworkers silently hammered away at “the pile.” The last thing anyone was thinking about was their own health, he says, although many were coughing and experiencing a mysterious ringing in their ears, which, he confesses, was strange in view of the absence of noise and the very deathly silence of the place.

To this day, he says, he can still recall the experience. “The sharp smells, the body parts, the rats—it just inundates your senses.”

“It was such a fulfilling mission. What did we know?” says Vince Forras.

To this day, he says, he can still recall the experience. “The sharp smells, the body parts, the rats—it just inundates your senses.”

From where Forras stood, over the pit, mounds of smoking debris loomed like mountains and the hundreds of firefighters like himself from all over the country (as well police officers, federal officials, canine units, army, FBI, iron workers, construction crews, and others) looked like Lilliputians in Gulliver’s Travels, scaling the immensity of the task ahead. Ironically, having worked around the clock, he had only seen a close-up view of Ground Zero—not the TV images of the immense catastrophe everyone else saw.

Many of the 35,000 or so people living in the neighborhoods around the buildings had been evacuated, although some stragglers remained holed up in their apartments on streets that had been turned into a war zone, with army tanks and National Guardsmen patrolling the streets. Among these residents was someone who came down to help with the rescue effort but was injured, having fallen from running from the towers who had been told by the police to return to

her apartment. Kim Todd, an actress who had just recently moved to the neighborhood, was just waking up from eventful day, in deep back pain.

Living just two blocks away, she had run to help, answering a call from the friend who worked in the World Trade Center needing help evacuating people just after the first airliner hit. But she was caught in thick smoke and the throngs of people escaping the building--and narrowly missed being hit by a falling piece of the jetliner. "Then the second tower came down, and everyone around me was dead. And while I was taking a breath and thinking, 'I'm OK—don't move,' a passing fireman stopped and, seeing me alive, slapped me across the face and said, 'Run! Run for your life!'"

Now she was trapped in her apartment without electrical or phone service, recovering from her back injury. "I was so sure I was going to die I had written out a will," recalls Todd, whose apartment was covered four inches deep in dust and debris, because her windows had been left open. Her dog Rigsby, who would later become a "therapy dog" at Ground Zero, was waiting there for her.

It would be weeks before Todd and her neighbors would begin to clean up their apartments but there was tremendous confusion about how, she remembers. Just getting electricity and phone service would be a challenge. "The city kept saying everything was fine, but people were sick, and had coughs, skin rashes, eye irritations and even nose bleeds," Todd remembers. "In the beginning, the city was overwhelmed and it wasn't the priority."

The scene at Ground Zero

Into this devastated, almost apocalyptic war zone of a landscape marched a host of different players from government, nonprofit groups, hospitals and medical institutions, and private industry.

To some, it was an environmental health disaster from the very first. "Standing down there, with your eyes closed," says Ron Burger, a public health advisor at the National Center for Environmental Health, Centers for Disease Control and Prevention, who arrived in New York to help September 11th but didn't arrive to the Ground Zero the site until the night of September 12th, "it could have been a tornado or an avalanche or a volcano."

A veteran of disasters from the Mississippi floods Mt. St. Helens, Burger said it reminded him most of the volcano, if he forgot he was in downtown Manhattan. "Feeling the heat, seeing the molten steel, the layers upon layers of ash, like lava, it reminded me of Mt. St. Helen's and the thousands who fled that disaster," he said.

"It could have been a tornado or an avalanche or a volcano."

Ground Zero was a disaster site like no other—with hazards everywhere. Shards of steel lay upon shards of steel, shifting and unstable, uncovering red hot metal beams excavated from deep beneath layers of sub-floors, exposing further dark crevasses. All around the 16-acre site lay millions of piles of debris, covered in dust, with noxious smoke smoldering up, carrying unknown toxins, from benzene to heavy metals, into surrounding neighborhoods.



Decreased visibility—10:05 a.m.

Photo: Paul Olivier

Throughout New York, people wore light masks and scarves over their faces. As the mayor and governor tried to assure people that the city was safe to inhabit, rumors of asbestos hung in the air. People heard news reports with terrorism experts quoted saying that dispersing a biological poison via airplane would be inefficient, while inspectors continued to inspect the debris for signs of biological or chemical poisons.

To cope with a disaster of this magnitude, New York City had to coordinate its operations with a vast number of local, state and federal agencies. Like the Oklahoma City bombing incident, the affected geographical area was small but involved massive damage to buildings. (There the comparison ends, since the World Trade Centers were far taller and made of lightweight steel versus the Murrah Building, made of concrete and only nine stories tall.)

Dr. Bruce Bernard, a public health specialist at the National Institute for Occupational Safety and Health (NIOSH) at the Centers for Disease Control and Prevention in Atlanta, who traveled to the site a few days after the terrorist attack, remarked that the federal agency was aghast at the size and variety of hazards present at the site—dust, blood borne pathogens, unstable structures, physical injuries, heavy metals, carbon monoxide, hazards of being trapped in confined spaces, and heat stress.

At first, when NIOSH arrived, Bernard said, “The major concern was dust.” But with thousands still thought to be missing, and workers determined to stay until all potential survivors were found, “health and safety was on the back burner,” according to Bernard. (2)

What category of catastrophe?

Before this disaster was regarded as a pollution event, it was a crime scene, an international terrorist incident unparalleled in history, and even an act of war. The World Trade Center terror attack was so complicated—involving so many mass casualties, so vast a crime scene, so many firefighting and rescue challenges, and so many national and international implications, that arguably it was too big to respond to quickly.

Yet one of the city’s first decisions was to declare Lower Manhattan and the Ground Zero area environmentally safe. Environmental Protection Agency (EPA) administrator Christie Whitman said, “Given the scope of the tragedy from last week, I am glad to reassure the people of New York and Washington, D.C., that their air is safe to breathe and their water is safe to drink.” New York Mayor Rudolph Giuliani has said that tests of air and water had turned up “no significant problems.”

Critics would later charge that the city and EPA did not have sufficient information—scarcely any samples of air and dust taken at this point—to make such a declaration. More than a year later, EPA itself in a draft of a “Lessons Learned” report from the Inspector General’s Office would state outright that such a declaration was premature. In reality, the nature of the emergency outstripped available agency resources. (3)

Three months later, fires still burned and smoldered beneath the World Trade Center wreckage, releasing high levels of benzene, as well as other toxic compounds, such as dioxin.

What made that critical management decision particularly problematic was that three months later, fires still burned and smoldered beneath the World Trade Center wreckage, in the process releasing high levels of benzene, an organic compound that can lead to leukemia, bone marrow damage and other diseases after long-term exposure, as well as other toxic compounds, such as dioxin.

Besides this, the dust created by the initial building collapse and the debris being trucked out was brought through open doors and windows, through ventilation systems and tracked in on shoes, into homes, offices and schools in the area.

For many months, the events of September 11 would severely test the community disaster response plans of New York City especially, including five local agencies that dealt with environmental health, and their coordination with another dozen state and federal agencies.

Volunteers found themselves way, way over their heads; agencies, too, were reeling from the attack. The challenges before them were monumental—addressing environmental health problems, occupational health and safety problems, identifying potential disease or injury trends, monitoring exposures, and finally communicating those hazards to decision makers and the public.

That second day, with so many people still unaccounted for in New York, it is understandable that people would risk their own health to save lives. All kinds of numbers would be thrown around to try to assess the numbers lost. Whatever the ultimate death toll, it will be “more than any of us can bear,” said New York Mayor Rudolph Giuliani, hours after the horrific attacks--a quote often repeated to show the mayor’s leadership in an atmosphere of confusion, fear and anguish. His leadership was widely touted, and Queen Elizabeth of England even acknowledged his behavior by knighting him. (4)

Although the mayor remained a figure of calm in the midst of the city’s crisis, steadfastly assuring the public that emergency workers were doing their jobs to manage the scene properly, some argued that his calming words hid some potent dangers.

Two years later, Forras remembers the Mayor standing next to then-EPA administrator Christie Whitman, saying the air’s safe. “When you have someone of the caliber of Mayor Giuliani saying it, they took that as gospel,” says Forras. “For me, it’s very scary. We lost another firefighter, and that makes one in New York and two volunteers who have died of pneumonia. My lungs are totally shot, and I’m afraid that’s what many of us are going to die of.”



Dust fills the air—10:05 a.m.

Photo: Paul Olivier

The rescue effort

The first priority for local responders was to rescue as many victims as possible. For the moment, the rubble at the World Trade Center was hardly regarded as too toxic to touch or breathe, since the pulverized ground and layers of charred debris could still yield more lives.

Time was of the essence. They knew that within the first few minutes, hours and days they had the best chance of recovering human beings and getting them medical help right away. In the hours that followed the morning's catastrophe, responders were miraculously able to pull several people out of the rubble of the building—but only a half dozen.

The greater miracle was how that so many thousands were evacuated safely from the second largest building in the world, which hours earlier had housed 100,000 workers and visitors each day.

No survivors were discovered in the wreckage after the morning of September 12th, as health officials were sad to realize, and thousands of lives lost.

Within several days, the mission of those at the site changed from rescuing survivors to caring for the rescuers and helping to insure their safety, noted Dr. Kenneth Miller, one of the medical experts with the Urban Search and Rescue teams, who traveled from Orange County, Calif. to serve as part of the disaster team.

"The void spaces in the buildings were few and the injuries sustained by the victims were dramatic," Dr. Miller recalled, in an article for the Health Care Agency of Orange County. "Our job changed from helping with the medical management of survivors to what was called the toxicology of building collapse." (5)

But some feel the "rescue" phase may have been too long, as rescuers pushed their hopes of finding people lost in the rubble, and moving to the recovery phase may not have been quick enough.

So while mayor Rudy Giuliani was praised for taking the helm, displaying leadership and galvanizing the public safety services, as well as wisdom in allowing the rescuers the time to mourn, there was a big cost to the fire department being too slow in winding down its fire-rescue medical response.

The occupational health side of this suffered as a result, wrote Donald Elisburg and John Moran of the National Institute of Environmental Health Sciences. "It became very apparent early in the WTC site visit that the WTC site was operating in a search and rescue mode being undertaken by the NYC Fire and Police personnel and Federal personnel such as the FEMA urban search and rescue teams in accordance with the federal response Plan." There should have been an earlier

end to the rescue effort, they wrote, but there wasn't "owing, no doubt, to several factors, such as the NYC Fire Department bearing responsibility for collapsed buildings and the fact that the fires continued to burn in the site debris pile."

"Our job changed from helping with the medical management of survivors to what was called the toxicology of building collapse."

At the Pentagon, by contrast, the fires were put out much more quickly. Within days, Army occupational health specialists found no potential health risks for Department of Defense employees returning to the Pentagon after the Sept. 11 terrorist attack. (6)

Who was in charge?

After several days, rescue turned to recovery.

The government's responsibility for recovering from a disaster is spelled out under the Federal Response Plan (FRP). Under this, the Federal Emergency Management Agency is designated as the lead agency for "consequence management," meaning measures taken to protect public health and safety. This protocol focuses on physical recovery and rescue, providing environmental health services in a time of disaster—i.e. in assessing risks, providing protection in the event of chemical threats, etc.

Under the plan, the Environmental Protection Agency (EPA) began removing asbestos-contaminated dust from streets and buildings around the New York site, as well as cleaning debris from more than 300 cars, about a week after the incident. FEMA reported that EPA was continuing its air monitoring and establishing more air monitoring stations around the impact site and in New Jersey. At the Pentagon, it reported, water sampling and air quality monitoring stations revealed no elevated levels of asbestos or contamination.

Experts say that the response system designed for response to natural disasters worked very effectively for the response to the consequences of a terrorist attack, in the sense that federal agencies like HHS and the Army Corps of Engineers integrated well with local responders. "Disaster Medical Assist and Disaster Mortuary Teams were mobilized and deployed by the HHS Office of Emergency Preparedness and debris removal teams deployed by the US Army Corps of Engineers as local fire and rescue responded to the WTC and Pentagon," notes The Institute for Crisis, Disaster and Risk Management at George Washington University.

However, because New York State is a "home-rule" state, the responsibility for managing the rescue and recovery was entrusted to the state. Because Mayor Giuliani exerted such leadership, the state was criticized for taking too much of a backseat during the crisis. "Gov. Pataki was criticized because he was not the leader supposedly (on Sept. 11). That's true. The mayor was the leader. New York State is a home rule state. All emergencies begin and end at the local level. We were there to support New York City during that time," New York state director of emergency response Ed Jacoby told reporter John Nagy of the Pew Center on the States (*Stateline.org*).

The city Fire Department was the so-called “incident command” from the beginning, and the city’s Department of Design and Construction was later appointed “co-incident commander” with fire officials.



However, some experts brought in to help assess the environmental damage say a significant problem early on was that the federal response plan did not anticipate—in fact, could not have anticipated—the kind of environmental impacts that struck the city on September 11 and was therefore not prepared to address it.

Sept 19—A NYC fire dept. worker takes a break amidst the piles of rubble.
Photo: Andrea Booher/FEMA News Photo

“ It is tough duty and it takes unique individuals.”

Even Joe Allbaugh, the Director of the Federal Emergency Management Agency, FEMA in an interview with Don Imus, was aghast at the hazards. He described them this way: “The rescue workers, fire, police the USR Teams they go into those pockets, and they run into carbon monoxide, which is deadly. And that forces them to back out after about 20-25 minutes. And take as much as an hour an hour and fifteen breaks to recoup. And it’s very strenuous. Not only on the physical side, but the mental side crawling around inside the rubble. It is tough duty and it takes unique individuals. That’s why I think Americans ought to go to the Fire Departments and Police Departments and say “Thank you”. And every one of these team that are coming in from outside of New York. When they return they ought to be welcomed home ...”

Immediate environmental health issues

In the days immediately following the attack on the World Trade Center, just getting a handle on the scope and scale of the environmental health issues at hand in New York City was a huge challenge.

“This was big – everything you could think of relative to environmental health--air quality, water quality, hazardous waste, disposal, was there was here and more,” says CDC’s Ron Burger. “It seemed to be the biggest environmental health incident the city had ever encountered.”

Among the immediate challenges for environmental health professionals in endeavoring to protect the city of 8 million people:

- Unparalleled worksite hazards at Ground Zero
- The huge amount of dust—later determined to be 1.2 million tons—pervading the city, particularly lower Manhattan, and carried aloft to other boroughs
- Characterizing what was in the plume and where it went, and dust
- Smoke from ongoing fires—characterizing what toxins it might be laced with
- Indoor dust that made its way through windows, doors, crevices and rooftops
- Resuspended dust outdoors and in
- Removing toxin-laden debris and dust
- The final hazards of debris disposed at the Fresh Kill landfill in Staten Island

Besides all these, as mentioned before, there were the host of environmental health concerns that come with any disaster—insuring the safety of food, restaurants, protection from rats and rodents and insects.

Traditional public health functions

Although this was a terrorist incident, and there was concern for bioterrorism, many of the traditional public health functions would be the first tested.

Kelly McKinney led the efforts to address the many environmental health issues that were staring them in the face. After having checked the building for evidence of any radiological hazards or bioterrorism, there were the more routine, standard checks needed to avert any pest outbreaks or rotting food that could spread illness and disease.

“The whole country was in shock. What does your mother do when she wants to show she care? She cooks. She gives you food. And everybody wanted to show they cared,” says Kelly McKinney of New York City’s Department of Health.

A big unexpected problem was managing the food donations, and getting a handle on unregulated food sources, which threatened to overwhelm public health officials and create further problems – such as insects and rodents.

“The whole country was in shock. What does your mother do when she wants to show she care? She cooks. She gives you food. And everybody wanted to show they cared,” said McKinney.

So the food poured in, from everywhere to Ground Zero. But much of it had to be thrown out. “To serve food, you had to have a city DOH food certification,” he said, but hundreds of unlicensed feeding stations popped up.

“Port Authority had feeding stations for volunteers coming in,” says McKinney. “But we had to send in teams of sanitarians to shut down a lot of others. All that unauthorized food had to be trucked away.”

Authorized food, too, had a shelf life, of course. “There were piles of beef brisket sandwiches on crash carts with Gator Ade and granola bars. But that all started to pile up too,” he says.



Sept 13—Firefighters battle the WTC fires and wreckage.
Photo: Andrea Booher/FEMA News Photo

Food sat on tables, with salad bars lying outside for hours, says McKinney. All of this had to be either vetted or disposed of. Any rotting or questionable food had been disinfected, using bottles of bleach, and all that hauled away as well.

Another unexpected problem was the volunteers leaving food around. “You had guys eating a bit of sandwich, then tossing it,” says McKinney. “There was waste everywhere.”

All that could have posed further problems with mosquitoes, since this was also, as mentioned, still West Nile virus season and the weather was still warm.

Through tremendous efforts, says McKinney, these problems were managed. “The rodent problem was never really out of control,” he adds, “though we set thousands of rodent bait traps.”

An added problem was enforcement: Enforcing health rules wasn’t always easy with uniformed services. “Some cops got really pissed off,” he says. But over time, DOH altered its protocols to become “more collaborative” with other agencies. “We’d have to say, ‘This could make you sick. I’m ordering you to destroy that food.’”

Then there were the restaurants. “The enormous amount of food downtown was a problem that we struggled with for weeks,” says McKinney.

Most of the 350 restaurants in the restricted zone around the World Trade Center were hastily abandoned by their owners on September 11, leaving huge amounts of spoiled food to be cleaned up and disposed of. The Pest Control office partnered with the Department of Sanitation to get into and clean another 92 closed restaurants.

Enforcing health rules wasn’t always easy with uniformed services.

In the first few weeks, the Office of Pest Control inspected some 469 properties of all kinds, exterminating 388 of them with rat poisons and insect sprays. In the weeks to come, the office would inspect 535 establishments and exterminate 982 more.

The city Health Department reported that tests taken immediately after the blast showed “no evidence of any biologic or chemical agents.” Meanwhile, the Department advised residents and workers “to guard against dust and soot which can cause respiratory symptoms and eye and throat irritation,” and directed to the DOH website with a “Public Health Advisory for residents and people returning to work in the nearby area.” In this, residents were advised to remove dust with wet rags and mops, rather than brooms, which could re-suspend the dust.

However, as the catastrophe unfolded, it became clear that the assortment of hazards at the disaster site at the World Trade Center would become a prolonged campaign and not simply a short-term event that could be cleaned up and disposed of quickly.

As public health experts all agreed, the World Trade Center (WTC) disaster was “unprecedented in the history of the United States.” City, state and federal agencies monitored conditions at the site for month and the city Department of Health (DOH) said it was “committed to working with the community to identify and address health concerns.”

A year later, researchers studying the dust and smoke in greater detail would characterize the conditions as having constituted a health “emergency.”

Re-establishing a command center

First responders faced many difficult challenges in the chaos that ensued in the days after September 11, recalls DOH’S Kelly McKinney, the first of which was the complete decimation of the city’s “command center,” when its Office of Emergency Management (OEM), which was displaced in one of the adjacent buildings that collapsed, as mentioned in Part 1.

As a result, the “incident command system” upon which emergency responders depend did not operate and took about 48 to 72 hours to reconstitute.

