

 New York Committee for Occupational Safety and Health

 116 John Street, Suite 604, New York, NY 10038
 email nycosh@nycosh.org

 (212) 227-6440
 fax (212) 227-9854
 email nycosh@nycosh.org

Oversight Hearing on <u>The U.S. Environmental Protection Agency's</u> <u>Response to Air Quality Issues</u> <u>Arising from the Terrorist Attacks</u> <u>of September 11, 2001:</u> Were There Substantive Due Process Violations?

testimony of David M. Newman, M.A., M.S. New York Committee for Occupational Safety and Health

> before United States House of Representatives

> > **Committee on the Judiciary**

Subcommittee on the Constitution, Civil Rights, and Civil Liberties

June 25, 2007

Good afternoon Chairman Nadler, Ranking Member Franks, and other members of the Constitution, Civil Rights, and Civil Liberties Subcommittee. Thank you for this opportunity to present testimony. My name is David Newman. I am an industrial hygienist with the New York Committee for Occupational Safety and Health (NYCOSH). NYCOSH is a nongovernmental, non-profit organization that has provided technical assistance and comprehensive training in occupational safety and health to unions, employers, government agencies, and community organizations for over 25 years

The attacks of September 11, 2001 produced not only an initial catastrophic loss of life at the World Trade Center (WTC) site, but also a lingering environmental disaster, with adverse health consequences for responders at Ground Zero as well as for workers and residents in a much larger geographic area. Because we may unfortunately be faced with a similar situation again, it is imperative to examine and learn from government efforts to protect public and worker health in 9/11 response efforts.

Since the tragic events of September 11, 2001 and continuing to this day, NYCOSH, in partnership with the National Disaster Ministries of the United Church of Christ, has worked closely with unions, employers, and community and tenant organizations at Ground Zero and throughout Lower Manhattan. This work has included outdoor and indoor environmental sampling, technical assistance with the design or evaluation of sampling, cleanup, and re-occupancy protocols, and with mechanical ventilation and filtration issues. Within days of 9/11, NYCOSH produced and distributed the first fact sheets describing respiratory hazards at Ground Zero and outlining appropriate respiratory protection. We provided technical assistance to unions at, under, and around Ground Zero. NYCOSH, in collaboration with the Queens College Center for the Biology of Natural Systems and the Latin American Workers Project, operated a mobile medical unit near Ground Zero which provided medical

screenings to hundreds of immigrant day laborers engaged in the cleanup of contaminated offices and residences. We also provided respirators to these cleanup workers, along with changeout filter cartridges, fit-testing, and training proper respirator use. NYCOSH also trained additional hundreds of Lower Manhattan workers about 9/11-related occupational and environmental health issues. NYCOSH continues to work closely with the medical centers of excellence and with unions, employers, and tenant and community organizations to ensure that their constituents are informed about and have access to appropriate health care for 9/11 health conditions.

In addition, I had the privilege of serving on the U.S. Environmental Protection Agency (EPA) World Trade Center Expert Technical Review Panel. I also served on the Exposure Assessment Working Group of the World Trade Center Worker and Volunteer Medical Screening Program and on the Advisory Board of Columbia University's Mailman School of Public Health World Trade Center Evacuation Study. I currently serve on the Community Advisory Committee of the World Trade Center Environmental Health Center at Bellevue Hospital and on the Labor Advisory Committee of the New York City Department of Health and Mental Hygiene's World Trade Center Health Registry.

My testimony will focus on three issues:

- Whether the data available to EPA and the Occupational Safety and Health Administration (OSHA) at the time of the 9/11attacks and during subsequent recovery operations indicated a potential for elevated risk to human health from environmental exposures;
- 2. Whether the actions of EPA and OSHA were consistent with regulatory requirements for risk assessment and protection of human health; and
- 3. Whether harm to human health occurred, and whether this harm was avoidable.

NYCOSH is well situated to comment on these issues. In addition to our 9/11 efforts, we have provided training and technical assistance on respiratory protection, hazard

assessment and control, confined space entry, and hazardous waste operations and emergency response, among other topics, to employers, unions, government agencies, and community-based organizations for several decades, often in collaboration with OSHA, the National Institute for Occupational Safety and Health (NIOSH), the National Institute for Environmental Health Sciences (NIEHS), the New York State Department of Labor, the New York City Department of Environmental Protection, and the New York City Department of Health and Mental Hygiene.

1. What data were available to EPA and OSHA at the time of the 9/11 attacks and during subsequent recovery operations? Did these data indicate a potential for elevated risk to human health from environmental exposures?

Although the chemical composition and extent of dispersion of WTC dust remain poorly characterized, the current scientific literature is unambiguous as to its general character and scope. Contaminants were dispersed over a wide area of Lower Manhattan and Brooklyn, and for "miles beyond." Hundreds of contaminants have been identified in air, dust, and bulk samples.^{1,2,3} Toxic contaminants of concern include asbestos, PCBs (polychlorinated biphenyls), PAHs (polycyclic aromatic hydrocarbons), manmade vitreous fibers, dioxins, volatile organic compounds, crystalline silica, pulverized glass shards, highly alkaline concrete dust, and lead, mercury, and other heavy metals.

The question, however, is what did EPA and OSHA know and when did they know it?

1.A. Credible, substantive data that indicated the presence of toxic substances in significant quantities at the WTC site were readily available to government agencies prior to and on September 11, 2001.

Prior to and on 9/11, information on the documented presence of toxic substances at the WTC site was available in government databases that itemize storage of hazardous raw

materials, as per the hazardous chemical storage reporting requirements of the federal Emergency Planning and Community Right to Know Act.⁴ These data, readily available at the time, indicated at a minimum the probable presence of barium, lead, chloroform, chlordane, carbon tetrachloride, cadmium, chromium, mercury, hydrogen sulfide, arsenic, and other toxic raw materials at the offices of the United States Customs Service, 6 World Trade Center, and of mercury, tetrachloroethylene, PCBs, arsenic, ethane, and other toxic raw materials at the offices of the Port Authority of New York and New Jersey, 1 World Trade Center. The purpose of the hazardous raw materials databases is precisely to facilitate safe emergency response and effective containment and cleanup in the event of an unanticipated chemical release.

Additional information on hazardous in-place building materials and office furnishings was widely known in the regulatory and public health communities. Knowledge and use of this information was a prerequisite to appropriate preliminary risk assessment, design of safe and effective work methods, and selection of protective equipment, including respirators.

An estimated 400 or more tons of asbestos had been utilized in sprayed-on fireproofing during the construction of the WTC towers.^{5,6} Additional unknown amounts of asbestos-containing material were used in pipe insulation. The extensive use of asbestos at the WTC site was well documented prior to September 11, 2001. In 1971, while the WTC was still under construction, New York City passed Local Law 49, which banned the use of sprayed-on fireproofing that contained asbestos, effective February 25, 1972. Application of structural fireproofing at the WTC continued with non-asbestos-based materials.⁷ The 1993 bombing of the WTC again raised the issue of inadvertent releases of WTC asbestos during disaster events, and some WTC asbestos was abated (removed). Thus, the regulatory agencies were without doubt cognizant of the potential for the release of hundreds of thousands of pounds of asbestos into the ambient air during the collapse of the WTC towers on September 11, 2001.

Further essential, albeit imprecise, information about the potential for the release of additional toxic substances should have been intuitive to any environmental or occupational health professional.

For example, computers and computer components contain significant amounts of lead.⁸ It can be conservatively estimated that there were greater than 10,000 personal computers in the WTC complex, each containing four or more pounds of lead, as well as numerous mainframe computers and servers. Consequently, it is likely that at least 40,000 pounds of lead were released into the general environment on 9/11, and very possibly a substantially larger amount.

Similarly, fluorescent light bulbs contain tiny but environmentally significant amounts of mercury.⁹ Estimates of the amount of mercury in a single bulb range from 3 milligrams to 21 milligrams. The Port Authority acknowledges the presence of 500,000 fluorescent light bulbs in the WTC complex.¹⁰ It is therefore possible that the amount of mercury released from fluorescent light bulbs only (and not including additional sources of mercury such as electric switches) ranged from 3 to 23 pounds. This is the approximate equivalent of 8% of the total daily mercury emissions from all coal-fired utility boilers in the United States or 26% of the daily mercury emissions from all municipal waste incinerators.¹¹

1.B. Environmental sampling results obtained by government agencies subsequent to September 11 indicated the presence of toxic substances at levels of concern at Ground Zero as well as at other locations in Lower Manhattan, both outdoors and indoors.