The OEM, a descendant of the city's Office of Civil Defense and the Police Department's Office of Emergency Management, includes personnel from the Police and Fire Departments, Emergency Medical Service, and other city agencies, and was designed to deal with catastrophes such as a chemical or biological attack or a "mass fatality situation." (However, until the attack on the World Trade Center, it had never confronted such a dire threat; previous threats included the much-feared Y2K computer virus, an infestation of longhorn beetles, and an influx of rodents. Ironically, the day of the attack, the office had been focused on the potential dangers of hurricanes and power outtages. “It's Hurricane Season in NYC,” announced its website.

For its part, the city Department of Health did follow an emergency response protocol that had been worked out in advance, including an incident command system: Laboratory, surveillance, epidemiology, medical and environmental response. “From the start, these plans and previously rehearsed exercises helped to organize the work and set priorities,” writes Susan Klitzman at the School of Health Science, Hunter College. (7)

By September 12, says McKinney, the department had already moved to a safer place and re-established a headquarters and a set of critical functions to communicate among staff, press and hospital staffers. Within 48 hours a new space was secured (first at the policy academy, then at Pier 92, a passenger ship terminal on the Hudson).

“The only other time the city had every had to deal with FEMA was an ice storm up state in which farmers had to be reimbursed for their cows.”

With a unified command, says Burger, “Everyone fell under Kelly and his staff.” But Burger’s help, says McKinney, was invaluable in terms of trying to navigate the array of bureaucracies and the protocol.

New York had much to learn, says Burger: “New York is typical of big cities, and think of themselves as equal to a state, so sometimes we needed to remind this city that it needed to get assistance from the state.”

A corollary to this: Localities have to make a request of the federal government before it can respond.

“This was a learning experience for New York City,” says Steve Touw, who was brought in as one of EPA Region II’s On Scene Coordinators (OSCs), to help with a full array of environmental-related expertise on everything from respiratory protection to hazard analysis to waste removal.

This was the first time that New York City had ever been through a national disaster, in which the Federal Emergency Management Agency (FEMA) would be called in. “The only other time the city had every had to deal with FEMA was an ice storm up state in which farmers had to be reimbursed for their cows,” says Touw.

The state had set up an Emergency Management Office charged with responding to disasters like this, such as a drought in the apple-growing district in the center of the state and hurricanes in the Hudson Valley, but before now the only emergencies had dealt with weather. The only exception was that the office broadened its purview to include “Y2K,” the much-worried-about computer fiasco that never happened. Even though the World Trade Center had already been target and seriously damaged with a bomb in 1993, the office was totally unprepared for the scope of the attack in 2001.

Nevertheless the State Emergency Management Office (SEMO) did rise to the occasion with a coordinated response, calling upon 31 emergency experts from 18 states to form the Emergency Management Assistance Compact (EMAC)—an agreement that was originally organized to help with natural disasters such as hurricanes, toxic-waste spills and also acts of terrorism. Although not formally part of EMAC, New York State quickly joined after the fact a few days after September 11.

Through SEMO, the city got help with 5,000 National Guard troops, 500 state troopers and K-9 units, 100 Federal Bureau of Criminal Investigation personnel and 2,500 crisis counselors. The State Department of Health also help bring in some 400 workers to help in issuing death certificates for families of victims, monitoring for air quality, and coordinating volunteers.

As part of activating its emergency response protocol, the Department of Health became a vital part of the city’s Emergency Operations Management command center. Re-established on Pier 92, it became the nerve center of the city’s response coordination, which included everything about responding to the disaster, from transportation to debris removal to protecting workers at the World Trade Center site.



Sept 17, 2001—An American flag hangs above the WTC wreckage.

Photo: Andrea Booher/FEMA News Photo

Federal officials like CDC’s Patrick Meehan were lavish in their praise for New York City’s quick recovery under the circumstances. Although the Emergency Management Agency lost everything and had to relocate quickly, and the health department also had to relocate, and had to work under very crowded, difficult conditions, they did a fantastic job, he says.

“They did a marvelous job in the early recovery,” says Meehan. “Everyone just rolled up their sleeves, worked together on the hardships they were facing and got the job done,” he says.

“Other than injury surveillance, everything else involving the Health department had to do with environment,” says CDC’s Ron Burger.

CDC initially worked with the New York City Department of Health on a range of health issues, from assessing hospital capacity issues and hospital needs to the environmental issues that, Meehan said, quickly rose to the top of the list.

“Other than injury surveillance, everything else involving the Health department had to do with environment,” says CDC’s Ron Burger, echoing Meehan’s comments.

With help from such seasoned advisors, the local city Health Department was able to effectively institute traditional public health measures such as sanitation, drinking water protections, and food safety monitoring and surveillance programs that helped protect the public from standard infectious diseases.

Biggest vacuum: Respirators

But the biggest environmental problem was the air rescue workers were breathing at Ground Zero, says Burger, who had experienced the unforgettable, sweet acrid smell himself there on the second night.

“You had a nightmare here—everyone wanting to help and driving through the night to get to New York,” recalls Burger. “Anyone could get in there before they set up these check points. They’d say, ‘I drove here all night for the past two nights,’ and would do anything to find a place on ‘the pile.’”

But these volunteers needed to be convinced to wear respirators, says Burger, because in their grief they were reluctant to.

That was a very understandable reaction, first responders agree. “It was tough to get guys to wear masks and to operate with any responsible protection in this strenuous environment,” says Anthony Sutton, director of Emergency Management in Westchester County, N.Y. “Their brothers and friends were in there and they wanted to get them out because that’s what they’d want done for them.” Mark Penn, director of Arlington County, Virginia’s Emergency Management Office agrees. “If I’d a been there, I would have been there on my knees too.”

However, both local officials and CDC personnel quickly recognized that the occupational health issues affecting rescue workers were not being managed, such as fitting workers for particulate masks and monitoring the safety of their food supply. Together they began to develop a comprehensive worker health and safety program, says Meehan. “The Health Department took it upon itself but the dilemma was enforcement. They were trying to balance the need for workers to be protected with personal protective equipment vs. their personal emotional needs.”

“People calling the shots at the top were simply not focused on safety.”

The city also got help from the National Institute for Occupational Safety and Health (NIOSH), a part of the CDC, who sent industrial hygienists with technical expertise to help assign proper respiratory protection. The city DOH, led by McKinney had arrived for the first time down on the pile September 13th, leading a group of 15 hygienists from NIOSH to test what workers were being exposed to. From the first personal sample readings, says McKinney, the city had determined that “Everyone who works on the pile needs to wear P100 dual-cartridge half-face respirators with combined Organic Vapor/ Acid Gas (OV/AG) filter cartridges.”

“If it weren’t for the local environmental health department there would have been little done,” says Burger. “They shone in the emergency response to the WTC disaster.”

As time wore on, though, with responsibility for worker protection confused as authority shifted to the Department of Design and Construction, compliance with respiratory use failed. “Kelly and I looked at each other and said, ‘It’s not getting done,’” says Burger.

No one could say with any certainty how long the process of recovery would take—nor how difficult the process of protecting workers would be.

Protecting the lungs of rescue workers

Within a day or so after the two towers collapsed, there were already thousands of workers on the



Sept 21, 2001—A member of the Public Service Health Disaster Medical Team helps at Ground Zero.

Photo: Andrea Booher/FEMA New Photo

scene, battling fumes, dust and constant danger on the five-story-high rubble pile of Ground Zero, signing up for shifts that went on through October. A few workers wore flimsy dust masks that had been collected from around the city. A few wore half-face respirators. But most workers had no respiratory protection at all, although the “pile” was still on fire and emitting clouds of thick smoke. Few tests had been done to characterize what people were being exposed to.

“We knew that we needed to get a handle on what was in that dust and smoke,” recalls Bruce Lippy, an industrial hygienist working for the International Union of Operating Engineers, representing the construction workers operating the cranes, forklifts, welding and heavy equipment that moved the large pieces of steel and debris.

From the minute he saw those pictures of the enormous dust clouds on his television set, Lippy scrambled to get funding from NIEHS to do safety consulting there. Within a few days, he traveled up to New York from Maryland to help protect the workers from his union, and after some delays in getting past security, made it to the site on September 17.

“People in the political structure said ‘we can’t talk about it as hazardous.’”

Upon arrival, he was appalled by the dangers he found and the lack of attention to safety. “People calling the shots at the top were simply not focused on safety,” remembers Lippy, who kept a hawk eye on workers’ compliance with respirator use. “Respirators were worn much like loose neckties, hanging below the neck,” he described it later in a paper published January 2002, which he hoped would direct attention to the widespread occupational hazards at the site.

Yet the scale, duration and hazards at the WTC site were unprecedented, says Lippy, with physical hazards being perhaps worse than the potential respiratory hazards. For the average of industrial hygienist it was treacherous, he said, describing how a colleague fell out of the cab of a piece of equipment, fortunately missing a piece of rebar. “He could easily have been seriously hurt, if not paralyzed.”

Although it was far from a standard construction site, the workers there treated it as though it was. “The heavy equipment was very dangerous,” he says, since workers labored in the tight confines of a cab precariously balanced on a pile that was always shifting. “One worker went off for coffee and found that his equipment had fallen into a pile,” he says, telling a story he repeats in the many presentations he has done since September 11. “I have always been a big fan of coffee and this just reinforced its value.”

“We had been pushing to have it regarded as a Superfund site,” says Lippy, “so that OSHA hazardous waste standards would be brought to bear, but people in the political structure said ‘we can’t talk about it as hazardous.’ “

Lippy's union, fortunately, with funding from the National Institute of Environmental Health Sciences (NIEHS) filled part of the gap by distributing respirators and training workers on the spot in the safest methods to deal with the potentially hazardous dust, smoke, and other hazards.

Every day for several weeks his team crossed the site and, using binoculars, watched to see every piece of operator of heavy equipment—cranes, earth movers, forklifts, etc.—and whether or not they were wearing the respirators as advised. Regularly less than half of the heavy equipment operators were wearing their respirators while working on the pile, often less than a third, his surveys found.

What was in the thick plumes of smoke that rose up from the tangled shards of steel and rebar had yet to be fully analyzed but there were serious concerns that it contained an assortment of combustion products, many of them carcinogenic, such as benzene, dioxins and furans; EPA had already found asbestos in the dust at levels of concern within the first few days.

By mid-October, Lippy had taken some 60 samples of the air and dust, looking in particular for traces of asbestos and heavy metals such as lead. Many of his samples did not show any surprising hazards, corroborating other readings done by agencies like EPA, but there were enough concerns that he kept prodding workers to keep their respirators on, just in case.

The catastrophic losses of the New York Fire Departments Hazardous Material (HAZ-MAT) companies struck a blow for health and safety. “With their loss, we lost that expertise, and we lost the ‘haz-mat’ culture.”

Later, however, his union would document the presence of many hazardous materials besides asbestos, including lead, silica, arsenic and Freon. Just in the first week, between September 14th and 25th, workers would suffer 995 injuries, with eye injuries, blisters and headaches topping the list.

Most of all, Lippy led by example, wearing his respiratory all the time. As a result, after weeks and weeks on the site, he never got any “World Trade Center” cough.

A staggering number of respirators were given out by various agencies, says Lippy: “OSHA gave out 130,000; EPA about 22000, and the operating engineers, about 11,000, but it was unclear where they went,” he says.

Workers at the site resisted wearing respirators for a number of reasons, Lippy feels. For one thing, as construction workers, they were not used to wearing respirators, since they typically build things, rather than doing demolition work, and usually in an environment absent these hazards, not a blast zone following a terrorist attack.

Plus, this disaster zone called for extraordinary endurance. Firefighters who wear their standard gear are typically in and out of a fire scene within minutes, in contrast to this scenario, which would last months upon months. “Firefighters, with their self-contained breathing apparatus – (SCBA, nicknamed SCUBA) typically get a half-hour bottle of air, and they’re out long before that,” adds Lippy. “When they switched to the half-face respirator, they hadn’t been properly trained in it.”

Secondly, the respirators were difficult to wear while working. “A lot of workers didn’t wear the respirators,” says Lippy, “because it was very hard to talk in them.” In a dangerous environment, hearing and talking can be a necessity. Also, many of the cartridges that came with the respirators didn’t work well because they weren’t compatible, or they didn’t last long enough to be effective.



Volunteers and professionals helped with recovery at Ground Zero.
Photo: EPA

Workers at the site needed to be properly fit-tested, and trained—yet they weren’t for months, Lippy charges. While workers labored around the clock, they got little if any protection. As an example of how little attention went to health and safety, Lippy notes: “The first personal samples weren’t given until September 19 (a week after the attacks); fit tests weren’t required until October 17th; a safety plan wasn’t issued until October 29; and first formal training wasn’t given until November 29th.”

Had this been a typical workplace regulated by OSHA, there would have been standards requiring that all respirator users be properly trained, fit-tested, and medically certified for wearing such devices. But OSHA was serving only in a “consulting” role rather than an enforcement role, because the Fire Department, and later the Department of Design and Construction had command over the site—so such standards didn’t apply as they should have.

Lastly, says Lippy, one of the tragedies of the September 11th attack at the World Trade Center was the loss of New York’s “crack HAZMAT team.” The New York Fire Departments Hazardous Material (HAZ-MAT) companies suffered about 75 percent casualties—and their loss struck a blow for health and safety.

“With their loss, we lost that expertise, and we lost the ‘haz-mat’ culture,” says Lippy. “Had they been at the table, there would have been a different dynamic at work, valuing health and safety.”

Lippy and others felt that OSHA’s hazardous waste standards ought to have been brought to bear. But, he says, there were disagreements among the agencies about the necessity of protection against organic vapors and acid gases because the levels measured have been generally low.

“The position of the IUOE team is that the potential exposure to dioxin in the smoke warrants organic vapor protection. Additionally, the cartridges will protect against odors from bodies. The presence of large quantities of Freon means that hydrochloric and hydrofluoric acid can be generated in the presence of heat. Consequently, workers need to be protected from acid gases, too.”

Lippy feels that there were misunderstandings behind the decision to ignore the OSHA HAZWOPER standard. New York city officials felt that lower Manhattan might have been in danger of being declared a Superfund site if that standard were enforced.

Yet there were occasions when that standards was used, as when there had to be clean up of underground tanks, covered under HAZWOPER, rather than under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund).



WTC wash station.
Photo: EPA

At the same time, too, OSHA considered the recent cleanup of anthrax contamination as covered by HAZWOPER, even though the Brentwood Post Office could hardly be regarded as a Superfund site. Another concern expressed at the site was that HAZWOPER would force workers into overly protective garments and respirators, slowing down the work and jacking up the price.

But Lippy points out that enforcing HAZWOPER only requires that the level of protection “be commensurate with the level of hazard,” as determined by assessing risks.

Most of these key practices of HAZWOPER—such as creating a site-specific health and safety plan, establishing zones of control, training workers, and decontaminating personnel and equipment – eventually became part of the procedures at Ground Zero. But according to Lippy and Carson, they arrived slowly and too late. Unlike the HAZWOPER requirements, personal decontamination was never mandatory at Ground Zero. Medical screening was not required and as a result not widely performed during the entire rescue, recovery, and cleanup.

Teaming up with Teamsters

Alison Geyh, an assistant professor from John Hopkins University, was another technical consultant who came to New York City, with funding from the National Institute of Environmental Health Sciences for a coordinated study of the disaster's potential health effects to workers. She focused her efforts on helping the Teamsters, checking the exposures of the truck drivers carrying debris away from the site.

She would arrive at about 4 a.m., the start of a shift, when she would equip the drivers with small pumps and cassettes with filters to measure their exposures to particulates, asbestos and other pollutants. “A team of us put monitors at various locations in the debris to see what people were exposed to,” says Geyh (pronounced ‘guy’), “whether it was heavy metals or plastics being combusted.”

The job of researching worker exposures and industrial hygiene wasn’t easy, she discovered, as she lugged two 40 to 50 pound bags of air monitoring equipment on foot through the dark canyons of Lower Manhattan office buildings.

The first week they walked in from the Chambers Street subway stop, the equipment was so heavy and the atmosphere so smoky, it felt like “walking onto another planet,” she said.

“Everyone was working one hundred and fifty percent, 20 hour days. No one was more heroic than anyone else.”

The researchers had to start early and stay late, since they were following the drivers and equipment operators, who worked in two 12-hour shifts. Because the air monitors could not be left overnight, she and her team would retrieve all the equipment, take it back to their hotel, and recalibrate it before turning in. Then the cycle would begin anew the next morning at 4 a.m.

“Everyone was working one hundred and fifty percent, 20 hour days,” says Geyh. “No one was more heroic than anyone else.”

Most draining of all, she found, was the sheer act of identifying and justifying her team’s efforts to the law enforcement officials guarding the site at entrance checkpoints.

At the Pentagon, by contrast, suggests Dodie Gill, of the Arlington County Employee Assistance Program, officials from different departments – Police, Fire, and Health – seemed to be more used to working together. The EAP itself crosses various official specialties.



Some monitoring was done on the burning debris pile at Ground Zero.
Photo: EPA

To thwart any potential questioning of EAP’s authority at the site, says Gill, her team simply joined forces with the incident command, in this case the county Fire Department.

“We even put on fire fighter uniforms,” says Gill.

Environmental health professionals had a harder time at the World Trade Center site.

“We had to explain ourselves all the time—constantly justifying what we were doing onsite—which was primarily a service to the Teamsters, and also gathering research data for our own studies,” says Geyh.

Even though her team had authorization to be onsite, with badges from John Hopkins, not being police, fire or EMS, with recognizable uniforms, required some explaining.

“We’re just trying to get a picture of what you’re breathing,’ we would say,” says Geyh, “and they’d shoot back, ‘You need to measure that?’” It didn’t help that their group of four researchers were primarily female in a largely male environment—and not part of the Red Cross or Salvation Army presence. The reaction, she said, was ‘What are you girls doing here?’” she laughs, but everybody was very generous and protective.”

Geyh herself wore a respirator when she felt the air quality had gotten so bad that she had to. “But you couldn’t do it all day,” she says. “It was too cumbersome.”

The reaction, she said, was ‘What are you girls doing here?’”

Wearing a respirator made a difference. Some of the early findings showed, for example, that workers were being exposed to air containing 1,600 to 1,800 micrograms of particulate matter per cubic meter—hundreds of times what OSHA considers to be the highest safe level—at 10 micrograms per cubic meter. (And that OSHA standard is based on particulates untainted by asbestos, silica, heavy metals and other contaminants.)

All of Geyh’s air sampling was done at the Ground Zero site. But what was striking to her was the contrast between the level of pollution at ‘the pile’ versus a few blocks away. “But that’s not to say that the wind changing direction might not expose people if a big just of wind blew that caustic dust toward them,” says Geyh.

When it came to identifying what was in the dust and smoke the community was exposed to, that was left to EPA, the state and other agencies that collected thousands of samples. By and large, they continued to assure the public that there were no pollutants of concern.

“But EPA came out way too early about the safety of the site,” Geyh concludes. In many cases, the public wasn’t buying it, she says. “They’re saying, ‘How can you tell me this is safe when my eyes are burning and I’m coughing?’ ”

In hindsight, she says, “It would have made sense to do a lot more human monitoring to find out what people were exposed to and what was in the ambient air.”

Multi-agency coordination

In the aftermath of any terrorist attack, the emergency response on the ground would likely involve hundreds of offices and agencies across government and across the land.

That was the case in New York City, where dozens of agencies struggled to re-establish connections to the city’s Emergency Operations Center in the first hours and days of the tragedy.