Early environmental sampling data obtained by EPA confirmed that asbestos was a constituent of WTC dust, at levels of concern. The EPA website posted data for 143 bulk samples of dust collected in Lower Manhattan, outside of the 16-acre collapse site. Asbestos was detected in 76% of the samples. Twenty-six percent of the samples contained asbestos

at levels between 1.1% and 4.49%, i.e., at levels between 110% and 449% of the level at which legal requirements are triggered. Most of EPA's outdoor air samples found relatively low concentrations of asbestos or no asbestos above the detection limit of the sampling, but the EPA website listed at least 25 12-hour samples, obtained at 10 separate locations, that exceeded the EPA clearance standard established under the Asbestos Hazard Emergency Response Act, the benchmark that EPA was using for 9/11 asbestos measurements.

Additionally, 12 of 21 personal air samples obtained in September 2001 by the U.S. Public Health Service from workers sifting WTC debris at the Staten Island landfill exceeded the OSHA Permissible Exposure Limit for asbestos.¹² Sixty percent of asbestos air samples collected at Ground Zero by the International Union of Operating Engineers' National Hazmat Program exceeded the EPA clearance standard established under the Asbestos Hazard Emergency Response Act, the benchmark that EPA was using for 9/11 asbestos measurements.¹³ Twenty-seven percent of 177 bulk samples initially collected by EPA and OSHA at Ground Zero were greater than 1% asbestos, the level at which legal requirements are triggered.¹⁴ Early independent air monitoring in two Lower Manhattan apartments found significantly elevated indoor levels of asbestos, including results 2 to 5 times the EPA 9/11 asbestos clearance level in one apartment and 89 to 151 times the clearance level in the other apartment.¹⁵

EPA test results for outdoor sampling for dioxin showed "unambiguous elevation" when compared to typical urban background levels. An EPA report noted:

the concentrations to which individuals could potentially be exposed . . . within and near the WTC site found through the latter part of November are likely the *highest ambient concentrations that have ever been reported.* [emphasis added]¹⁶

These findings indicated that workers and residents who returned to areas that were reopened to the public as safe one week after 9/11 were potentially exposed to concentrations of dioxin "nearly 6 times the highest dioxin level ever recorded in the U.S." The findings also indicated that the dioxin concentrations to which rescue and recovery

workers were potentially exposed were between 100 and 1,500 times higher than the levels of dioxin typically found in urban air.¹⁷

In another example, benzene was detected at Ground Zero in 57 of 96 air samples, at levels from 5 to 86,000 parts per billion (ppb). (The OSHA permissible exposure limit (PEL) for benzene exposure averaged over 8 hours is 1,000 ppb. The OSHA short term exposure limit (STEL) for benzene exposure averaged over a 15 minute period is 5,000 ppb.)

Even during November, readings exceeded the OSHA levels in half the tests conducted. . . . On November 8, an EPA grab sample at the North Tower plume detected 180,000 ppb of benzene–180 times above [sic] the OSHA limit. Even as late as January 7, benzene readings were as high as 5,300 ppb.¹⁸

The United States Geological Survey (USGS) reported the results of its WTC environmental studies to government response teams as early as September 18, 2001. USGS found that steel beams from the WTC site were coated with fireproofing containing chrysotile asbestos at concentrations up to 20%. It reported that in the "area around the WTC . . . potentially asbestiform minerals might be present in concentrations of a few percent to tens of percent" and may occur "in a discontinuous pattern radially in west, north, and easterly directions perhaps at distances greater than 3/4 kilometer from ground zero." USGS also found that WTC dusts "can be quite alkaline," reaching a pH of 11.8. The agency warned government response teams that "cleanup of dusts and the WTC dusts should be done with appropriate respiratory protection and dust control measures."¹⁹

2. Were the actions of EPA and OSHA consistent with regulatory requirements for risk assessment and protection of human health?

Multiple federal statutes have applicability to the protection of public health and occupational health during catastrophic environmental emergencies. The applicability of statutory requirements to disaster response efforts and to subsequent cleanup operations and the uses of agency discretionary power in the application of legal standards are central to

assessing governmental response to 9/11.

2.A. EPA is clearly required to protect the public health against exposure to toxic environmental contaminants associated with catastrophic disasters.

EPA has legal authority and responsibility to respond to a hazardous substance release that presents or has the potential to present an imminent and substantial danger to public health. EPA is required to assume lead authority with regard to issues of environmental health by the National Contingency Plan, the National Response Plan, and Presidential Decision Directive 62 of 1998.

The National Emissions Standards for Hazardous Air Pollutants (NESHAPS), section 112 of the Clean Air Act, establishes standards for air pollutants that may cause fatalities or serious, irreversible, or incapacitating illness.^{20,21} Hazardous air pollutants regulated under the Clean Air Act are also regulated as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), known as Superfund. The National Contingency Plan (NCP), part of CERCLA, is the federal plan for responding to hazardous substances to EPA. In the event of a hazardous release, the NCP requires that the release site be assessed to characterize the source and type of the release, the pathways of exposure, and the nature and magnitude of the threat to public health. In addition, EPA is authorized to "enter any vessel, facility, establishment or other place, property, or location . . . and conduct, complete, operate, and maintain any response actions. ..." Further, "the NCP applies to and is in effect when the Federal Response Plan and some or all of its Emergency Support Functions (ESFs) are activated." ²²

The National Response Plan (NRP) mandates a comprehensive response to terrorism incidents. (The Federal Response Plan²³ preceded the National Response Plan, was in effect on September 11, 2001, and was substantively similar to the NRP.) The NRP establishes

protocols to protect the health and safety of the public, responders, and recovery workers. National Response Plan Emergency Support Function #10, the Oil and Hazardous Materials Response Annex, assigns explicit responsibility to EPA as both the primary agency and the emergency support function coordinator in response to an actual or potential discharge or uncontrolled release of hazardous materials.²⁴

Presidential Decision Directive (PDD) 62 names EPA as the lead agency for responding to the release of hazardous materials in a terrorist attack and gives EPA specific responsibility for indoor remediation.^{25,26} Shortly after 9/11, then–EPA Administrator Christine Whitman confirmed EPA's responsibility under PDD 62: "Under the provisions of PDD 62 . . . EPA is assigned lead responsibility for cleaning up buildings and other sites contaminated by chemical or biological agents as a result of an act of terrorism."²⁷

2.B. EPA's response actions were not consistent with its legal obligations to protect the public health against exposure to outdoor and indoor toxic environmental contaminants associated with a catastrophic disaster.

EPA's 9/11 response efforts were predicated on the agency's contention that environmental regulations were not applicable to natural or technological disasters or to terrorist incidents.²⁸ EPA minimized the issue of hazardous waste and chose not to consider the WTC site as either a Resource Conservation and Recovery Act (RCRA)²⁹ hazardous waste site or a Superfund site, even though the collapse and combustion of the WTC "must have released chemicals orders of magnitude times the reporting thresholds."^{30,31} According to an EPA senior policy analyst, this was the first major chemical or hazardous waste release in 20 years for which EPA did not conduct a site characterization for environmental hazards and risks.³² In addition, the agency did not ensure that clearance tests were conducted at the conclusion of the waste and debris removal project to confirm that environmental contaminants had been effectively removed from the WTC site, and no such tests were conducted.³³

For eight months after 9/11, EPA contended that it had no legal responsibility for assessing or addressing indoor environmental contamination.^{34,35} Indoor environmental testing and remediation in common spaces were left to building owners; testing and remediation of private spaces were left to commercial and residential tenants.^{36,37} Because government financial assistance, reoccupancy guidelines, oversight, and enforcement were not provided, private environmental sampling and remediation efforts occurred only on an occasional, haphazard, limited, and often ineffectual basis. The single government-sponsored indoor cleanup effort that ultimately took place, EPA's 2002-2003 "test or clean" program, was modest, non-mandatory, limited to residences, and of questionable effectiveness and scientific and technical merit. Only 18% of eligible downtown apartments were cleaned or tested.³⁸ Approximately 1,500 Lower Manhattan buildings were excluded, including all schools, hospitals, firehouses, workplaces, businesses, and commercial and government buildings—even City Hall. Most of Chinatown and other impacted communities were also excluded. The failure of EPA to require or even encourage indoor environmental assessments, and cleanup where warranted, in commercial and government buildings, coupled with the agency's limited and inadequate sampling and cleanup in residential spaces, is likely to have subjected area workers and residents to unnecessary and avoidable exposures.