Steve Touw, an On-Scene Coordinator with EPA’s Emergency Response team, arrived at the World Trade Center on the morning of September 12th, having spent the day before as a liaison to the city and FEMA and “finding out what the city needed from the federal EPA.”

Initially all the agencies were trying to re-establish communications. “Verizen just kept adding phone lines, as so many were out,” said Touw.

In days that followed, many national agencies would spill out of the D.C. area and head to New York’s Ground Zero. At its peak, there were some 30 different city, state and federal government agencies involved, more focused at the time on evidence collection than environmental health, but still calling for unprecedented coordination.

In a television interview with NBC a month after the attacks, FEMA’S Director Joe Allbaugh said, “You have over 26 federal, state and local agencies working together, it’s an unbelievable site—folks working shoulder-to-shoulder; sifting over debris. I mean fine-tooth comb with rakes and a lot of it by hand. They pull out and segment, segregate the large items, the steel beams and whatnot. But it is a thorough, thorough process, looking for any evidence, looking for individuals, remains of individuals, that we can help families bring closure to those questions that they’re asking right now. I’m very impressed with the organization that they have.”

Matters were not so straightforward when it came to coordinating who was doing what with respect to environmental health.



Sept 21, 2001—FEMA rescue workers.
Photo: Michael Rieger/FEMA News Photo

At any one time, there were dozens of city, state and federal agencies responding and mobilized, many of them working 18 hour days. The city’s Fire Department directed the rescue and recovery, while the city Department of Design and Construction supervised the four contractors at the site. Several agencies shared air quality issues, including the federal EPA, the DOH and the State Department of Environmental Conservation.

But for every issue there were many overlapping agencies involved: like the issue of protecting the rescue workers from the toxic dust in the air.

“I was getting a little rubbery,” he remembers. “I had to come home and decompress. But it was tough to sleep.”

“We met three times a day to discuss the level of respiratory protection needed and to analyze sampling data,” says McKinney.

Many of those representatives from those agencies say they much appreciated those regular calls and meetings to attempt to coordinate functions and eliminate duplication.

“God bless Kelly and his staff—for he put it under one command,” says Burger. ‘Anything affecting the environment was put under his command.’”

Others say that the meetings got fairly contentious. “Many of the safety people were asking for the city and contractors to slow things down,” says Bruce Lippy. “You don’t work 12 hour shifts for two weeks in a collapsed structure without it getting to you.” For many, says Lippy, the psychological impacts alone were physically bruising.

When he came across a human hand with a candy bar still in it, he admits, he had to pause. “I was getting a little rubbery,” he remembers. “I had to come home and decompress. But it was tough to sleep.”

The biggest criticism was that the environmental health effort lacked coordination. Among the problems Mt. Sinai’s Landrigan identified: A “disorganized approach to worker health and safety.” This, he feels, came about because of “unclear lines of authority.” Other problems that would crop up included a lack of health-based standards for certain chemicals that made their way into the air and water. “These problems,” Landrigan warned, “must be addressed and the necessary improvements to the system must be made, if mistakes are not to be repeated in future disasters.”

Assessing Risks

From an environmental perspective, probably the most difficult challenge confronting the agencies was identifying the substances in the dust and their potential health hazards.



“Determining which pollutants were out there in concentrations that were hazardous,” was at the top of EPA Region II’s list of challenges. That meant assessing the risks of exposures to pollutants it wasn’t required to monitor by law—such as dioxin, PCBs and dozens of other compounds—and for which health standards had not been set.

Sept 21, 2001—WTC site.

Photo: Michael Rieger/FEMA News Photo

Of course, too, truly life threatening hazards awaited in the recovery effort. There were many hazardous materials, such as Freon tanks for the air conditioning units, stored in six underground levels of the WTC. If the fires reached these levels they might have triggered larger fires or toxic

plumes. There were hazards amid the rubble because moving debris could open pockets of oxygen that could mix with combustible dust and vapors and cause other explosions. So pinpointing sources of hazards were key.

Among the first agencies to help in this regard was EPA. But On-Scene Coordinator (OSC) Steve Touw, who had been to Hurricane Hugo and Floyd, as well as oils spills and overturned tank trucks, was unprepared for the scope and size of the environmental disaster at the 16-acre World Trade Center site. “The resources brought to bear were like nothing I’d ever seen,” he says.

Among other responsibilities, Touw was tasked with collecting hazardous materials, and so he had to determine where those might be by tracking hazardous waste permits on file—finding oil storage tanks in the basement, sources of perchloroethane from dry cleaning establishments, and so forth.

“We came cross several drums of cleaning chemicals at the former Vista Hotel,” Touw remembers, “and the excavators turned up a white vapor wafting up.” Suddenly, the site had to be evacuated, though, fortunately, says Touw, it only turned out to be casks of laundry detergent.

Air and water monitoring

The federal EPA Region II began taking samples of air and dust a few days after the terrorist attacks occurred. It also gathered data on drinking water, river water and sediments. So did the state Department of Environmental Conservation.

A challenge for local officials was interpreting environmental monitoring data from the various agencies—as different agencies were coming up with different levels and measuring for different contaminants. According to the Region, it “used established standards where they were available and modified guidelines” to produce benchmarks. For example, it used PELs (Permissible Exposure Limits) for lead, certain volatile organic compounds (VOCs), and asbestos. Otherwise it put together ad hoc benchmarks, for substances like dioxin and PCBs.



Air monitor near a debris pile.
Photo: EPA

EPA was available to the city for the health data it needed, but its samples were supplemented by samples taken by other agencies. Among the many agencies with responsibility for protecting health, safety and the environment there was the city Department of Health, the state and various federal agencies, including FEMA, as well as EPA. But their sampling methodology and evaluation criteria were different.

Various agencies were sampling for different toxicants, and, to make matters more complicated, there were different toxicological criteria among different agencies. For some compounds, there were no standards at all. There had never been an air quality standard for asbestos, for example, since it is normally regarded as an indoor air pollutant. And there were different standards for asbestos under various agencies. OSHA had one standard; EPA had a more protective standard. But neither of these was health-based.

“Since the first day of the World Trade Center disaster, the rapid and continued coordination among federal, state and local environmental, occupational and health agencies around such monitoring and risk communication has probably been unprecedented,” Jessica Leighton, the city DOH’s assistant commissioner for environmental risk assessment testified in a State assembly hearing held in late November.

Contaminants were not uniformly dispersed—so that one could find high levels of certain pollutants in one area and not in another.

But risk assessment was one of the biggest challenges for the various agencies because it was so difficult to accurately pinpoint the hazards in this instance. Several factors made it particularly difficult. The first was that equipment to monitor the air was not in place on September 11th. That testing done in November and December may not have accurately portrayed the kinds of contaminants people were exposed to.

The Agency for Toxic Substances Disease Registry (ATSDR) of the Department of Health and Human Services (HHS), and the New York City Department of Health and Mental Hygiene, together collected air and dust samples from 30 residential buildings in November and December 2001 in lower Manhattan in an effort to gauge whether there were levels of contaminants in the dust to constitute a major hazard. But the agencies had to acknowledge that their conclusions might have been skewed because the dust they tested was already several months old.

“By November, outdoor dust contamination was likely reduced by wind, rain, and cleaning (city workers vacuumed the streets and sidewalks with HEPA trucks). Indoor settled surface dust may have been reduced if areas were cleaned before being sampled. Therefore, these results probably underestimate the levels of World Trade Center-related materials that were in lower Manhattan immediately after September 11,” they wrote.

Plus, the contaminants were not uniformly dispersed—so that one could find high levels of certain pollutants in one area and not in another. They were heterogeneous, random mixtures of everything in the buildings—plastics from furniture, mercury from lightbulbs, including exotic metals like vanadium from computer parts.



Setting up air monitors in New Jersey.
Photo: EPA

The ATSDR wrote, for example, “A review of the building sampling results from this investigation indicates that there is not a consistent spatial distribution pattern of asbestos, SVF, mineral components of concrete, and mineral components of wallboard in air and settled surface dust. This indicates that the materials are heterogeneously distributed.”

A key problem was that the teams of people and the tools for environmental monitoring were not in place to respond to an event like that which happened. Shockingly, even though the high particulate count from the building collapses was higher than New York City had ever experienced in its history, the tragic event *violated no pollution standards for particulate matter*.

That's because the air quality regulations were set up to measure particulate matter loadings over 24 hour periods, rather than intense, short term bursts. Yet such a high-particulate storm, even lasting several hours, "can produce significant adverse health impacts," wrote Eric Goldstein et. al. in the NRDC's paper, "The Environmental Impacts of the World Trade Center Attacks." Plus, these authors note, the same air standards did not adequately account for other health concerns arising from very fine particulate matter arising from the fires.

"We in the environmental health community are used to high probability events with low probability risks," says Paul Lioy, "the effects of ubiquitous, low level toxic substances, their probability of giving people cancer over a 70 year lifetime. We were not equipped to deal with a low probability event with high probability consequences."

Interior environments

A significant vacuum here was that the agencies didn't address the hazards right under people's noses—in interior spaces—as Rep. Jerrold Nadler (D-N.Y.), the congressman whose district includes the neighborhoods surrounding Ground Zero, would charge in congressional hearings months later.



Heavy dust accumulated in a store near the WTC site. Photo: EPA

The dust in people's apartments came up as an issue, early on, Touw says. "Within the first few days, someone at the Red Cross was worried about windows blown in with debris and dust," he says. "So someone asked, 'Steve, is EPA going to clean for people?' Typically, though, we don't clean people homes—unless there's a mercury spill or pesticides misapplied, although Superfund could under certain circumstances come in."

However, says Touw, had the city asked for this federal response within the first few days, it could have gotten 100 percent reimbursement. So he did ask the city, he says.

"If we had to do it all over again, we should have made sure it got done. It would have been a huge project, but [doing interior cleanings] would have been easier to do early on than after the fact."

Having asked Kelly McKinney, however, he says, the decision came back, “No, we were not going to be cleaning buildings, and this was to be the responsibility of building owners.’ Instead the city Department of Environmental Protection would address the dust on exteriors of buildings. “If there was a public complaint, the city could then address.”

“In hindsight,” says Touw, “I think we could have done a better job. If we had to do it all over again, we should have made sure it got done. It would have been a huge project, but [doing interior cleanings] would have been easier to do early on than after the fact.”

By law, though, it is a local decision, Touw reiterates. “Setting the record straight, though, we became the whipping boy for senators and congressmen, when it was up to the city to make the decision. Why did the city make that decision? There was a lot of political decision making in play. The city and state had the resources and equipment, but they just needed to pay overtime.”

It would take many months even for the experts to begin to assess the risks of the type of pollution event that occurred at the World Trade Center.

And when the anthrax crisis hit a few weeks later, government agencies would call on all resources at their disposal. For example, by October, some 58 Coast Guard Strike Team members managed by the National Strike Force Coordination Center in Elizabeth City, N.C., would deploy to the WTC Site, Washington, D.C., and Boca Raton, Fla., to assist other agencies with response as a result of terrorist attacks.

It would be the first time in the Coast Guard Strike Force’s history that they would be assisting in the mission of biohazard cleanup. EPA asked the Strike Force, specialists in emergency and chemical response to help with monitoring the air, overseeing contractors and washing stations in New York at Ground Zero and the Staten Island evidence collection site.

Unique challenges

Typically, OSCs go into hazardous situations needing to monitor for a particular toxic chemical or set of chemicals—as might be of concern in a hazardous truck spill on the highway. But this mode was not adopted.

“Our initial response wasn’t viewed as a hazmat response,” says Touw. “When you have something like gas venting or a tank car derailed with a hole in it and spilling, then you evacuate the area, and neutralize it to stop it.”

The pollution threat here was quite different. Here there were huge plumes of fumes and dust laced with unknown chemicals.

“In this situation, the problem was a huge volume of debris with small amounts of hazardous materials, as well as large plumes of smoke containing unknown byproducts of so many things—burning plastics, carpets, computer parts,” says Touw. It was difficult to say how much PCB or heavy-metal content might be present or “could be burned off,” he says.

What rescue workers and New Yorkers might be breathing as a result of the fallout at Ground Zero was only one of many concerns Touw was “tasked with.” Within several days EPA had dispatched ten special vacuum truck equipped with HEPA filters to clean dust off the streets of Lower Manhattan.

Also unique to this disaster for EPA's Touw was the vast range of environmental-oriented tasks needing to be addressed. Besides air and dust monitoring there was also:

- Setting up “washdown” stations for workers and for vehicles exiting the site;
- Collecting hazardous materials in the vicinity of the World Trade Center, within the dozen subfloors;
- Disposing of hazardous wastes, such as scrap metals that had to be staged while en route to various landfills or recycling companies, or drums and tanks that might be found;
- Monitoring storm water discharges to the Hudson River, everything from chemicals that leached to the bacterial contaminants from body parts;
- Securing respirators for the Department of Health.
- Working with the contractors on the debris removal, should there be any particularly hazardous wastes unearthed.

Touw and his team would erect what was called the “Taj Mahal,” the largest tent for workers ever built, a 31,000 square foot heated area where workers could wash off their hands and face and boots, shower, and get a hot meal. “It was a dome the size of a football field,” Touw recalls, a structure for which \$75 million was earmarked by FEMA, capable of serving 10,000 people per day, 24/7, for four months.

After it was built, of course, the dome would house respirators, booties, military tents, water for rehydrating equipment—and equipment for “disposal of all that stuff.” Early on, Touw remembers they were instructed not to call them “decontamination” stations.

Planning for this winterized ‘biosphere’ dome on the night of September 16th, Touw remembers, “We pulled an all-nighter.”

If Region II emergency personnel would be stretched, so would the agency as a whole, as former EPA Administrator Christie Whitman would argue in her testimony before the Senate Committee on Environment and Public Works September 24, 2002. EPA, she said, “responded to three national incidents” simultaneously: not just at the World Trade Center, the Pentagon and the Pennsylvania crash and would be responding to the anthrax attacks too.

September 11th was unprecedented in yet another way—perhaps for the first time, government coffers were laid wide open.

But EPA and other agencies were not stretched financially at all.

September 11th was unprecedented in yet another way—perhaps for the first time, government coffers were laid wide open, as the President and Congress enacted a \$40 billion emergency response package to help deal with the tragic events of September 11. The funding, according to the government, would “ensure that the U.S. had the resources to respond to and recover from the attacks and to protect national security.”

By early October, billions of dollars were released to assist in New York and the other impacted areas—and more funding was headed to both disaster sites as well as a dozen agencies involved.



With \$2 billion, FEMA supported overall emergency assistance in New York and other affected jurisdictions. This went to pay the costs of such items as debris removal and emergency protective measures, as well as individual and family assistance, search and rescue, and other disaster assistance efforts.

WTC site.
Photo: Earl Dotter

In this authorization, the President gave FEMA “an unprecedented level of assistance.” For example, the President gave FEMA enough funding to pay for 100 percent of public assistance activities in New York and at the Pentagon (typically, states pay 25 percent of these costs). This would mark “the first time FEMA covered the entire share of public assistance expenses,” according to the text of an October 3 White House fact sheet on responding to the September 11 terrorist attacks.

That filtered down to city agencies as well.

“For the first time I can remember, we didn’t have any resource constraints,” recalls the city DOH’s McKinney. “I could call anyone and say, I need this or that; there was no problem with contracting processes.”

Conclusions

Certainly, because of the complexity of the issues confronting the city, there was a need to call in federal officials from many agencies. With its new authorization, FEMA assigned 11 Federal agencies to respond to the attack. Among the Federal agencies it tasked to respond were the Department of Defense, Army Corps of Engineers, USDA Forest Service, Public Health Service, and EPA.

Environmental health essentially fell under two agencies: EPA and Health and Human Services (HHS). According to the White House fact sheet on the agencies’ mandates, EPA, which had in the first two weeks provided 200 of its personnel, dealt with: “monitoring the disaster sites to ensure that rescue workers and the public are not facing dangerous environmental risks”; “cleaning and washing down of all workers, equipment, and resources employed during the rescue stage; “sampling air, water, and asbestos as well as conducting radiological and dust monitoring”; “vacuuming and cleaning sidewalks, streets, and buildings in the World Trade Center area.”

HHS had made available “about 100 doctors, nurses and other health care professionals to staff two treatment stations to provide round-the-clock medical care to rescue and recovery workers toiling in the aftermath of the attack in New York City.” The Centers for Disease Control and Prevention (CDC) had also sent people to assist the New York City Health Department in tending to patient care and whatever was needed from a health standpoint.

But when it came to managing the environmental health side of the situation, some say there should have been an even stronger federal management role.

“It was clear that at the local level New York officials weren’t ready to respond to something of this complexity.”

“FEMA should have been designated to oversee the catastrophe,” says Paul Lioy, a professor of environmental and community medicine at the University of Dentistry and Medicine at Rutgers University in New Jersey. “But this agency was used to mud, floods, and natural disasters—not dust, like one would have in an industrial accident.”

It was a mistake to have local agencies manage the environmental aspects of the crisis, according to Lioy, because “the local agencies were not prepared to respond to a disaster of this scale.”



WTC site.
Photo: Earl Dotter

Some agree. “It was clear that at the local level New York officials weren’t ready to respond to something of this complexity,” says Alison Geyh, of John Hopkins.

Other experts would later write that much of the attention would be focused on vast physical hazards and challenges posed by cleaning up “the pile” rather than the complex, unprecedented range of environmental hazards facing rescuers, emergency responders and residents in the surrounding community.

“Initial sampling at Ground Zero was hampered by the general chaos and uncertainty, the ongoing fire, and by treatment of Ground Zero as a crime scene by federal agencies,” writes Lioy. And air sampling, for example, to check for contaminants was substantially delayed, by about a week.

“Considering the total surprise and resulting chaos, the response by various organizations was reasonable. However, it is also apparent that no agency was prepared to deal with the devastation of this magnitude in a major urban area,” he adds.

“At Ground Zero, they discounted the environmental hazards, even though this was no ordinary building collapse,” says Westchester County’s Anthony Sutton. “As the operation wore on, and time was no longer a factor, people could have stepped back and made it a priority. Before they sent in workers for a protracted amount of time, they should have very early on, established baseline pulmonary function tests on workers to detect any obstructions to their lungs.”

Months later, Rep. Jerrold Nadler, the Congressman representing "Ground Zero" and the surrounding areas, argued that the Environmental Protection Agency (EPA) should have taken the lead role. EPA, he charged, "has failed in its mission to "protect human health and to safeguard the natural environment . . ." by not exercising its full authority to test and clean all indoor spaces where people live and work. As such, the EPA has created a full-scale crisis of public confidence."

His contention was that there was a huge gap in the agencies' assessments due to potentially adverse health effects from indoor air pollution caused by very fine particulates seeping through fabrics and tiny building crevices.

Even though many of EPA Regions responded within the first few days, EPA's Region II office turned some away, including Region 8, which had particular expertise in asbestos.

He argued that the EPA had the clear authority to respond to the release of hazardous substances that may present an imminent and substantial danger to public health under the "National Contingency Plan," authorized by the Comprehensive Environmental Response, Compensation, and Liability Act.

Other critics have also called attention to the fact that even though many of EPA Regions responded within the first few days, EPA's Region II office turned some away, including Region 8, which had particular expertise in asbestos.