EPA provided limited, and sometimes incorrect and hazardous, technical guidance to the impacted public. EPA press releases counseled residential and business tenants to clean their indoor spaces using "appropriate" equipment, following "recommended" and "proper" procedures, without defining these terms.³⁹ EPA's technical advice sometimes contradicted regulatory requirements and even common sense. In one instance EPA advised that "if dust or debris from the World Trade Center site has entered homes or offices, people should be sure to clean thoroughly and avoid inhaling dust while doing so."⁴⁰ The same press release referred readers to the website of the New York City Department of Health for further technical guidance. That website advised "residents and workers returning to homes and offices in Lower Manhattan" to clean up WTC dust (i.e., asbestos and other toxic substances,

in many cases) with wet rags and HEPA vacuum cleaners, in violation of federal and city regulations. It further advised that respiratory protection was not necessary so long as these "guidelines" were followed.⁴¹ The report of the EPA Inspector General ultimately concluded that advice such as this "may have increased the long-term health risks for those [tenants] who cleaned WTC dust."⁴²

EPA's public statements mischaracterized or ignored sampling results. Its September 18 announcement that the "air is safe to breathe"⁴³ was not supported by the available data.⁴⁴ EPA risk communication statements were altered to conform to political directives from the White House. "Guidance for cleaning indoor spaces and information about the potential health effects from WTC debris were not included in EPA's issued press releases. . . . Reassuring information was added . . . and cautionary information was deleted" after intervention by the White House Council on Environmental Quality.⁴⁵ Other government agencies also issued inaccurate risk communication statements. EPA's unsupported assurances of lack of risk had the unfortunate effect of giving a green light to employers and workers not to use respiratory protection and to landlords, employers, and government agencies that remediation of contaminants was not necessary.

2.C. OSHA is clearly required to ensure that workers are protected against avoidable harmful exposures at their places of employment, including workers engaged in disaster rescue and recovery efforts.

OSHA in general is legally mandated to "assure safe and healthful working conditions for working men and women," in part by "providing an effective enforcement program."⁴⁶ Specifically, OSHA is legally mandated to enforce standards that limit worker exposure to toxic and hazardous substances;⁴⁷ afford workers workplaces "free from recognized hazards";⁴⁸ require assessment of the hazards to which workers may be exposed;⁴⁹ require the use of appropriate respiratory protection against "occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or

vapors;"⁵⁰ protect worker safety and health at cleanup operations involving hazardous substances at uncontrolled hazardous waste sites;⁵¹ and protect the health of workers' families by preventing transport home of hazardous chemicals and substances on workers' clothing.⁵²

2.D. OSHA's response actions were not consistent with its legal obligations to protect workers against avoidable harmful exposures at their places of employment, including disaster and recovery efforts.

The OSHA Respiratory Protection Standard requires that employers provide respirators, training, fit-testing, and medical evaluation when "necessary to protect the health of the employee."⁵³ OSHA did not enforce the Respiratory Protection Standard, nor was it able to assure effective respiratory protection for workers in the absence of enforcement. The percentage of workers "on the pile" observed to be wearing respirators ranged from 20 to 50 percent; the percentage of immigrant day laborers and unionized building maintenance workers who wore respirators while cleaning up dust and debris outside Ground Zero was virtually zero.^{54,55} As a result, tens of thousands of workers suffered avoidable and illegal exposures to highly toxic contaminants, including a robust array of carcinogens. Many are today experiencing persistent, disabling respiratory illnesses, and some are dying.

The OSHA Hazardous Waste Operations and Emergency Response (Hazwoper) Standard is "arguably the most proactive standard for protecting workers during disasters."⁵⁶ Hazwoper provides an integrated framework for chemical spill and disaster response through requirements for site characterization and analysis, worker training and qualification, worker protection, environmental and medical monitoring, handling of hazardous waste, and emergency preparedness and response. Hazwoper is routinely invoked in less hazardous situations. For example, EPA-required removals of leaking underground fuel storage tanks are conducted in accordance with Hazwoper.⁵⁷ Even though the WTC site contained leaking fuel storage tanks, as well as myriad additional chemical releases, the Hazwoper standard

was "purposely and thoroughly avoided during the rescue and recovery operations at Ground Zero."⁵⁸

OSHA and other agencies allowed the rescue phase to be artificially prolonged for 10 months⁵⁹ even though building collapse victims who are not extricated within 12 to 48 hours have a very low survival rate, which declines to virtually zero after 4 days.^{60,61} The inappropriately extended rescue phase facilitated government avoidance of responsibility and enforcement.

OSHA asserted that the Federal Response Plan required it to emphasize "consultation, guidance, and technical assistance."⁶² However, the FRP did not exclude enforcement. The problem with the consultation approach was not that it was inappropriate but rather that it was ineffective. OSHA chose to operate under a zero enforcement policy which ultimately facilitated rapid debris removal at the expense of protection of worker health. At no time did a collaborative approach preclude enforcement where appropriate, apart from the initial hours and days when rescue of live victims was theoretically possible. In fact, as EPA has pointed out, OSHA standards are "applicable in catastrophic emergencies. . . . There are no exemptions for emergencies in the [OSH] Act."⁶³ Moreover, because the inadequacy of respiratory protection at the site was self-evident and prolonged, federal and city agencies, including FEMA and NYC Department of Health, as well as unions, repeatedly requested OSHA enforcement, to no avail.

(Although OSHA has argued that it used discretionary authority when it opted for nonenforcement at Ground Zero, automatic non-enforcement in disaster response is now official OSHA policy, as codified in its 2003 National Emergency Management Plan.⁶⁴)

3. Did exposure to WTC-derived contaminants result in harm to human health, and was this exposure and harm avoidable?

Within days of the attacks, EPA declared Lower Manhattan's air "safe to breathe"⁶⁵ and OSHA announced that "it is safe for New Yorkers to go back to work."⁶⁶ EPA maintained until recently that "short-term health effects dissipated for most once the fires were put out [and] there is little concern about any long-term health effects."⁶⁷ Unfortunately, there is considerable evidence to the contrary. It is now well-established that a large and increasing number of people who were exposed to 9/11 contaminants, primarily rescue and recovery workers but also area workers and residents, are suffering serious and persistent adverse health outcomes.

The incidence and persistence of 9/11-induced respiratory illness among response workers and area workers is extensively documented in the scientific literature, including among rescue, recovery, and service workers,^{68,69} firefighters,^{70,71,72,73} transit workers,⁷⁴ and immigrant day laborer cleanup workers at buildings outside Ground Zero.⁷⁵ Although there is no question that, in general, those working on the pile experienced more severe exposures and health impacts than did community residents, students, and workers, it is of note that adverse health impacts have also been documented among these latter groups.^{76,77,78,79,80}

Because Ground Zero workers and other exposed populations may have been exposed at varying levels to a robust array of carcinogens, including asbestos, dioxins, silica, benzene, PAHs, and PCBs, there is concern for the potential development of late-emerging cancers.⁸¹ It as yet unknown whether or when 9/11-derived exposures will produce late-emerging diseases, but it is prudent and scientifically appropriate to anticipate the possibility. While the latency period for solid tumors is 10 to 50 years, the latency period for hematolgic and lymphatic malignancies can be as short as 4 to 5 years.⁸² Although neither the World Trade Center Medical Monitoring Program nor the scientific literature has yet reported the occurrence of 9/11-related cancers, the Monitoring Program has begun the process of verification of self-reported cases among responder and recovery worker patients.⁸³

We now know that there is an association between the chronology of firefighters' 9/11-related exposures and the severity of their adverse health effects; i.e., those caught in the dust cloud and/or those responding at the WTC site in the first hours or days tend to have higher incidences and greater severities of health impacts. Presumably, the intensity and duration of exposure and the lack of access to appropriate respiratory protection were significant factors in this association. These early exposures were unavoidable. However, the failure of OSHA to effectively require the use of respiratory protection by recovery and cleanup workers at and around Ground Zero, and the failure to enforce clearly applicable OSHA standards, such as the Respiratory Protection and the Hazwoper Standards, subjected workers to unnecessary and avoidable exposures, with the result that many are now experiencing persistent, disabling respiratory illnesses. Similarly, the failure of EPA to provide, require, or even encourage indoor environmental assessments, and cleanup where warranted, in commercial and government buildings, coupled with the agency's limited and inadequate sampling and cleanup in residential spaces, is likely to have subjected area workers and residents to additional unnecessary and avoidable exposures.

Thank you for your concern about these issues.

REFERENCES

1. P. Landrigan, P. Lioy, et al. Health and Environmental Consequences of the World Trade Center Disaster. *Environmental Health Perspectives*. Vol. 112, No. 6, May 2004. http://www.ehponline.org/members/2004/6702/6702.pdf (accessed May 31, 2007).

2. J, McGee, L. Chen, et al. Chemical Analysis of World Trade Center Fine Particulate Matter for Use in Toxicologic Assessment. *Environmental Health Perspectives*. Vol. 111, No. 7, June 2003.

http://www.ehponline.org/members/2003/5930/5930.pdf (accessed May 31, 2007).