A veteran hazardous waste expert at the EPA, Cate Jenkins charged that the EPA used a much more sensitive method for settled dust sampling which found a "positive" result for hazardous materials in its own building, yet turned away the services of the other region, which could have applied the same expertise more widely helping the people of New York determine the hazards of the dust in their homes and offices.

Likewise, others say officials in New York viewed hazards differently than at the Pentagon. Places where workers were decontaminated were called "decon" at the Pentagon, officials say, but "washdown" stations at Ground Zero.

Despite such critiques, many environmental health specialists called in to advise in the crisis expressed praise for the first responders in New York.

"Agencies without having a plan did a terrific job," says Alison Geyh, an assistant professor at John Hopkins University who came in to help with assessing risks for rescue workers.

However, the city was not clear about which agency was overseeing the health and safety aspects, wrote Donald Elisburg and John Moran of the National Institute of Environmental Health Sciences.

“This situation created a very complex safety and health setting in which there was confusion as to which occupational safety and health standards were applicable, whether enforcement agencies indeed had enforcement jurisdiction, and at what point in time the WTC Disaster Site safety and Health Plan would become effective and operative,” they wrote.

Environmental health: a low priority?

A primary problem early on, say officials who were there, was confusion about what kind of event it was: Was it a disaster scene or a public health emergency; was it a crime scene?

The nation was reeling from more than an environmental health disaster. Whether the event constituted an “act of war” or an “act of international terrorism,” as pundits argued that day, it was the worst assault on America’s soil in its history—a fact that made the scope of the environmental and public health challenges posed by the implosion of the buildings and continuing fires seem, at least for the moment, secondary.

It was in fact the worst international terrorist event in our nation’s history, involving four separate but coordinated air hijackings and the killing of more than 3000 people, including citizens of not just our nation but 78 different countries.

This event was not only a human disaster but a crime scene as well, making for special dynamics, because law enforcement agencies at all levels of government were involved. “Instead of the usual crowd control concerns of keeping on-lookers at a distance, these agencies were tasked with the arrest of anyone who did not follow instructions,” wrote Paul W. O’Brien for the University of Colorado. “This raised the level of urgency and seriousness to a much higher level than in many natural disasters.” (9)

So environmental and health officials and technicians had trouble getting clearance to get onto the site, say experts like Alison Geyh and Bruce Lippy. “The authority for Ground Zero changed ten times during the first few weeks before it became the purview of the Department of Design and Construction,” says Geyh.

“It was such a scramble early on, we just said ‘whoa,’ take a deep breath,’” says Lippy, who adds that the sheer effort of getting badged and approved was a challenge. “It was impossibly large, with 23 different entrances onto the site. There was the OEM orange badge, then getting through the FEMA documentation.”

Since authority for the site rested with uniformed services, the Fire Department as incident commander, and police as enforcers of crowd control and evidence collection, it was hard for people doing environmental health enforcement to do their jobs effectively.

Environmental health officials like McKinney say they faced difficulties enforcing health rules with fire department personnel. McKinney says he would flash his Health Department badge to warn them of the need to make sure that food being handled safely, or the need for garbage to be properly disposed of. Among the health problems were the presence of dust and waste everywhere, the greater potential for rats, he says.

Environmental health may have been overlooked in the early months because the media, by and large, focused on other, “bigger” themes related to terrorism, everything from the cultural and geopolitical issues surrounding the attacks—Islam and the Middle East—the immediate economic dislocation...

“But reactions varied from ‘okay’ to real anger,” says McKinney. “Cops are cops—they’re not used to that [being told what to do].”

Another main reason why environmental health may have been overlooked in the early months was that the media, by and large, focused on other, “bigger” themes related to terrorism, everything from the cultural and geopolitical issues surrounding the attacks—Islam and the Middle East—the immediate economic dislocation; the search and rescue operations; the process of criminal investigations and the suspects. In a paper on the patterns of media coverage of the terrorist attacks, Christine Rodrigue, (1) a geographer at California State University, identifies ten main themes—and environment is not one of them.

That’s surprising considering, at least on the local level, the physical environment around the World Trade Center had changed drastically—from giant piles of rubble strewn everywhere to trucks hauling debris to smoke and soot to empty buildings and displaced residents to the fact that it was difficult to breathe.

“For more than a year a profound split troubled New York journalists on how to cover and play this unfamiliar new threat,” according to a memo from the Society of Environmental Journalists on the issue. “One set of journalists was accused of being ‘alarmists’ pushing fear to raise ratings; another was accused of being lapdogs placidly accepting EPA reassurances. Good information was hard to find.”



Cleanup at Ground Zero.
Photo: Earl Dotter

At first, the media least concerned with reporting on the environmental impacts were the local New York City papers, as journalist Susan Stranahan points out in her piece, “Air of Uncertainty” in the *American Journalism Review*. (11)

“Not since the 1979 accident at the Three Mile Island nuclear power plant in Pennsylvania have reporters and government officials faced such an Everest-size task of communicating complex information to a frightened public,” wrote Stranahan. “All too often after 9/11, however, journalists simply accepted the party line from city, state and federal officials. With a few notable exceptions, the New York media took months to zero in on a story that touched the lives of thousands.”

The first to report on the environmental health aspects of the disaster were not *The New York Times* but national outlets such as Newsweek, MSNBC, CNN, and others. The first local reporter

to flag discrepancies between official statements about health risks and independent studies showing otherwise, however, was *Daily News* reporter Juan Gonzalez, who would write a book about it, entitled “Fallout: The Environmental Consequences of the World Trade Center Collapse” (New Press, 2002).

While health and environmental issues should have been recognized as big issues, their full impacts didn’t emerge until later. Agencies really didn’t begin to manage these issues until about four weeks after the events took place in New York City. For example, disaster analyst Claire Rubin speaks of “the many problems and issues connected with the public management of health and environmental issues that began to emerge about four weeks after the attacks took place.”

But all these health effects were coming out as people already returning. Unfortunately, the “all clear” had already been given. What agency ever backpedals after it’s made a decision?

While there was plenty of “crisis intervention” for mental health in those early days and weeks following 9/11, there wasn’t a corresponding attention to environmental health.

Yet city officials readily admit that they recognized it as being, besides a catastrophe on many levels, also an environmental disaster. Immediately, New York City was calling upon public health experts at universities and in government for expertise on the environmental hazards at the Ground Zero site and the neighboring area. The range of hazards was astounding, from asbestos to heavy metals to polycyclic aromatic hydrocarbons (PAH’s) arising from the fires.

Some would say later that environmental health was not accorded enough attention. While there was plenty of “crisis intervention” for mental health in those early days and weeks following 9/11 for people in the neighborhood, says health advocate Claire Barnett, director of the group Healthy Schools Network, there wasn’t a corresponding attention to environmental health. “Stuyvesant High School should never have re-opened until the World Trade Center fires were out and the building completely cleaned and tested,” says Barnett, contributor to a book, *Schools of Ground Zero*, (12) published by Healthy Schools Network and the American Public Health Association. “That’s what smart downtown law firms did. But they also had the money to make the smart choices.”

The local situation post 9/11 pointed up a larger national environmental issue, adds Barnett. “No one thinks of or plans for schools as children’s workplaces; there is no system at any level of government to protect children from environmental hazards.”

Among the schools at Ground Zero, Stuyvesant took pains to test and clean its premises, after many contentious meetings between parents and school officials. But to this day, many schools in the area remain untested and uncleaned, say neighborhood advocates.

Stuyvesant parents and teachers were particularly concerned because their school stood directly across from a continuous stream of the trucks unloading hazardous World Trade Center debris en route to the landfill. The parent association hired its own consultant to test the air, who found it unacceptable.

On more than half the days between October 9th and February 2002, according to the consultant's report, the level of respirable particulates, or dust, inside the school exceeded EPA guidelines for children; high levels of lead had also been found. (13)

Asked about the decision to site the barge there, DOH's Kelly McKinney admits, "It wasn't ideal" and that it triggered a lot of public protest "from an emotional standpoint." Nevertheless, he adds, "looking at the challenge of moving 1.3 million tons of debris, sifting it and cleaning it, I don't know how they did what they did. The job was done with low injuries and no fatalities."

"Where else could we site it [the barge]?" says McKinney. "No I wouldn't have wanted to live across from it, but we had guys inspecting to make sure tarps covered the trucks and there was a tremendous amount of data collected on the dust."

However, the World Trade Center dust never quite settled in the public's mind. "Environmental health issues were the ones that emerged and became more relevant and intense as time went on," McKinney concedes.

Neighborhood resident Kim Todd survived the blast but lived to endure a shot of ailments connected to breathing the air and dust. Her case is unusual in that she breathed the high particulate counts of September 11 and 12 found in evidence that day. But how many others that weren't evacuated also suffered? And in retrospect, did the city give the all-clear to return prematurely?

"I am extremely reluctant to criticize what anyone did in the first few days," says Phil Landrigan. It was an unprecedented disaster for which the city could never have been prepared." However, the leadership over the next few weeks and months for health and safety should have addressed public and occupational health far better than it did, he argued.

Like many, he acknowledges that the responses to the attacks on the World Trade Center involved, as he put it, "extraordinary heroism."

"They demonstrated the ability of the American health care system and of individual public health workers to respond magnificently to an unprecedented crisis," wrote Landrigan, remarks in a paper, "The Aftermath of September 11th- Lessons Learned for Public Health."

Nevertheless, the environmental response, he argues, "underscored deep problems in the nation's public health infrastructure."

Footnotes:

1) An early number given 10,000 -- Early number given by U.S. Rep. Jim Moran of the possible dead in the World Trade Center. An estimated 30,000 to 50,000 might have been in or near the center's twin towers when they were hit by hijacked jetliners Tuesday morning. How many of them escaped before the 110-story buildings collapsed soon after remained unknown.

http://www.greatdreams.com/trade_day2.htm>>

(2)http://www.cdc.gov/niosh/sbw/sessions_1_2/pdfs/bernard.pdf

(3)

<http://216.239.57.104/search?q=cache:0F5eOkMTJFIJ:www.epa.gov/airnow/presentations2002/werner.pdf+%22world+trade+center%22+%2B+standard+disaster&hl=en&ie=UTF-8>

(4)

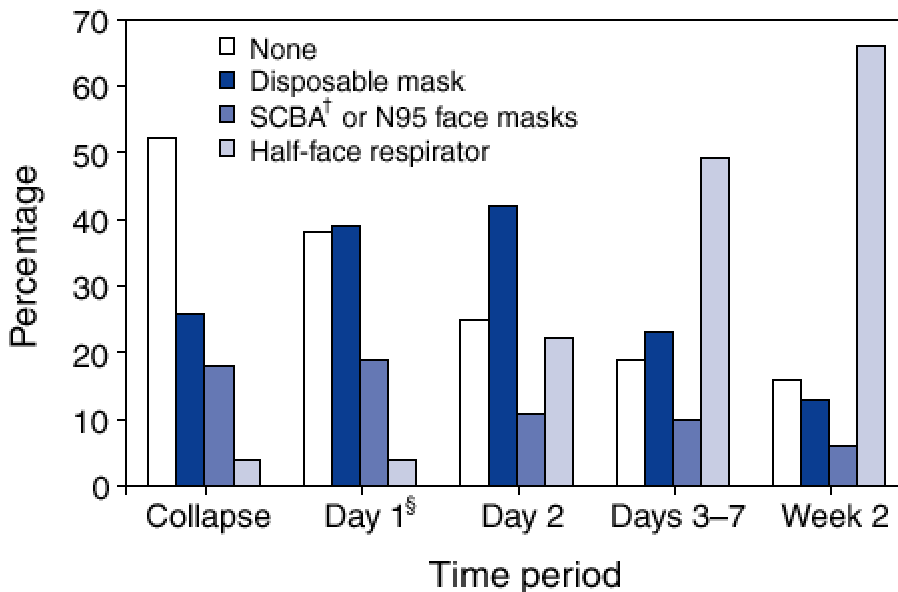
<http://www.colorado.edu/hazards/qr/qr140/qr140.html>

(5) <http://www.ochalthinfo.com/newsletters/whatsup/2001/01-11.pdf>

(6) EPA Response to 9-11, Pentagon Environmental Monitoring Summary
<http://www.epa.gov/wtc/pentagon-air-sampling.htm>

- (7) Klitzman, Susan, and Freudenberg, Nicholas, "Implications of the World Trade Center Attack for the Public Health and Health Care Infrastructures," *American Journal of Public Health*. 2003; 93: 400-406
- (8) U.S. State Department, <http://usinfo.state.gov/topical/pol/terror/01100304.htm> October 3, 2001
- (9) Paul W. O'Brien, Institutional Warning Response Following the September 11th World Trade Center Attack, Natural Hazards Research and Applications Information Center University of Colorado <http://www.colorado.edu/hazards/qr/qr150/qr150.html>
- (10) Rodrigue, Christine, "Patterns of Media Coverage of the Terrorist Attacks on the United States in September of 2001." <http://www.nyu.edu/icis/Recovery/pubs/rodrigue-update01.pdf>
- (11) Stranahan, Susan, "Air of Uncertainty," *American Journalism Review* <http://www.ajr.org/Article.asp?id=2746>
- (12) *Schools of Ground Zero: Early Lesson Learned in Children's Environmental Health*, by Sarah Bartlett and John Patrarca, a joint publication of the American Public Health Association and Healthy Schools Network, 2002.
- (13) *Schools of Ground Zero*, p. 28.

FIGURE. Percentage of firefighters who used respiratory protection during and following the World Trade Center attacks, by time period and type of respirator — New York City, September 2001*



* n=319.

† Self-contained breathing apparatus.

§ Includes firefighters who arrived on day 1 but following the collapse.

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm51SPa2.htm>

Part 3. Was environmental health protected on 9/11? Whistleblowers, watchdogs and wee little people

In the aftermath of the World Trade Center disaster, hundreds of thousands of New Yorkers fled lower Manhattan. Once they had absorbed the shock of the tragedy, and began to return to their homes and offices, however, they were urged to try to return to normal.



Satellite image of Manhattan, NY—Sept 15, 2001.
Photo: Space Imaging

On September 15th, a day after the mayor had urged people to return to work, Kim Todd returned to her home after leaving briefly. Like many people with pets, she returned for her dog Rigsby, whom she took down to Ground Zero to hug and pet rescue workers, and to perform, raising money for search and rescue.

Despite the upheavals, she settled into life again in a totally shaken neighborhood filled with police in full riot gear and a tank parked permanently—until the beginning of November—outside her door “There were loud speakers all over the neighborhood playing patriotic sounds—which made you know someone was there,” she recalls.

Another new reality: Her apartment, like thousands of other New Yorkers’, was covered in dust. “Every week they’d discover something new about the dust or how to get rid of it,” she says. First it was wet rags, then it was vacuuming, then it was no vacuuming, then it was HEPA filters, but what we discovered was that dust can usually be removed, but this didn’t dust off.” The fine, pink or grey talc that stuck to everything proved difficult to remove, she found, but Todd and Rigsby stayed in her apartment because, like others, she didn’t have the means to do otherwise. With no grocery stores, her friends made her care packages or sent canned food, and she coped with lack of permanent phone service until January.

“They kept a lot from people because they didn’t want to scare us—but we were distrustful because either there was stuff they weren’t telling us or they didn’t know.”

It wasn’t long before the cough that gave her intense shortness of breath would be described as “World Trade Center cough,” because doctors seemed to be able to diagnose it as nothing else. “The city kept saying there was nothing to worry about health-wise, but there were problems and everybody knew it,” says Todd. After months, her dog died of a stroke brought on by any number of causes—“probably just the stress of being down here.”

Nearly two years later, Todd still gets terrible headaches, continues to have a raspy throat with a little bit of asthma that she never had before, but she is glad that she is sleeping more than she used to, which was no more than an hour at a time. “We all have post traumatic stress,” says Todd, who still gets flashbacks of bodies falling to the ground, or people walking out of buildings with their skin peeled back. “But now everyone is moving on. I have a chance to start anew. I’m still on a cane, but hopefully by next fall I won’t be.”

Does Todd have hard feelings toward the city? “No, they did the best they could under the circumstances,” she says. But she regrets health officials kept them in the dark about dangers. “They kept a lot from people because they didn’t want to scare us—but we were distrustful because either there was stuff they weren’t telling us or they didn’t know.” She regrets not hearing about serious contaminants like mercury and lead until too late.

Reassuring residents

When the attack on the WTC caused the buildings to begin collapsing, federal, state and local officials all began monitoring the air to check the dust and smoke for dangerous substances, as this report describes. But just how good was the environmental health information that agencies accrued and gave to people after the terrorist attacks?

Within a few weeks after the incident, with the WTC still in a raging fire, many people living in the neighborhoods surrounding Ground Zero were fearful about asbestos and other toxins that might be in the smoke and air they were breathing. Asbestos, fiberglass, benzene, dioxins, Freon, PCBs and heavy metals were just a few of the toxicants residents were concerned about. Some even debated whether the whole area should be designated a Superfund site, based on the volume of debris and particulates in the air. (1) Months later, the levels of asbestos in dust would be described as higher than that in Libby, Montana, a federal Superfund site.

EPA’s then-Administrator Christie Whitman said, “Given the scope of the tragedy from last week, I am glad to reassure the people of New York and Washington, D.C., that their air is safe to breathe and their water is safe to drink.”

Yet health and environmental officials had quickly allayed initial concerns about the safety of the air around the World Trade Center site, as mentioned. On September 16, only several days after the events, Mayor Rudy Giuliani and EPA’s then-administrator Christie Whitman gave residents and office workers the “all clear” sign that the environment was safe.

The day of the disaster, within hours, as the last chapter details, local, state and federal environmental officials began testing the air, water and dust. After several days, the federal EPA proclaimed the environment basically “safe,” at least outside the immediately affected area.

EPA’s Christie Whitman said, “Given the scope of the tragedy from last week, I am glad to reassure the people of New York and Washington, D.C., that their air is safe to breathe and their water is safe to drink.” New York Mayor Rudolph Giuliani has said that tests of air and water have turned up “no significant problems.”

Nevertheless, word was leaking out that conditions in and around the site were still hazardous. Some were convinced that the area contained potent hazards.

"It's not safe, and what's proof of this is that medical clinics have diagnosed people with occupational asthma already and other respiratory problems, people that not only work down there but live down there," Joel Kupferman, executive director of the New York Environmental Law and Justice Project, told CNN. (2)

Some officials monitoring air, water and soil admitted that pollutants did "climb to hazardous levels" on occasion. "The further you get from the site, the data does not demonstrate significant risks to people," William J. Muszynski, acting regional administrator of the Environmental Protection Agency told a reporter for CNN. "I think you can sensationalize -- I mean, I think you can look at the numbers, a spike, and believe that number is overly significant," the EPA's Muszynski said. "Most of what we do is based on long-term exposure."

Tests of soil in the immediate vicinity of the World Trade Center did show elevated levels of asbestos in one of four soil and debris samples, Chris Paulitz of EPA told MSNBC. "So officials plan to keep up the monitoring," he said, to ensure that concentrations do not reach high enough levels to cause respiratory ills. Rain was washing away some of the heavy particulates in the air, he said.

Understandably, in this climate of confusion, the city Department of Health was besieged by phone calls from residents and others. In its own communications, the DOH was not quite so definite as EPA's Whitman had been. While encouraging people to move back to their homes and restore their lives to normalcy, the city urged citizens to take precautions with dust and ash, Sandra Mullin of the city's Department of Health told *MSNBC Online*, "to protect people with underlying respiratory problems." The agency advises "simple housekeeping tips like removing shoes, keeping windows closed and changing filters in air conditioners." (3)

While the official word was that ordinary citizens were at no real risk from being in contact with the ash and dust remains of the trade towers, others thought far more precautions should be taken.

"Hazards are being swept under the rug in the interests of restoring calm. You have every reason to be concerned when they don't give you the data."

From the beginning, Kupferman, for example, was a strong advocate for more public right to know and greater precaution. "Hazards are being swept under the rug in the interests of restoring calm," claimed Joel Kupferman, a lawyer with the nonprofit Environmental Law and Justice Project, who faults the city for failing to make public its measurements of toxins in the air and dust. "You have every reason to be concerned when they don't give you the data," he charged. (3)

At the time, of course, there was no dearth of air quality monitoring in and around the site. The U.S. EPA was monitoring the area's outdoor air for asbestos and particulate matter and for levels of asbestos in the dust. And the state Department of Environmental Conservation was also adding to that effort with further measurements of fine particulates.

But controversy ensued over whether government scientists were testing for precisely the right chemicals, or, whether they were deliberately withholding information from the public.

Kupferman filed a Freedom of Information Act request to get data about the EPA's monitoring of pollutants, but both his group and the Queens-based Center for the Biology of Natural Systems, were unsuccessful in getting environmental monitoring data from government agencies. "They even declined our Freedom of Information Act request," Kupferman told MSNBC.

Some environmental experts expressed concern that other substances besides asbestos were of greater concern shortly after the attacks. Asbestosis, the scarring of the lung from exposure to asbestos fibers, according to biologist Peter deFur, who teaches at the Center for Environmental Studies at Virginia Commonwealth University in Richmond, takes prolonged exposure to asbestos.

"The larger problems are heavy metals and organic compounds," deFur told MSNBC on Sept. 26, two weeks after the catastrophic attacks. Mercury, lead, copper, nickel, cadmium, chromium, dioxin and polychlorinated biphenyls [PCBs] could all be present in the air because of the materials found in everyday office equipment, from copiers and printers to computers and electrical equipment. (3)

Several organizations began doing their own independent tests, unsatisfied with government reports and an inability to get monitoring data from government agencies. Kupferman took samples of dust and debris and found not just asbestos at levels (3 percent) similar to those found by EPA—4.5 percent, or 4.5 times the safe level—but also high levels (15 percent) of fiberglass, the substance used to replace it, and other types of mineral fiber (65 percent), MSNBC reported.

Although fiberglass is not as dangerous as asbestos, pulmonologist Neil Schachter, medical director of respiratory care at Mount Sinai Hospital in New York City, told MSNBC, "We do not as yet know what the health consequences of breathing fiberglass fibers are." It is known that direct contact with fiberglass fibers can irritate the skin, nose and throat, however, and according to the American Lung Association, "There is a possibility that these fibers cause permanent damage to the lungs or airways, or increase the likelihood of developing lung cancer."

Newsweek also reported on a new study by independent researchers who suggested that more asbestos was released than EPA tests were revealing, in a finer-particle, more hazardous form. In a *Newsweek* web exclusive October 5, 2001, David France described the study by the Virginia firm HP environmental and its findings that the force of the building collapse shattered asbestos into fibers too small to be picked up by standard EPA testing methods. "This stuff was just crushed, just pulverized," lead author Hugh Granger told the magazine. "As it turns out, when we now measure and look for these very small fibers in the air and buildings, we find them, and we find them in uniquely elevated concentrations." (4)

By October 5th, tens of thousands of workers had returned to offices on Wall Street and the Financial District, while some 12,000 of the 20,000 displaced residents were now back in their homes.

Juan Gonzalez also reported a story on the wide array of toxic chemicals in the dust -- in an Oct. 26, 2001, front-page column, with a tabloid cover that screamed "A Toxic Nightmare at a Disaster Site." His story detailed the EPA tests' findings of notable quantities of hazardous benzene, as well as dioxin levels discharged from a sewer pipe into the Hudson River that were more than five times higher than any previously recorded in New York Harbor. (5)

By October 5th, *Newsweek* reported, tens of thousands of workers had returned to offices on Wall Street and the Financial District, while some 12,000 of the 20,000 displaced residents were now back in their homes. (4)

This had pulmonary health experts increasingly worried. Dr. Alan Fein, chief of pulmonary and



critical-care medicine at North Shore-Long Island Jewish Health System, said he had treated five patients with what he calls "World Trade Center syndrome," respiratory distress stemming from relatively brief exposures of a day or two near the collapsed buildings. And he expects there will be more. "We probably will find out a lot more about the health aspects of asbestos from this event, unfortunately," he says.

Oct 4, 2001—An aerial view of the recovery operation in lower Manhattan.
Photo: Andrea Booher/FEMA News Photo

Many critics close to the issue argued that EPA health professionals didn't had enough data to be able to advise the public and first responders on potential hazards, and therefore misled the public with respect to those hazards. Daily News columnist Juan Gonzalez charged that EPA and state and local officials had concealed the dangers of the dust to reassure a jittery public facing a terrorist assault, and to reopen the stock market to avoid deeper damage to the U.S. economy.

"EPA officials and fire-fighting experts were well aware, from previous studies of a handful of spectacular and tragic fires in hotels, commercial buildings and downtown areas, that such blazes are capable of releasing a witch's brew of some of the most toxic substances known—including mercury, benzene, lead, chlorinated hydrocarbons and dioxins. Despite this prior knowledge, federal officials rushed to dismiss or understate potential health dangers to the public and rescue workers at the site during those first few days," wrote Gonzalez in his book "Fallout: The Environmental Consequences of the World Trade Center Collapse" (*The New Press*). (6)

Whatever it was in the air, alone or in combination with other pollutants, the dust was starting to sicken people in the community. The first shot was probably heard in October or November when the chemically sensitive community began emailing its members about evidence of greater asthma and respiratory ills, and warning people of the need to guard against "environmentally induced injuries and autoimmune diseases" that might be triggered.

“There are no scientific papers detailing the creation, dispersion, and long and short-term effects of a tragedy of this magnitude,” wrote the Coalition, “911 ASH” (*Air Safety Hazards*). “Asbestos and fiberglass are clearly present, as is soot; fine particles known to increase the incidence and symptoms of asthma, heart disease, and other medical conditions. What are rarely mentioned are the myriad toxins in the smoke itself. Since no one knows exactly what this particular combination of plastics, PVC, office furniture, carpet, Freon, natural gas, jet fuel, metals, asbestos, glass, fiberglass, and other components of the office buildings do when incinerated, it is impossible to fully test for toxic exposures.” (7)

A study in the *Mortality and Morbidity Report* a year later would summarize the results of a telephone survey conducted among Manhattan residents 5-9 weeks following the attacks showing that among the 13% of adult respondents with asthma, 27% reported experiencing more severe asthma symptoms after September 11.

"People feel like they are not getting a clear picture from the authorities."

Concerns over potential health risks surrounding exposure to World Trade Center smoke and dust didn't really erupt until weeks after the disaster, some time after EPA and Mayor Giuliani had made their pronouncements of safety. Sometime in October 2001, community newspapers began reporting local disgruntlement and confusion, and even some fierce objections to the government's handling:

“Many of the people closest to the World Trade Center relief efforts are not satisfied with how government agencies are handling the cleanup. There appear to be a lot of gaps. In particular, residents, workers and advocates have expressed concern about the lack of coordination, and the lack of information, on environmental health issues at Ground Zero and the neighborhoods around it,” wrote Michael Burger, the author of an article in *Gotham Gazette* - October 22, 2001. (8)

"People feel like they are not getting a clear picture from the authorities," Foster Maer, a downtown resident and member of the Warren-Murray Street Task Force told the *Gazette*. "To the extent that information is being released people are not getting it. And there is probably a lot of information not even being released."

While neighborhoods were expressing concerns, discussions were ongoing in the medical community. Mt. Sinai Hospital's Department of Community and Preventive Medicine jumped into the fray, educating its patients and the public on the medical implications of the disaster. Robin Solomon and Margaret Pastuszko said they'd received many calls, especially from the media, about air pollution.

“We have also received 200 - 300 inquiries about the possibility of a bio-terrorist attack and about the advisability of stockpiling antibiotics or vaccines to counteract such an attack,” they reported. “Our message here has been to reassure people that the City of New York is keenly aware of the possibility of bioterrorism and that they and investigators from the Centers for Disease Control are monitoring the situation extremely closely. To date, there is no evidence of an attack.”

“No one was sick in the beginning of the Gulf War, but as time went on they developed illnesses. I can only imagine that the same thing could happen here.”

Physicians also started seeing an increased number of patients with respiratory ailments - coughing, wheezing, sore throats, bronchitis, new cases of asthma or its exacerbation, reported the National Library of Medicine. It also reported that, at the same time, elevated levels of mercury have been found in the blood of several police officers that had been assigned to the site “In the wake of the September 11 attack on the World Trade Center, the potential for environmental health risks to residents and workers in lower Manhattan has been a topic of considerable concern among both the public and the scientific community,” wrote the New York Academy of Sciences several months after the events.

Its community forum held Oct. 18, for example, featured Dr. Paolo Toniolo, of NYU School of Medicine, who discussed the complex context of this disaster, a densely populated urban area living in conditions of high stress, “including emotional stress, displacement and economic hardships, and future uncertainties; the possibility of exposure to a wide variety of pollutants; and the limited information so far on exposure.”

There was also a fierce critique of the absence of safeguards for workers. Tom Barnett, a Manhattan police officer and a trustee of the city’s Patrolman’s Benevolent Association, who was on the scene of the wreckage in the beginning, says that many police, fire and other rescue workers went unprotected in the first few days after the catastrophe. He fears that many could develop illnesses as a result.

“There were too many to count down there,” said Barnett, who added, “No one was sick in the beginning of the Gulf War, but as time went on they developed illnesses. I can only imagine that the same thing could happen here.” (9)

Within a few weeks, addressing what the group felt to be an absence of leadership from OSHA, The New York Committee for Occupational Safety and Health published several fact sheets for workers and others engaged in the cleanup and restoration effort detailing a host of hazards from toxic ash to blood-borne disease risks.

Meanwhile, the Ground Zero Elected Officials Task Force called for a single agency to monitor environmental safety and to respond to concerns of nearby residents and businesses. The task force was especially concerned about the dust on rooftops and buildings, as well as the collateral dust spread by trucks transporting the debris.

Reassurances repeated



Mayor Giuliani and Administrator Whitman.
Photo: EPA

Nevertheless, at the top levels of government, officials continued to insist there were no real long-term hazards to the general public. Several weeks later, a reporter for CNN.com wrote, “The smoke may be unpleasant, city, state and federal health officials agree—but it's not a health threat.” The mayor was reported saying: “It may be uncomfortable and it may be offensive—and it is in many ways—but the reality is, it is not dangerous,” New York Mayor Rudy Giuliani said. (10)

Meanwhile, city Health Commissioner Neal Cohen repeated assurances that the air and dust posed no “significant adverse health risks” but that people should follow precautions to guard against throat and eye irritation. Levels of particulate matter were “below levels of concern.”

Joel Miele, senior commissioner of the city’s Department of Environmental Protection, too, insisted “We have bent over backwards to be as conservative as possible in our testing...and there is no significant danger to anyone’s health.”

“The officials,” according to an article in Newsday, “scoffed at a report in Friday’s *Daily News* that said levels of poisonous chemicals and metals in the environment at and around ‘ground zero’ exceed federal levels.” (11)

Cohen continued to say that there might be an occasional “uptick” in elevated readings but that these “returned to acceptable levels very, very quickly.”

Mayor-elect Michael Bloomberg faced the quandary of whether to allow residents’ dust-contaminated cars to be returned to them.

Yet for months while the World Trade Center burned and workers carried away debris from the site, workers and residents complained of medical problems – everything from minor nosebleeds to racking coughs as a result of exposure to smoke and dust. The health problems people were experiencing seemed to fly in the face of the government’s assertions that everything was okay.

By December, *The Wall Street Journal* – the daily newspaper hardly given to alarmism on environmental hazards – ran a front page story describing the growing fears of the public vis a vis the area’s air quality and indoor dust problems. “In the weeks since September 11, government agencies testing the air near ground zero have reached a nearly unanimous conclusion: There is no significant long-term health risk for area workers and residents. Yet hundreds, and possibly

thousands, of people who live, work or go to school in lower Manhattan have experience persistent sore throats and hacking coughs. Area physicians report a surge in new or worsened asthma cases: How to explain the contradiction?"

Even though the government had given the 'all clear' that the homes and offices of Lower Manhattan and the financial district were safe to re-occupy, many questions remained. In December, Mayor-elect Michael Bloomberg faced the quandary of whether to allow residents' dust-contaminated cars to be returned to them. At first, the city health commissioner had said they could be potentially contaminated and therefore unsafe to return to their owners. Then the agency flip-flopped and told car owners they could pick them up at the landfill, giving them specific instructions on HEPA vacuuming them.

Critics surface

Behind the scenes, some environment experts were criticizing the agencies' handling of the hazards.

In a series of scathing memos critical of EPA's response to 9-11, Cate Jenkins, a senior chemist in the EPA's hazardous waste division, and whistleblower, argued that asbestos levels in lower Manhattan were high enough to declare the entire area a Superfund site. Jenkins maintained that the level of asbestos contamination up to seven blocks away from Ground Zero was comparable to or higher than that found at the recently designated Superfund site in Libby, MT.

In an earlier December memo, Jenkins first criticized EPA for effectively "waiving" federal asbestos guidelines and endorsing more lenient cleanup methods. (12) She wrote that EPA's own tests showed that more than a third of the agency's bulk dust samples for asbestos were higher than 1 percent—the agency's 'action level' under federal Clean Air Act standards.

She argued that the 1% level was only to be used to identify materials as containing asbestos, not as a standard of safety. That law, she argued, requires elaborate and strict procedures for asbestos removal to be followed and the use of trained asbestos cleanup companies.

"We haven't waived any regulations," Walter Mugdan told a reporter for the Daily News, The agency's regional counsel insisted Jenkins was misreading the law. "She [Jenkins] assumes that they [the regulations] apply to the cleaning up of dust in residential or office buildings in lower Manhattan.

"When they were written, they were never intended to apply to something like a terrorist act. These regulations apply to owners and operators of a facility who are carrying out a demolition or renovation. They were never contemplated to apply to someone cleaning an apartment," Mugdan said.

Jenkins, meanwhile, argued that the agencies may have ignored some potent health hazards. "I think people really are at risk here, because unless there is thorough and effective cleanup, people are at risk of breathing asbestos fibers, and once they get in their lungs, they never go away." (13)

Because microscopic asbestos fibers are so small, they can hang in the air and, when inhaled, penetrate and irritate the lung, she says. And studies have shown that breathing in airborne

asbestos fibers can lead to a variety of ills—mesothelioma, or cancer of the lining of the lung, lung cancer and asbestosis, a thickening and scarring of the lungs.

Jenkins compared dust samples drawn from New York apartments in an independent study done by the Ground Zero Task Force with similar samples drawn from houses in Libby, Montana, a small town designated last December as a Superfund site after a surrounding vermiculite mine released deadly asbestos fibers into the air, allegedly killing hundreds. As a Superfund site, Libby was automatically added to the EPA's National Priority List of toxic sites to be monitored and cleaned.

Although there weren't many samples, says Jenkins, these results suggested that lower Manhattan could be eligible for listing as a Superfund site, the criterion being that its contamination, like Libby's, poses "an imminent and substantial endangerment to public health."

For example, one sample of dust from a windowsill in an apartment on Warren Street, four blocks away from Ground Zero, had 79,000 fibers per square centimeter of asbestos, some 22 times the highest level found in house dust in the town of Libby, which has just 5,000 residents, she notes.

Considering that Manhattan is so densely populated, and other pollutants are an added concern, its residents may be arguably at greater risk than officials admit, Jenkins believes.

Others agreed. Joel Kupferman, director of the New York Environmental Law and Justice Project, requested that the EPA and state of New York designate the World Trade Center site as well as neighborhoods within a five to six block radius as a federal Superfund site "to enable federal dollars to be spent on proper monitoring, inspection and cleanup." The advantage of this, Kupferman says, is to guarantee that regulations are enforced to ensure thorough removal of toxic residues.

Paul Bartlett, an environmental scientist with the Center for the Biology of Natural Systems, agreed that some sort of "emergency designation" for the whole area could help ensure health and safety, and perhaps institute an effective health-tracking system to follow the area's public health. As it is now, he charges, "the kind of environmental monitoring we're getting from EPA and other agencies doesn't adequately measure contaminants."

Earlier in November, local politicians had begun to weigh in. Rep. Jerrold Nadler (D-N.Y.), whose district encompassed the neighborhoods in Ground Zero, had earlier formed the Ground Zero Elected Officials Task Force, with Sen. Hillary Clinton, to coordinate the efforts of all the government representatives from the area. This Task Force had heard "countless complaints from citizens who suffered from adverse health effects, and/or lacked the resources necessary to test and clean their apartments and buildings properly," Nadler said later. As mentioned, Nadler felt that the city had neglected the issue of indoor cleanup. When it commissioned a study to look at indoor pollution and the effect of the dust on people living downtown, it found extremely high levels of asbestos in two buildings near Ground Zero.

The Task Force also thought that the environmental health efforts were too scattered among agencies, and asked that there be one city agency designated to oversee everything having to do with debris cleanup in lower Manhattan."

“If I knew then what I know now, I would never have sent my child back [to school].”

By January, the smoldering fires where the Twin Towers once stood were finally quelled. But if one looked beyond the crater to the hundreds of apartments and offices in the surrounding neighborhoods of the Financial District, Battery Park City, Tribeca and Chinatown, there were thousands of people still worried whether their homes and workplaces had been adequately cleaned up from the thousands of tons of dust thrown off by the buildings' collapse — and wondering if it was safe to stay.

There were some 30,000 residents and as many as 300,000 were working in the area before the terror attacks, according to figures from the city and the New York Development Corporation. But those numbers had greatly fallen.

Independent scientists, doctors and public health advocates had been coming forward to express concern that some health risks were being overlooked or not fully publicized.

At the time, for example, *The Gotham Gazette* reported, Dr. Paul Liroy of the University of Dentistry and Medicine of New Jersey revealed that he had found levels of lead in dust samples from around the World Trade Center disaster area that could be hazardous. At a public meeting at New York University, Dr. Liroy said that the lead needed to be removed from homes and buildings, especially where children lived, and advised homeowners to apply to the Federal Emergency Management Agency for aid, and renters to approach their building managers.

Dr. Jacqueline Moline of Mt. Sinai Medical Center described fiberglass, one of the main constituents in air and dust samples at Ground Zero, as a suspected carcinogen and a significant irritant of the eyes, nose and throat. The reporter quoted Carrie Loewenherz, an industrial hygienist with the New York Committee for Occupational Health and Safety, that there are no state or federal standards for levels of fiberglass or for fiberglass cleanup. "There are guidelines [for cleanup] by the American Conference of Governmental Industrial Hygienists, but OSHA [the Occupational Safety and Health Administration] regulates it as if it were regular, household dust," she told the newspaper.

Schools reopen

Among the people of the neighborhoods surrounding Ground Zero there was confusion and widespread public mistrust. This was particularly the case among parents of area school children, many of whom came home complaining of respiratory illnesses, headaches and nosebleeds. There were five high schools and elementary schools downtown close enough to the Towers to have been evacuated on the day of the terror attacks (and seven total near the towers); yet one of these, Stuyvesant High School, a highly visible, prestigious place, re-opened within a month later.

“If I knew then what I know now, I would never have sent my child back,” says Marilena Christodoulou, the president of the Parents’ Association for Stuyvesant High School, and the mother of a student there. “The government was reckless [in response to health hazards] starting all the way from Washington down to Mayor Giuliani,” says Christodoulou, “because in trying to trying force a return to normalcy too quickly, I fear a lot of people will suffer.”

The day that the school reopened, in a powerful statement of New York City's resilience in response to the horrific terrorist events, all was not normal, she says. Soon after, she says, there were long lines of kids complaining of illnesses outside the nurse's office. "My son Peter waited for two periods on line, so long were the lines," she recalls.

According to Christodoulou, and press reports at the time, about 100 students and teachers had complained of mysterious headaches, nosebleeds and nasal stuffiness since returning to the school Oct. 9 after a month in temporary quarters. Other students were also suffering from ailments they didn't report to the school nurse, Christodoulou says. By January, she says, about a third of teachers were still suffering various physical ailments while many students were also complaining of various ill effects.

A major factor, Christodoulou believes, was the presence outside the school of trucks carrying hazardous debris to the barge used to transport the wastes to the landfill.

"The schools should have been closed and residents should not have been allowed to go back," she concludes. There was so little faith in health authorities that the local schools Board of Education hired its own consultants to assess safety of schools. After many complaints, carpets, vents and interiors underwent heavy testing and cleaning.

But it wasn't just school parents who were divided by suspicion, mistrust and anger. Some residents were distrustful enough of official health assurances that they moved out for months. Their absence added to the sudden displacement of workers and residents in the area. In early October, the New York City Economic Development Corporation estimated that the terrorist attacks displaced 80,000 to 100,000 of the 300,000 people who worked in lower Manhattan.

From the very moment that the terrorist attacks began, the health of great numbers of people began to be potentially affected, according to federal health documents. (13) Injured people began flocking to local hospitals within minutes of the attack and peaked two to three hours later.

"Among 790 injured survivors treated within 48 hours, approximately 50% received care within 7 hours of the attack, most for inhalation or ocular injuries; 18% were hospitalized."

The high particulate count could have been of grave health importance to some populations, leading to heart attacks and asthma worsening, according to Lung Chi Chen, of New York University Department of Environmental Medicine.

Local mistrust

Months before, many had decided to move out, some on the advice of doctors. A former resident of Battery Park, Steve Swaney, for example, moved because of his wife's respiratory ailments and his own anxieties. "You can't tell me or people in this neighborhood that there's nothing in the air," he said at the time. "Anybody with a kid still living down here is nuts." So few children were left in the complex that the day care center was on the verge of closing.

Congressman Nadler charged that EPA had “created a full-scale crisis of public confidence.”

Another New Yorker, Diane Miller, who up until recently lived in a co-op apartment two blocks away from the disaster site, delayed returning to her home in the financial district. She considered herself one of the fortunate, having friends who could loan her places to stay while the dust settled. An asthmatic and mother of an infant boy, she said, “I don’t need to have an official designation of whether it’s safe or not. If I’m in a place with bad air and I’m coughing all the time, I leave,” said Miller.

Yet many thousands returned to their homes and offices, because the official word was that the environment was totally safe.

Four months after the disaster, noted the Congressional Research Service, in a report entitled *Federal Disaster Policies after Terrorist Strikes*, “residents and workers in the area continued to report respiratory difficulties and related problems,” begging the question of whether public agencies failed to protect the health of the general public and first responders. (14)

Some critics charge that the EPA failed to protect the public and first responders “by issuing inconsistent and misleading statements about the safety of air quality in the vicinity of the WTC,” the CRS report notes. Indeed, some information on hazards was delayed for weeks, making it less useful to people concerned.

Among the most outspoken critics was Rep. Jerrold Nadler (D-N.Y.), who charged that EPA and other agencies had failed in their public health mission.

“It has now been exactly five months since the terrorist attacks and, unfortunately, the people in Lower Manhattan still do not know whether or not it is safe to live and work in the area,” Nadler testified before the Senate Committee on Environment and Public Works/ Subcommittee on Clean Air, Wetlands, and Climate Change on February 11, 2002, in hearings covering the “Impact of the September 11th Attack on Air Quality and Public Health in Lower Manhattan.” (15)

The Environmental Protection Agency (EPA) has failed in its mission to “protect human health and to safeguard the natural environment,” the congressman charged, “by not exercising its full authority to test and clean all indoor spaces where people live and work.” In a “white paper” on the issue, the congressman said that the agency had “created a full-scale crisis of public confidence. (16)

But don’t people in a community have a right to be protected, or told if they may be potentially adversely affected by release of hazardous chemicals? Don’t emergency personnel need immediate information so they can protect themselves from short or long-term health impacts? And doesn’t the general public need health risk information so that they can make choices about personal protection, or leave the area if need be?

Even those who head into danger, mindful of occupational hazards, in time want access to timely and accurate information about health and safety.

According to the CRS report, the answers to all these questions are *yes*. “Because information about health risks can be provided only by environmental and public health experts, government officials with expertise arguably have a responsibility to make such information available to the affected public.”

That’s the case for emergency responders too. Even those head into danger, mindful of occupational hazards, in time want access to timely and accurate information about health and safety. Studies show that lack of knowledge about the hazards at the World Trade Center contributed to the rescue workers’ stresses.(1)

“Responders respond and they go to work right away, with or without information,” a panelist at a conference on protecting emergency responders told conferees. “What kills rescue responders is the unknown.” Hundreds of firefighters, police and other first responders were lost at the World Trade Center because they weren’t made aware of deadly hazards. Another law-enforcement panelist remarked, “With cops, it’s a real simple mantra: ‘If you don’t give me information, I will give you a rumor.’ And rumors will spread faster than information.” (2)

Evidence of health effects

As the events unfolded and as doctors and hospitals began seeing health effects in their patients, they began to see a need to mount studies. Unfortunately, though, many of these researchers had to delay their studies until funding could be secured, CRS notes. So there may have been missed opportunities for data, as a result.

According to Congressman Nadler, the agencies’ lack of attention to indoor hazards loomed as a very real problem. Nadler claimed that it was absurd that the EPA claimed publicly that it didn’t have the legal authority to do necessary environmental tests and remediation in response to the World Trade Center attacks when it has clearly done residential work throughout the country, said Congressman Nadler. “Why is New York being treated differently?”

His congressional hearings spurred an avalanche of new information about the Towers’ collapse.

- The EPA’s Ombudsman’s office launched an investigation into the actions and response of the agency around the World Trade Center.
- And the St. Louis Dispatch, in an article February 9, 2002, unleashed a bombshell when it reported that the U.S. Geological Survey had a "team testing the particulate dust covering the immediate area [of the World Trade Center. They] found that some of the dust was as caustic as liquid drain cleaner and alerted all government agencies involved in the emergency response." The article reported that USGS officials are unclear as to why the EPA didn’t release the information. http://pubs.usgs.gov/fs/fs-0050-02/fs-050-02_508.pdf

“With its world-class laboratories and sensors that can detect minerals on a distant planet, the Denver-based team was already making arrangements to get NASA's infrared sensors and aircraft over ground zero as the EPA and the U.S. Public Health Service requested its help,” wrote Schneider. “Responding to requests from the White House science office, the NASA team flew over Manhattan four times between Sept. 16 and Sept. 23, while USGS scientists collected samples of the dust from 35 locations below.”

The towers' collapse spewed enormous amounts of potentially lethal, extremely tiny particles of crushed and incinerated computers, glass, furniture and other building debris, unrecognized by the EPA's air monitoring.

So why didn't EPA make that information known to the public, Schneider asked?

In February, too, scientists at the University of California, Davis, reported that dust and fumes from the smoldering rubble exposed lower Manhattan residents to some of the highest levels of air pollution ever recorded. Thomas Cahill, a physicist and expert on air pollution who led the study, said his laboratory analyses of air samples showed that the towers' collapse spewed enormous amounts of potentially lethal, extremely tiny particles of crushed and incinerated computers, glass, furniture and other building debris unrecognized by the EPA's air monitoring.

At the time, the researchers claimed months worth of government readings on post-Sept. 11 air pollutants' risks were woefully incomplete.

The atmospheric research group called DELTA, short for Detection and Evaluation of Long-range Transport of Aerosols, researches weather patterns and aerosols, the tiniest bits of pollution dispersed into air from a wide variety of sources. From Oct. 2 through mid-December, the group's rooftop air monitor clicked away on top of the Department of Energy office one mile north of Ground Zero.

Their equipment was registering unprecedented clouds of "very fine particles," according to UC Davis researcher Kevin Perry, recently hired by the University of Utah to work as an assistant professor in the meteorology department. That, Perry said, should be a red flag in the evaluation of rescue workers' and residents' exposure levels. There is no definitive proof of the ill health effects from breathing gunk smaller than the PM2.5 standard.

"Everybody in our field knows ultra-fines are very likely to be hazardous to our health," Perry told a reporter for the Salt Lake Tribune. (17) "The EPA can't regulate such things until they have proof in hand or they'll get hammered in court."

Perry said the importance of his group's very-fine pollution findings was not to prove the EPA lied or set out to deceive. Rather, it was useful to show that officials failed to take into account how much emergency workers, spending large amounts of time on-site, may have been breathing in known carcinogens.

Perry said EPA's PM2.5 measurements of the area mirrored DELTA's pollution readings near the site: "But a more thorough sampling protocol would catch all the ultra-fines his group found and offer a clearer picture of worker exposure and, possibly, what is behind the mysterious cough."

Criticisms of the EPA

On the heels of these revelations, Rep. Jerrold Nadler charged that EPA had failed to protect the public health. He remarked that "New York was at the center of one of the most calamitous events in American history and the EPA has essentially walked away."

Rather than serving to inform the public on dangers to their health, Nadler claimed, EPA was continuously misinforming the public as to the safety of the conditions in downtown New York.

Although EPA Region II counsel Walter Mugdan, admitted that "...a significant number of the WTC bulk dust samples that we have analyzed did have more than one-percent asbestos," the agency repeatedly claimed the opposite. He quoted an October 3, 2001 EPA memo claiming that the agency had found no "significant health risk" stating, "the vast majority of EPA and OSHA samples of air and dust analyzed for asbestos have been at levels that pose no significant health risk to residents and workers returning to their homes or area businesses." Yet, charged Nadler, "This was one of the most often quoted EPA statements, and it continues to be echoed to this day."

Nadler called on the federal EPA, which denied jurisdiction over indoor air hazards, to test and assure the safety of New York residences.

That went against EPA's previously stated policy. Joe Martyak, spokesman for EPA in Administrator Christie Whitman's office, said that already "there's an enormous amount of money provided by the Presidential disaster declaration." As to whether that money could be used to help in cleanup of homes and offices, however, Martyak notes, "indoor air is beyond EPA's jurisdiction." (13)

Nadler said that under the National Contingency Plan (NCP) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), EPA had authority to act on indoor air—and charged that EPA had not fully utilized the NCP in acting around Lower Manhattan. At the same time, he blasted EPA for on the one hand, by advising residents to clean dust- and debris-laden apartments with a wet mop or wet rag while it hired professional asbestos contractors with more stringent standards to clean its own local offices were cleaned by an asbestos contractor.

The Congressman also took aim at the various agencies passing health responsibilities around like some sort of shell game. "EPA allowed the City of New York to handle indoor air quality," he testified before Assembly Speaker Sheldon Silver, saying EPA should have responded more quickly to concerns about indoor air.

"The City, in turn, delegated indoor air matters (testing and remediation) to individual building owners for indoor public spaces, and to tenants for indoor private spaces. The City provided little enforcement with respect to indoor public spaces and no enforcement with respect to indoor private spaces, and gave improper advice regarding hazardous materials testing and remediation," Nadler testified.

“As a result of the EPA's misleading statements about air quality and because it allowed the City of New York to handle matters related to indoor environments,” he continued, “there has been inadequate hazardous materials testing and remediation inside residential and commercial buildings downtown—putting the public health at risk.” (18)

Flip-flopping on cars

For awhile, EPA started to exert its strength on environmental health, stepping in to butt heads with the city Department of Health over the issue of Ground Zero dust-contaminated cars. Hundreds of cars extracted from the parking garages around the collapsed buildings, the agency said, should now to be destroyed because of asbestos contamination, according to Greg Gittrich, writing for the New York Daily News, (5/14/02). (19)

The New York City Department of Health told *Newsweek* it would honor the EPA's request, but that its decision to release the autos was based on careful review of numerous environmental tests.

“The data indicates that there is no significant risk to human health,” Kelly McKinney, the NYC Department of Health's Associate Commissioner for Environmental Health was quoted saying. “The fundamental way we work is to gather as much data as we can, to look at that data, compare it with whatever standards are available, compare it with our knowledge of the issues, and that's what we did with this issue as we have with every World Trade Center issue.”

Earlier, *Newsweek* reported, New York's then-health commissioner Neal Cohen in December said that “the cars' engines and bodies were contaminated with dangerous World Trade Center debris and would not be returned. Two months later, after owners of the vehicles sued the city to get them back, city officials reversed themselves and said they would release the autos—along with written instructions on how to clean them.” (20)

But this little feud between agencies was just one instance of many confusing inconsistencies in how the agencies applied environmental and health standards at the World Trade Center. Such jurisdictional conflicts and quandaries abound, according to Cate Jenkins, author of “A Documentary Basis for Litigation,” a compilation of hundreds of decisions and statements by agencies regarding the environmental health issues confronted at Ground Zero.

If EPA was cleaning asbestos-contaminated dusts in Libby, Montana, why did the agency not think it should address the issue of indoor contamination around the World Trade Center? If both the New York City Health Department and the EPA were to condemn asbestos-contaminated cars as unsafe, why were dust-covered buildings and apartments considered safe? If OSHA's chief said that all dust should be “presumed to contain asbestos” were so many tests thought to be useful for residents? If children or the elderly, or those with respiratory problems were deemed at special risk from respiratory hazards, according to the city Health Department, why were pregnant women considered not at risk? If FEMA grants were given to professionally clean buildings, why was it okay for residents to do it on their own?

“It's like that line from the film *Casablanca*. ‘Round up the usual suspects!’ But the usual suspects weren't the problem.”

Indeed, as many reporters, like Andrew Schneider, a staff writer with *The St. Louis Post Dispatch*, wrote, people living on the lower part of the island felt abandoned by the city, fed so many bits of conflicting information by different agencies.

“The agencies really didn’t know what they were doing,” says Kim Todd. “They seemed to not have a clue.” Residents, she said, did their own tests and came up with substances that the agencies couldn’t even identify, let alone certify as safe, says Todd. “I found something called kaolin. What is that?”

While asbestos removal seemed to be a highly technical procedure, and workers were warned of asbestosis, why was it suddenly safe for downtown residents, Todd wondered. “My uncle was an asbestos worker and died of it. No one will know until ten years from now how sick we’ll be.”

Tammy Meltzer, leader of the tenants' association at Gateway Plaza on the edge of Ground Zero, told *The Boston Globe* that city-hired cleaners had removed dust from the residences in October and November 2001 before occupants were allowed to return. "But the fires were still burning in late December," Meltzer told the *Globe*. "Nobody came back to do any retesting. We don't know if our apartments are safe."

Deeper criticisms

Today, Thomas Cahill, co-author of the DELTA study faults EPA for failing to realize the serious repercussions of the World Trade Center on the urban environment.

“They did a marvelous job at first, racing in with great bravery into the smoldering pile,” says Cahill. “But the agencies involved should have realized that this was not a typical building collapse, especially with the huge volume of building materials on the pile continuously burning.”

It wasn’t so much that they didn’t do things right as that they did things too much by the book, failing to get beyond the standard measurements under the clean air act, and failing to recognize how extraordinary this ‘pollution event’ was.

“It’s like that line from the film *Casablanca*. ‘Round up the usual suspects!’ But the usual suspects weren’t the problem, Cahill says.

In a survey done in May 2002 regarding public health issues following September 11, residents of lower Manhattan expressed more concern about air quality than they did about another terrorist attack.

Cahill believes that the volume of dust, the high particulate counts, the fineness of the dust, and most importantly, the final aerosols in the anaerobic fire under ‘the pile’ that caused the most danger to the public in releasing unprecedented levels of carcinogens.

“Everyone knew it,” says Cahill. “It was burning insulation, plastics, in a plume that burned above the pile but also on numerous occasions rolled across the city.”

On the eve of the second anniversary of September 11, Dr. Cahill released the conclusions of his study of the fine aerosols sent up into the air during the catastrophic World Trade Center collapse and fires. In an article in the scientific journal *Aerosol Science and Technology* Cahill wrote that breathing the air around Ground Zero was much like that around a chemical factory. “The WTC plume resembled in many ways those seen from municipal waste incinerators and high temperatures processes in coal fired power plants,” he wrote.

Instead of the ordinary measurements they took, the agencies should have had more imagination to realize the health threats, Cahill says, adding, “and more common sense.”

People who moved away temporarily, he says, listening to their inner instincts, were the smart ones, adds Cahill.

Marjorie J. Clarke, a Scientist-in-Residence at Lehman College, and expert on waste incineration, argues that the synergistic mixtures of pollutants also need to be considered for the next terrorist event. “The environmental agencies at all levels need to become more expert in evaluating the health and environmental effects of various mixtures of pollutants,” she testified to the Senate Environment Committee. She argues that EPA should rewrite its air quality standards to assess the impacts of various combinations of pollutants. This way, she says, there will be standards in place “next time to know how to protect the public health.”

While scientists debated the fine points of particulates and their impacts on human health, New Yorkers simply registered great worries in widely publicized polls and surveys.

In a survey done by the Mellman Group in May 2002 regarding public health issues following September 11, residents of lower Manhattan expressed more concern about air quality than they did about another terrorist attack. Seventy-four percent (74%) said air pollution was “a big problem” in their community, with 29% saying it is a “very big” problem, according to the market research company, whose poll was based on a survey of 500 residents living south of Canal Street in Lower Manhattan.

Indeed, in a very real sense, dust still did lurk in school carpet, office air vents, and crevices of cars and trucks and people’s apartments—even after many previous cleanups.

At the same time, new grassroots community organizations formed to respond to local health concerns. But the 9/11 Environmental Action Group, calls EPA’s recent efforts to clean apartments “a complete joke.”

Kimberly Flynn, outreach coordinator for the group, says “First there was the buildup, which took forever, then there was the speedup, as they rushed to finish up apartments for the few that knew about it.” As a result, she says, less than 15 percent of eligible residences were actually served. “There’s still concern about the long term effects and residual dust,” adds Flynn, who still signs people up at block parties for the group’s information.

Unfortunately, EPA’s last-ditch efforts to “assuage public concern,” as they put it, says Flynn, have done the opposite. “If their communications to the public had been clear and truthful from the beginning, New Yorkers are very savvy and would have understood the need to weigh relative risks,” says Flynn. “Can you really lie to people from one of the most sophisticated cities on the planet?”

It's hard to undo the negative effects of its early pronouncements of safety, she says. "That set off a 'domino effect.' With that utterance from Christie Whitman, the Administrator saying 'all's safe' then DOH was able to say 'residents are just experiencing temporary irritation' and FEMA didn't have to pay for health-related expenses, and insurance companies were able to absolve themselves of responsibility."

But their claim that there would be no short term or long-term consequences has already been proved wrong, argued Marjorie Clarke. We can already see the evidence.

Meanwhile, advocates for rescue workers feared the worst. "The preliminary results are frightening: fire fighters, police officers and abatement workers are presenting with onset of asthma, chronic cough and respiratory irritation, and even GERD (acid reflux) as a result of the exposures they suffered after the collapse," wrote Arthur Scheuerman Battalion Chief FDNY Retired, Former Deputy Chief Instructor Nassau County Fire Training Academy. "The true effects, on rescue workers, as well as residents and workers may not become known for decades.

"What is certain is that the toxicity of the site is far in excess of what was first disclosed," wrote Scheuerman, "It is yet another vision of what the Trade Towers have become."

Conclusion

The twin towers left a long, dark shadow. And their shadow gets longer every day.



It was sad enough that so many thousands of innocent lives were lost in the September 11th terrorist attacks. What is also saddening is that, a full two years after these events, so many survivors are still suffering health repercussions, many as a result of pollution-related causes.

The remnants of the WTC towers stand in silent testimony.
Photo: Andrea Booher/FEMA News Photo

Women pregnant and living in the proverbial shadow of those events have been found to give birth to smaller babies. Workers on the pile are still suffering a host of ailments. And stalwart residents of Lower Manhattan—though many have left—still complain of respiratory and other ills. Some, like Kim Todd, speak with unease about the illnesses that plagued rescue dogs and other dogs living in the area. One famous rescue dog, "Bear," died. "A lot of dogs have gotten cancer and died," she adds, recalling her own dog Rigsby's death.

Pregnant women exposed to air pollution from the World Trade Center attacks, according to a preliminary study released in August 2003, apparently face double the risk of delivering babies up to a half-pound smaller than babies born to women not thus exposed. And other studies that have come out in the time since the terrorist attacks show that workers continue to suffer pulmonary problems.

Hazards thought to be negligible at one time, in some quarters, are turning out to have long-lasting effects. The New York City Fire Department reported that a year since the terrorist attacks, several hundred members were still suffering from respiratory problems. Even firefighters who answered the call to assist in the recovery effort from across the country returned home with lasting pulmonary and other medical problems.

“We’re still hearing about people being sick,” says Anthony Sutton, director of emergency management in Westchester County, N.Y., just north of the city. “There are a lot of stories.”

“We probably would not still be discussing many of the issues [still being raised] had a vigorous and proactive risk communication strategy been implemented following 9/11.”

Ohio Senator George V. Voinovich, at a hearing on the EPA and FEMA response to September 11, expressed outrage when the Ohio Task Force of the Urban Search and Rescue teams told him how badly afflicted firefighters were. “I am outraged that no one seems to be managing the effort to provide information and health care to these workers,” said Sen. Voinovich. “The Captain of the Ohio Task Force told me last week that if I could figure out who was in charge of disseminating health data then I should be President!” (22)

Kelly McKinney defends his Department of Health, saying that it brought in as much expertise as it could. “The range and magnitude of technical expertise brought to bear on health and safety issues at Ground Zero was unprecedented, and I believe, fully sufficient to the task.”

However, he admits that “we probably would not still be discussing many of the issues [still being raised] had a vigorous and proactive risk communication strategy been implemented following 9/11.”

Officials acted like technicians, “talking too much with each other and not enough with everyone else,” he says. “We acted like research scientists with our heads buried in the data discussing technical details among ourselves instead of talking, and listening, to the concerned public. We did not immediately speak to the real health effects that workers, residents and others were experiencing. We were probably more arrogant than was justified by the data and over confident about what the results meant. We practiced good science but bad humility, and bad empathy and bad communications.”

“Having said all that would I change our basic recommendations and conclusions about these issues? Probably not.”

Survivors of the environmental health ‘fallout’ in New York argue that the agencies’ claims that the pollution episodes in New York won’t produce short or long term effects have already been proven wrong.

“Much of the concern has died down,” says Jenna Orkin, on the steering committee of the 9/11 Environmental Action Group in New York, “but you still hear lots of cases—children coming down with new onset asthma, restrictive airway diseases or weird ailments like a kid who was exposed to dust that got a spinal illness. Whether there will be more cancers is everyone’s worry, but I’d like to be wrong.”

So far, *The New York Times* reported in August 2003, researchers haven’t turned up cases of “significant harm” to those who breathed the air around ground zero, even though it contained increased levels of benzene, lead, mercury, PCB’s, asbestos and fiberglass. The newspaper cites the one preliminary study which found a slight but significant increase in the percentage of smaller than usual infants born to pregnant women who were at or near the site around the time of the attack.

But studies are far from over—about 70 health studies are now underway of workers and residents – and even dogs -- touched by the environment at Ground Zero.

The city recently launched its health registry to determine if such ailments continue to persist—or if other long-term ailments have cropped up. This is a source of anger in the Ground Zero neighborhoods because residents argue that a registry started two years after the fact won’t be accurate. There is some early data, however. Early on, in October 2001, the NYC Department of Health and CDC conducted a door to door survey of residents of Battery Park City and two other areas near the attack site and found that almost 40 percent of those sampled showed post-traumatic symptoms, while 50 percent of those sampled were still experiencing symptoms to be expected from smoke inhalation and from the still burning fires. (23)

Meanwhile, however, a recent poll of downtown residents shows that health ailments related to September 11th remain. According to Blum and Weprin, 30 percent of residents responding who lived Downtown before 9/11 said someone in their household suffers from coughing, respiratory problems, or some other ailment which they believed to have been caused by the World Trade Center debris. As for new residents, 25 percent answered yes to this question.

The health toll for workers is, of course, much worse. In New York City, the terrorist attacks have triggered a flood of legal claims by workers against the city, according to a report released by City Comptroller Bill Thompson in June 2003. Firefighter claims against the city increased more than 20-fold last year due to the World Trade Center disaster.

Where only 171 members of the uniformed services sued the city in the prior year, in the fiscal year 2002, the number of lawsuits ballooned to 1,194. By far, most of the lawsuits were filed by firefighters, many of whom sought compensation from the city for illnesses suffered after work at the World Trade Center site. “Because of the time that was spent over at Ground Zero and the work that was done, there are a number of people that are saying they are suffering, whether it’s respiratory problems or other problems, as an after-effect of the work that was done there and what they felt was inadequate equipment that didn’t protect them fully,” said Thompson. (24)

Dr. Kerry Kelly, chief medical officer of the New York City Fire Department testified before the Senate Environment and Public Works committee that firefighters were severely disabled by their service at Ground Zero. Although 90 percent of the force were afflicted by cough within the first few days, as many as 500 may still have persistent respiratory disabilities. “Clearly, our recovery did not end with the closing of the site,” he testified.

At the same hearing, Ohio Senator George V. Voinovich voiced his dismay that the country's stewards of environmental health let workers and neighborhood residents down. Beyond his outrage over the health effects on firefighters, Voinovich said he was equally upset that the EPA gave premature reassurances regarding health risks and exposure to the workers and the residents around the World Trade Center.

"Knowing what we know now, the statements from EPA last fall were inaccurate and ambiguous at best," said Voinovich. "What is important today is that people exposed last year receive clear guidance from the federal government as to their long-term health risks. Their doctors need to know what to look for and what to expect... We cannot afford to allow misleading statements about air quality to be made in the future."

Post script

Journalist Juan Gonzalez writes that the government officials who made early blanket assurances



Paper blew from the towers and surfaced on the plaza.

Photo: Paul Olivier

of safety made a "grave mistake," and argues that "their continued defense of those assurances in the face of widespread public skepticism" is inexcusable.

When asked, Police Captain Terrence Revella doesn't feel that there was any attempt to mislead people but admits, "Saying there was no hazard to people—that was a little much."

So far, though, few officials are willing to publicly acknowledge some of their blunders.

However, the much-publicized final report of Environmental Protection Agency's inspector general (25), in an investigation into official statements about air quality after the collapse of the World Trade Center, has now found that White House officials instructed the agency to downplay and reassure the public in the first few days after the attack. The report says the agency "did not have sufficient data and analyses" to make a "blanket statement" when it announced seven days after the attack that the air around ground zero was safe to breathe. " The report cites other competing considerations, such "reopening Wall Street" and "national security," as reasons for the spin.

The final report by EPA's Office of the Inspector General (OIG), released August 21, states, among other criticisms, that the White House reviewed and even changed EPA statements about public health risks to make them sound less alarming. The report charges that the White House Council on Environmental Quality influenced "the information EPA communicated to the public through its early press releases when it convinced EPA to add reassuring statement and delete cautionary ones."

It also concluded that EPA presented "an overriding message that there was no significant threat to human health" even though there was cause for caution. "When EPA made a September 18 announcement that the air was 'safe' to breathe, it did not have sufficient data and analyses to make such a blanket statement," said the OIG, adding that the agency lacked data on other

pollutants, such as particulates and chemicals like PCBs, and had samples of dust showing that 25 percent contained asbestos, a potent carcinogen.

According to the report, on the morning of Sept. 12, EPA former Administrator Christie Whitman issued a memo stating, "All statement to the media should be cleared through the NSC (National Security Council) in the White House before they are released." A contact person at the Council on Environmental Quality was named to vet all press releases.

The Inspector General's 165-page report compares EPA's own drafts of press releases to their final versions after having been vetted by the White House. Here are some examples:

- Although EPA's position has been that WTC residents should obtain a professional cleaning, the final press release" deleted this information and instructed them to refer to the city's Department of Health instructions instead.
- Although EPA had wanted to give specific warnings for "sensitive populations"—i.e. asthmatics, parents of young children, the elderly, etc.—those warnings were also removed.
- One press release that would have said "recent samples of dust gathered by OSHA show higher levels of asbestos in EPA tests" was changed to state "samples confirm previous reports that ambient air quality meets OSHA [Occupational Safety and Health Administration] standards and consequently is not a cause for public concern."
- In another draft, the language would have said asbestos levels in some areas were two to three times higher than national was changed to "slightly above the 1 percent trigger for defining asbestos material."
- A draft that would have said initial tests failed to turn up dangers instead added the statement: "Our tests show that it is safe for New Yorkers to go back to work in New York's financial district."
- A statement warning of potential lead and asbestos exposure at Ground Zero was changed to state that while some contaminants had been found, "the general public should be very reassured by initial sampling."

EPA Acting Administrator Marianne Horinko told MSNBC news that the press releases and how they might have been changed ought to be balanced against an awareness of the dimensions of the challenge on 9/11. Coordinating communication among agencies was a "huge challenge for us," she says.

In the early days and weeks of the World Trade Center disaster, says Horinko, there was such chaos that mistakes were inevitably made. "Did we rush out (too soon) with data? On balance, I think we used our best professional judgment in an atmosphere where people were clamoring for answers." But the agency wasn't trying to deceive the public, she claims. (26)

In the future, Horinko told NEHA, there will certainly be efforts to make sure people are not reassured wrongly and that health risks are accurately described.

In the Inspector General's report, Tinsley tempers her criticism with a recognition of the unprecedented challenges of the agency and the bravery and dedication of its employees. "This report, initiated by the OIG early in 2002, found that EPA staff did a commendable job reacting to the unprecedented disaster," Tinsley concludes. "Nonetheless, many problems were encountered and changes should be made so that EPA can better respond to future disasters.

“Unfortunately, our country lives under the threat of future terrorist attacks, and it is important that we use what we have learned from the World Trade Center tragedy to make improvements to our emergency response capabilities,” Tinsley concludes.

The report set off a political firestorm, both in the local New York community and among Democrats in Congress.

“This release of this report has had a tremendous impact on those of us living around Ground Zero,” says downtown New York resident Pat Dillon, who lives in a high rise six short blocks of the former World Trade Center. “Many of us who had enormous difficulty raising attention to these issues in the past now suddenly have an ear from those who were at first skeptical of the environmental and health effects.”

Many New Yorkers expressed outrage at the report that the White House influenced environmental officials to downplay hazards posed by the toxic dust that fell in an avalanche over the city. Kim Todd, long-suffering downtown resident, who still lives several blocks from the former towers, says she’s angry. “I might not have stayed down here—with dust on me for days—had I known of the dangers,” she told MSNBC. “We were all lied to, and I’m afraid everybody is going to be seriously sick.”

Meanwhile congressional Democrats, including Democratic Leader Nancy Pelosi, Representative Jerrold Nadler (D-NY), and Committee Ranking Members John Dingell (D-MI), John Conyers (D-MI), George Miller (D-CA), and Henry Waxman (D-CA) in September 2003 called on Speaker Hastert to launch a Congressional investigation into EPA's response to World Trade Center contaminants.

In their demand for a Congressional investigation, the legislators cited studies that they said “show that 78 percent of emergency responders, who traveled from all over the country to work at Ground Zero, reported at least one World Trade Center-related lung symptom as a result of their work at the site. Doctors have also documented thousands of cases of New York City residents and workers who have become sick after they returned to their homes, offices and schools around Ground Zero.”

Democratic Leader Nancy Pelosi stated, “The Environmental Protection Agency knew there were air pollution risks and failed to act.”

The Senate Environment and Public Works Committee recently released its oversight report of how EPA handled the aftermath of September 11. According to the committee, it “transcends the EPA Inspector General investigation, which, because of limited jurisdiction, lacked authority to question officials from the Occupational Safety and Health Administration (OSHA) and the Council on Environmental Quality (CEQ), who were intimately involved in the decision making process after September 11,” it wrote in a press release.

The report’s five conclusions, according to the committee, include:

- That “EPA acted properly in its response to the World Trade Center collapse, as well as in its communications with the public regarding exposure risks faced by workers and residents near the catastrophe”;

- That the Administration “did not suppress any public health information or data. EPA’s communications reflected the prevailing coordinated views expressed by agencies weighing in on the risks posed by asbestos;
- That “EPA went beyond its statutory obligations in its attempts to protect public health;
- That “the Council on Environmental Quality’s “influence” on EPA’s communications was a proper function delegated to it by the President for coordinating environmental health and safety decisions and information between EPA and OSHA.
- And that “On matters of indoor air in the fall of 2001, it was proper for EPA to defer to New York City, which was assigned the lead role.”

Time will be the best judge of whether or not the government did enough to protect the public health.

But Ground Zero neighborhood advocates argue that the EPA’s insistence that exposure to World Trade Center dust would not be likely to pose “short term or long term health risks” has already been proved wrong. Eric Goldstein, attorney with the Natural Resources Defense Council, calculates that at least 30,000 people were affected by short-term illnesses. The New York Firefighters Union points to thousands of members suffering from chronic illnesses, some of whom have even gotten sicker, not better, over time.

There is nothing that can be done now to bring back the lives of those lost in the towers, nor to bring back the health of those survivors or rescuers who were injured. But 9/11 should serve as a “warning shot” for the future. And there’s one issue everyone should agree upon: As long as environmental health is regarded as a disposable item, no lessons will be learned for the future.

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- (4) Gonzalez, Juan, “A Toxic Nightmare at a Disaster Site,” 10/26/01 <http://www.nyenvirolaw.org/PDF/Daily%20Cover%20%20Story%20-%20A%20Toxic%20Nightmare%20At%20Disaster%20Site.pdf>
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(27) Other comments from Congress:

Rep. John Dingell, Ranking Democrat on the House Energy and Commerce Committee, stated, "The White House was wrong when it told EPA to 'add reassuring statements and delete cautionary ones' in their report on the air quality in Lower Manhattan. This put the heroes and victims of September 11th at further, and needless risk. We need to investigate what EPA knew, and what it didn't know. And we need an objective look at how the White House influenced EPA's report. We can then see what needs to be done to ensure that the American public is not misled again."

Rep. John Conyers, Ranking Democrat of the House Judiciary Committee, stated, "From providing the American public with faulty assurances to downplaying significant environmental and health risks, the EPA's IG report clearly documents a pattern and practice of corruption and cover-ups that has placed the lives of countless emergency responders, rescue volunteers and New York city residents in harms way. What's most disturbing is a majority of the actions undertaken by the Administration were carried out all in the name of political gamesmanship."

Rep. George Miller, Senior Democrat of the House Education and Workforce Committee, stated, "The men and women who put their lives on the line day and night for weeks in the Ground Zero pit and at the Pentagon have a right to know who at the White House Council on Environmental Quality whitewashed the EPA reports on the hazards at the rescue sites, as documented by the EPA inspector general; a right to know their health and safety was paramount in the minds of those federal officials charged with protecting them; and a right to compensation for the equipment they brought to protect their health, especially in light of the serious underestimations of risk by the EPA and OSHA."

Rep. Waxman, Ranking Democrat on the House Government Reform Committee, stated, "While political meddling in EPA's work is a hallmark of this Administration, it is outrageous that the White House would gag EPA from keeping the public adequately informed after a terrorist attack on our country."

In a letter to Speaker Hastert, the congress members asked that Congressional hearings be convened immediately in relevant House committees, including the Committees on Energy and Commerce, Education and the Workforce, Government Reform, and the Judiciary, to know what further action must be taken to safeguard the health and lives of those affected by the EPA's response to the terrorist attacks.

http://www.house.gov/nadler/EPA_091703.htm

Part 4. Lessons Learned

Ask environmental health experts and local health officials about how they performed on September 11, and you're likely to get the same response: People responded admirably, especially given the unexpected and unprecedented nature of the attack.



Sept 15, 2001—The sun streams through the dust over the WTC wreckage.
Photo: Andrea Booher/FEMA News Photo

Former EPA administrator Christie Whitman testified proudly in Senate hearings that “EPA accomplished a remarkable achievement to three national [terrorist] incidents during the same time period,” referring to the response at the World Trade Center, the Pentagon and the anthrax-contaminated buildings at various locations.

“It’s so easy to be critical in hindsight when everybody was out there and their brother and they were really working hard,” says Jessica Leighton, assistant commissioner for environmental disease prevention at the New York City Department of Health.

“At Ground Zero, heroism was in ample supply” among the safety experts who traveled down to rescue the “brave band of rescuers.”

“What we did at the Pentagon was the way it should be; there was a real success here at the Pentagon and we want everyone to know,” says Mark Penn, head of OEM for Arlington County, VA.

The highest praise goes to those who supplemented the government’s efforts.

“At Ground Zero, heroism was in ample supply” among those like Bruce Lippy and Don Carson for the International Union of Operating Engineers, wrote Rep. Nick Rahall (D-W.Va.) of the safety experts who traveled down to rescue the “brave band of rescuers in New York City are endangered by asbestos, dust, and noxious vapors.” According to Rahall, “They are American patriots.”

When asked what, in hindsight, they might have done differently, however, many officials and experts have a long list of suggestions.

It’s clear that there have been many more ramifications in New York than in Washington, so in many ways, one can’t compare the situation in New York and Washington, D.C. because the nature and scale of their crises were so different. Nevertheless there are some points on which

they may be compared. In both cases, there were a lot number of surviving victims needing medical care, but in both cases, there were plenty of physical damage, infrastructure disruptions and environmental hazards needing attention, from hazardous materials monitoring to decontamination.

But critics of those charged with enforcing occupational safety and health standards in New York don't mince their words: "First responders, and many unequipped workers like those in construction went in to do heroes' work and became martyrs instead," says Joel Shufro, executive director of The New York Committee for Occupational Safety and Health (NYCOSH), a coalition of unions and health professionals.

"Where we see a real need is to understand incident command, chain of command, so that all the things like protecting disaster responders, can get done," says Joseph (Chip) Hughes of NIEHS' Worker Education and Training Program (WETP).

Almost all those polled agree one of the biggest areas to improve is risk communication, how public officials communicate hazards to the public. New York City Health Department's Kelly McKinney admits that the real lesson for his department was for officials to communicate what they know "every day and all day long." He adds, "If it is a hazard, be clear about what you know and don't know – and where the uncertainty lies."

"The public is a little bit smarter and could have understood more complexity."

"EPA came out way too early about the safety of the site," says Alison Geyh of Johns Hopkins. "The public is a little bit smarter and could have understood more complexity."

Paul Lioy criticizes the agencies for letting people come back to Lower Manhattan prematurely. "People came back but they never should not have been allowed to be back," says Lioy, "No one should have been back at work. Children should definitely have not been back in school." This was a chaotic time, but there was no basis, he says, for the city and federal government to state that the environment was safe to reinhabit.

Environmental health professionals feel they made a positive difference in many areas. "We were very lucky to have be prepared with incident command, urban search and rescue, medical and occupational response, and quick federal response in ruling out a bio-terrorist attack," says Arlington County's Mark Penn.

Despite the problems in pinpointing air pollutants at Ground Zero, there were many words of praise for those who worked hard to get data under pressure and to be responsive to the needs of agencies. Bruce Lippy praises Leighton of DOH because "She did a really nice job of getting hundreds of air samples and reviewing them.

"Agencies without having a plan did a terrific job," says Alison Geyh. "Three times a week people on the AQ issue spent an hour on the phone making sure everyone was aware of what they were doing; "It was a huge time commitment on the part of Region II EPA, NY State Department of Environmental Conservation, NYC DOH and others. Kelly McKinney did a fantastic job, running on overdrive and fumes. He was good at keeping things on track."

Public health officials say that public health system worked well under such high pressure.” The bottom lines was that 100,000 medical charts were surveilled and that went on through November,” Ron Burger of CDC. And scholars agree.

Amazingly, New York City was able to “weather this episode” despite the fact the state’s disaster plan had not been updated since the early 1990s, and, according to New York State Assemblymember from Manhattan Richard Gottfried, the plan “did not function” during the crisis, David Rosner and Gerald Markowitz point out, in their report on September 11th.

“The episode reveals the enormous resources available in New York, and that the institutions themselves were able to implement emergency protocols quickly and efficiently, despite the chaos of the moment and the lack of clarity as to the true extent or nature of the disaster,” they wrote. (1)

Where did safety succeed best?

- EPA and city sanitation got much of the dust off the streets in the first days of the crisis, says Captain Terrance Revella of the New York State Department of Environmental Conservation. That greatly reduced the city populations’ exposures to the dust.
- Although the city, specifically those designated agencies such as the Department of Design and Construction, can be faulted for failing to enforce worker protections, there were no fatalities at the site.
- The Coast Guard’s able evacuation of people from Lower Manhattan spared people’s health as well as their lives.

At the Pentagon, officials credit the benefit of emergency planning drills; good coordination among agencies. In fact, today some community fire departments are trying to emulate the skills carried out at the Pentagon. Framington, Massachusetts, for example, is putting together an ‘incident command system’ that will create one system of response to be used by everyone--what Homeland Security Director Tom Ridge has been calling for since last year. “ It’s important for



local communities to have solid plans because local departments are always the first on the scene,” said one official there.

Despite the many successes, however, by the agencies’ own estimations, they were stressed beyond their limits.

EPA feels its responders were able to carry out their mission to protect human health and the environment. “Their response, though successful, was hampered by the unprecedented demand on Agency’s emergency response resources and by limitations posed by EPA’s still developing capacity to respond to terrorist events.”

EPA monitored the air for pollutants.

Photo: EPA

Having so many air samples to run from so many agencies at one time stressed EPA to its limit. According to EPA, it was seriously tested by having to coordinate air samples being run by 13 different agencies, had to reconcile numerous different sampling protocols. It didn’t have enough

facilities and equipment to quickly analyze samples given the volume of data; “The volume of samples requiring quick laboratory analysis greatly exceeded the Regions’ capabilities” and they couldn’t get access to other national labs. (2)

Others would be far less charitable in their assessments. “The heroes were the police and firefighters who got people out of the buildings,” says Mt. Sinai’s Philip Landrigan.

If a terrorist incident without chemical, nuclear or bioterrorism could so strain the system, what would happen in the event of a highly environmentally hazardous event? EPA says: in its leaked report, “EPA’s mission was to protect front-line responders from dust and contaminants released when commercial aircraft were deliberately crashed. Although the Attacks did not contain weapons of mass destruction (WMD), the results were a series of disasters on a scale greater than EPA had ever encountered during emergency response.” (2)

Since there’s like to be some sort of environmental contamination in future attacks, local agencies need to be prepared to deal with the kinds of issues to surfaced in New York – indoor contamination and removal, assessment of risks to vulnerable populations.

And, experts point out, all sorts of future environmental disasters, from earthquakes in urban areas, to tornadoes, fires and hurricanes, could involve a complex building collapse.

Critics also some major policy failures: No agency enforced proper respiratory protection for workers; no agency took charge of the environmental health piece of the 9/11; and no agency focused on indoor cleanup, and, in fact, according to critics like Congressman Jerrold Nadler, tried to evade it.

If EPA has authority under the National Contingency Plan to control the release of hazardous substances it should be ready to address complex building fires in the future.

Some blame the insufficient awareness of the risks and hazards on political factors like the rush for normalcy and to get financial district back running; lack of good sampling in the first days due to factors beyond their control, like no electricity and not being prepared, and the anthrax crisis coming on its heels; too much focus on asbestos to the exclusion of other toxicants; and too much focus on physical hazards of cleanup and not enough on environmental health.

September 11th, of course, has made the idea of unthinkable environmental disasters involving hazardous chemicals or nuclear byproducts far more imaginable but that has done little to slow their commercial production or encourage their being more strictly regulated. Certainly, the focus on terrorism has permanently changed the terms of the environmental debate in some respects: After 9/11 politicians began to view environmental hazards as security threats too.

At first, the political winds favored regulating toxic chemicals at chemical plants more strongly. Environmentalists in the past used to play down the terror threats of chemicals because industry would complain “Greenpeace was courting attacks by spotlighting potential hazards,” wrote *Wall Street Journal* reporters Jacob. M. Schlesinger and Thaddeus Herrick. “But soon after the Sept. 11 attacks, the activists made terrorism the new centerpiece of their old crusade. That fall, Rena

Steinzor of the Natural Resources Defense Council told Congress: "Human error ... killed several thousand people in Bhopal. What price will we pay for deliberate sabotage at such a facility?" (3)

While that logic has won some converts, they write, the new crusade has triggered a chemical industry lobbying campaign to stall any new regulation in the name of terrorism protection. (3) Earlier legislation that would have promoted industries moving toward least-toxic processes has been derailed while new legislation drafted by the White House and Sen. James Inhofe, the new



chairman of the Senate Environment and Public Works committee, would remove the EPA from control, giving authority instead to the Department of Homeland Security. "The new version also would give companies more credit for actions taken on their own," they write. "It would give the government little, if any, authority to promote inherently safer technologies."

March 15, 2002—A FEMA debris specialist looks down into the pit of the WTC site.
Photo: Larry Lerner/FEMA News Photo

Have we learned anything in the two years' worth of lessons? Environmental professionals cite a litany of lessons, as well as their recommendations for the future:

(1) Call a hazard a hazard.

Be ready to protect the public against all environmental risks by giving them ample warning. "It's very clear that the government may have gone too far in reassuring people," says Kenneth Olden of the NIEHS. "People are still suffering. And there will be long-term consequences to the public [from the hazards at the disaster site of the former World Trade Center.]"

Recommendation: Public officials need to be open about risks and hazards to the public, and agencies should not try to downplay those hazards.

(2) If it is a health emergency—as well as a disaster—treat it that way. Be clear about what kind of event it is.

Critics say EPA could have done more to protect residents from the pollutants coming off the Ground Zero site, by warning them, or making efforts to restrict them from hazards.

Air pollution expert Thomas Cahill of the University of California at Davis, and Marjorie Clarke, hazardous waste expert at Lehman College fault the agencies for not coming up with a way to keep unprotected populations away while the "pile" was burning like an uncontrolled incinerator.

If EPA has authority under the National Contingency Plan to control the release of hazardous substances it should be ready to address complex building fires in the future.

Define the perimeters of environmental contamination. There should have been systematic testing of dust and debris in different gradients from the epicenter of Ground Zero, to know the level of hazard to the public, suggests Dr. Stephen Levin of Mt. Sinai Hospital. “Instead, the city set an arbitrary line at Canal Street,” says Levin. “But that is a political, not a medical or scientific boundary.”

Recommendations: Data is critical in managing emergencies. Investments should be made in making sure that adequate environmental data is available.

(3) Clear Chain of command to protect health and safety.

The authority for the Ground Zero site changed many times, and it was unclear which agency was in charge of which functions. Occupational health protections suffered, and some environmental health questions fell through the cracks – such as protecting residents from hazardous indoor dust.

Critics suggested that there ought to have been a lead agency for environmental health, to coordinate among the various other agencies. (Lioy; NRDC; Jerrold Nadler’s Ground Zero Task Force)

Had there been such an agency at Ground Zero, this would have made sure respiratory protection was emphasized from day one. “The way it was at Ground Zero, we couldn’t throw workers off the site if they didn’t comply,” says EPA’s Steve Touw.

“There ought to be solid interagency agreements worked out beforehand to insure good coordination,” says Paul Lioy, “and perhaps under the Department of Homeland Security there can be much better pre-planning and coordination.

Recommendations: Need for effective pre-planning, coordination, and (most important) enforcement mechanisms to insure standards are enforced.

(4) Open communication with the public.

“I don’t think we understood at the time the magnitude of the risk communication challenges we faced,” says New York City DOH’s Kelly McKinney.

However critics say that the public shouldn’t be kept in the dark about real or potential environmental hazards. Public officials should not make reassuring statements before they have the information. “EPA came out way too early about the safety of the World Trade Center site,” say critics like scientist Alison Geyh.

At the same time, federal agencies shouldn’t withhold data, as some charge the EPA did under the guise of “national security” in fighting terrorism. The EPA’s OIG report states that the agency never suppressed any data it could have made available to the public. However it is clear that many scientists and nonprofit groups had to file Freedom of Information Act requests to get information because the agency wasn’t forthcoming with its data. “We had trouble getting clearance to put data up on the web and had to clear it through the White House counsel for national security reasons,” says EPA’s Steve Touw. “Yet we had nothing to hide; it was just one or two people in the White House trying to keep it close to the vest.”

Nor should 'terrorism' be used as an excuse to hold back information, as it has been in some instances—an issue raised by journalists. For example, the Society of Environmental Journalists, on behalf of its 1200 members, signed a letter to Secretary Tom Ridge at the Department of Homeland Security, along with other organizations also representing scientists, librarians, privacy advocates and others, calling on it to allow public input on procedures for "safeguarding" and sharing a vaguely defined set of information between firefighters, police officers, public health researchers, and federal, state and local governments. In a news release, they wrote, "Under the auspices of fighting terrorism, the Department is poised to write — without guarantees for public input — procedures that could sweep up otherwise publicly available information that has nothing to do with terrorism into a zone of secrecy while subjecting millions of Americans to confidentiality agreements."

Disaster experts, instead, emphasize that officials should enlist the public's help. They stress that it is important to have the public trust so that it can be depended upon to help in a crisis, by, for example, stopping cell phone use so as not to deter the transmission of emergency information.

Recommendation: "Make data available as soon as possible, with a registry of samples."

(5) Better training and preparedness

Fire departments are not used to respirators needed for hazardous events unless they've been trained. Some first responders don't fall into current "environmental health" training and went into the WTC disaster without any sense of the consequences of being exposed, such as tow truck operators, electricians, telephone repair people and others need to be considered. (4)

In responding to the World Trade Center disaster, local hospitals were ready for any casualties and injured victims because they were prepared from the last terrorist attacks. In Arlington County, local emergency responders had experience from an earlier airport disaster. In New York City, by contract, local, state and federal agencies were not prepared to coordinate their efforts because those disaster plans had never been tested before. And, strikingly, the Rand Corporation has found that few localities are prepared for chemical or biological terrorism (5)

Recommendation: Have a broader definition of first responder, says Mark Penn of the Arlington County Office of Emergency Management.

(6) Better health registries and health tracking. Localities should start developing health data right away, instead of simply relying on samples and monitors.

New York's 9/11 Environmental Action group complained that the city waited too long—two years—to start its promised Health Registry in New York, months after physicians, researchers and residents clamored for it.

A similar charge is leveled at the national level. "The September 11 attacks have made the gap in our public health knowledge more dangerous than ever," according to advocates for better disease monitoring. "While Congress is considering how to help the public health system be better prepared in the face of unprecedented health risks—whether from the increasing concerns of disease clusters or the unforeseen threats from chemical and biological terrorism—we must make sure investments are made in the right way and that they part of a long-term commitment."

While we track more than 50 infectious diseases in this country, the Pew Environmental Health Commission found almost no national monitoring of chronic diseases. ("For instance, more than

half of the states have no ongoing tracking and monitoring of asthma, and less than half of the nation's population is covered by birth defects registries. Only nine states report tracking developmental disabilities such as mental retardation and cerebral palsy.”)

Supporters of a Nationwide Health Tracking Network, advocate involving a network of local, state, and federal public health agencies in tracking the trends of priority chronic diseases and relevant environmental factors in all 50 states and Washington, D.C., Puerto Rico, and U.S. territories. This, they say, will help create an early warning system to monitor immediate health crises, such as heavy metal and pesticide poisonings, that can trigger action against hazards. It would also be vital as baseline data in any future terrorist incident.

Recommendation: Start a tracking system as soon as possible after a terrorist attack. (6)

(7) Better preparedness on evacuation plans.

Even though cities have evacuation plans, they're not enforced adequately.

New York City, for example, didn't even contemplate any kind of evacuation plan, not having updated its disaster plan in more than 10 years.

Recommendation: Cities should update evacuation plans and make them enforceable; train fire marshals.

(8) Improve the way buildings are designed and constructed.

Fire fighters and their advocates have long been concerned about building materials because of their tendency to make for unusually toxic fires.

But is the construction industry revising how it builds—and how high it builds—especially in likely targets? To make for a safer post 9/11 built environment, construction planners need to investigate safer materials, and designs that facilitate easier evacuation in emergencies.

Recommendation: From an environmental health perspective, designers ought to also look at construction materials for their durability and well as elimination of toxic products and processes.

(9) Manage an abundance of volunteers—and donations.

Localities need to learn to manage volunteers as they converge upon the scene. Dodie Gill of Arlington County, Va. suggests finding constructive ways to accept people's donations of time and resources. When it comes to food, “Thank them, and once they've left, dispose of it quickly.”

“As in other disasters, New York saw a tremendous influx of resources after the disaster. Some of these resources were needed, while others were a burden on the system.” Notes Tricia Wachtendorf in her presentation, “A changing risk environment: Lessons Learned from the 9/11 World Trade Center Disaster.” (7)

(10) Make way for better partnerships

Robert Martin, former EPA ombudsman faults the EPA for failing to consult with the New York community on places hardest hit from a public health standpoint.

When it comes to research, the public and research community could benefit in the future if a more formal process were developed to guide the reactive and proactive steps that researchers should take in disaster situations. A national body such as the NIEHS or National Academy of Sciences could play a role in developing an action plan

Recommendation: Consult with the community and empower them to be involved. Set up a process to have a liaison research committee to the community.

(11) New on-scene emergency protocol for measuring potential pollutants.

Sen. Hillary Clinton has suggested that setting health-based air quality standards should be part of the Homeland Security Act. She has called for the passage of the Disaster Area Health and Environmental Monitoring Act of 2003, legislation she cosponsored with Senator George V. Voinovich (R-OH) and which was approved by the Senate Environment and Public Works Committee.

“This legislation would ensure that the health of first responders, workers, residents, school children, and other community members is adequately protected and monitored when exposed to harmful substances and other health risks in a declared disaster area,” according to Clinton. (8)

Recommendation: Create a new emergency protocol for environmental health identifying the pollutants to be measured in the aftermath of a disaster and standards for controlling them.

(12) Give environmental health higher priority.

“At 9/11 safety professionals were rotated in and out but we didn’t have the manpower,” says Bruce Lippy of the National Union of Operating Engineers.

Professionals needed more staff and funding, argues CDC’s environmental health expert Ron Burger. “There should be more than 2 or 3 environmental health professionals in a local health department of 20 or 30,” says Burger.

Patrick Meehan at the CDC agrees. “New York City, as well funded as it was, didn’t have enough capability. That speaks to what we can expect from other, much smaller, cities and towns.”

One way to give environmental health greater priority would be to issue advisories to physicians so that they can be aware of illnesses that may arise out of environmental health consequences, suggests Stephen Levin of Mt. Sinai Hospital.

Recommendation: Beef up environmental health funding, staffing, and other public and professional resources.

(13) Be ready to improvise.

“You can’t plan for every single thing; but when something happens, it’s not time to take a plan out,” says CDC’s Ron Burger. At both Ground Zero and the Pentagon, says disaster scholar Kathleen Tierney, improvisation was as critical as pre-planning in helping handle everything from unsolicited food donations to creating credentialing procedures that balanced effective access to the site against security.

Recommendation: “Plan effectively beforehand,” urges Tierney, but also create an environment where you can “improvise solutions to unforeseen problems that will inevitably develop.”

Footnotes:

- (1) Rosner and Markowitz, et al. <http://www.milbank.org/reports/911/foreword>
- (2) EPA, “Lessons Learned”
- (3) “Chemical Manufacturers Elude Crackdown on Toxic Materials: Sen. Corzine Pushed for Rules to Reduce Terror Threats, but Political Wind Shifted,” By Jacob M. Schlesinger and Thaddeus Herrick, *Wall Street Journal*, 5/21/03
- (4) http://wetp.org/oldchfiles/awardee_mtgs/spring02/WMDreport.pdf
- (5) <http://www.rand.org/publications/IP/IP217/IP217/index.html>
- (6) <http://healthyamericans.org/resources/testimony/hearne030602-oral.php3>
- (7) Wachtendorf, Disaster Research Center, University of Delaware, <http://www.udel.edu/DRC/tricia/AEM%20Presentation%20July%202002%20DRC.pdf>
- (8) *Proposal for Disaster Area Health and Environmental Monitoring Act of 2003*
<http://www.cbo.gov/showdoc.cfm?index=4503&from=2&sequence=0>
- (9) Kathleen Tierney, National Academies Press,
http://www7.nationalacademies.org/ndr/1Tierney_Presentation.pdf