3. Centers for Disease Control and Prevention. Occupational Exposures to Air Contaminants at the World Trade Center Disaster Site—New York, September—October 2001. *Mortality and Morbidity Weekly*. May 31, 2002.http://www.cdc.gov/mmwr/ preview/mmwrhtml/mm5121a1.htm (accessed May 14, 2007).

4. Code of Federal Regulations, Title 40, Parts 350, 355, 370, and 372, Sections 311-312. http://www.access.gpo.gov/nara/cfr/waisdx_06/40cfrv27_06.html (accessed May 14, 2007).

5. M. Nordgren, E. Golstein, M. Izeman. The Environmental Impacts of the World Trade Center Attacks—A preliminary Assessment. Natural Resources Defense Council, February 2002. http://www.nrdc.org/air/pollution/wtc/wtc.pdf (accessed June 8, 2007).

6. M. Gerrard. World Trade Center: Response, Recovery and Reconstruction. *New York Law Journal*. October 4, 2001. http://www.arnoldporter.com/publications_articles. cfm?publication_ID=317 (accessed June 9, 2007).

7. A. Langer, R. Morse. The World Trade Center Catastrophe: Was the Type of Spray Fireproofing a Factor in the Collapse of the Twin Towers? *Indoor and Built Environment*. Vol. 10. No. 6, 2001.

8. L. Yadong, J. Richardson, et al. TCLP Heavy Metal Leaching of Personal Computer Components. *Journal of Environmental Engineering*. Vol. 132, No. 4, April 2006.

9. M. Aucott, M. McLinden, M. Winka. Release of Mercury from Broken Fluorescent Bulbs. Environmental Assessment and Risk Analysis Element - Research Project Summary. New Jersey Department of Environmental Protection, February 2004. http://www.state.nj.us/dep/dsr/research/mercury-bulbs.pdf (accessed May 31, 2007). 10. J. Gonzalez. *Fallout—The Environmental Consequences of the World Trade Center Collapse*. The New Press, New York, 2002.

11. U.S. Environmental Protection Agency. Mercury Study, Report to Congress -Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States. EPA 452/R-97-004, December 1997. http://www.epa.gov/ttn/oarpg/t3/reprots/volume2.pdf (accessed May 31, 2007).

12. Emilcott Associates, Inc. Preliminary Report on the H&S Evaluation of the Fresh Kills Landfill Project Supporting the WTC Disaster Recover (sic), Prepared for New York City Detectives Endowment Association. September 28, 2001.

13. J. Nash. Cleaning Up After 9/11: Respirators, Power, and Politics. *Occupational Hazards.* May 2002. http://www.nycosh.org/about_NYCOSH/NYCOSHNews/2002-april-News.html (accessed May 31, 2007).

14. B. Lippy. Operating Engineers National Hazmat Program - World Trade Center Disaster Air Monitoring Overview. Presentation ot Dr. Kenneth Olden, Director, National Institute of Environmental Health Sciences, October 4, 2001. http://www.wetp.org/wetp/wtc/wetp%20wtc%20report.pdf (accessed June 8, 2007).

15. E. Chatfield, J. Kominsky. Characterization of Particulate Found in Apoartments After Destruction of the World Trade Center. October 12, 2001. http://www.epa.gov/wtc/panel/GroundZeroTaskForceReport108.pdf (accessed May 31, 2007).

16. U.S. Environmental Protection Agency, National Center for Environmental Assessment. Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster. EPA/600/P-2/002A, October 2002. http://oaspub.epa.gov/eims/eimscomm.getfile?p_download_id=36387 (accessed May 31, 2007).

17. J. Gonzalez. EPA Report Buries a Revelation. *New York Daily News*. December 31, 2002. http://www.nycosh.org/about_NYCOSH/NYCOSHNews/2002-September-News.html (accessed May 31, 2007).

18. J. Gonzalez. Fallout, op cit.

19. R. Clark, R. Green, et al. Environmental Studies of the World Trade Center Area After the September 11, 2001 Attack. U.S. Geological Survey, Report 01-0429. http://pubs.usgs.gov/of/2001/ofr-01-0429 (accessed June 8, 2007). 20. 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants. http://www.access.gpo.gov/nara/cfr/waisidx_06/40cfr61_06.html (accessed May 31, 2007).

21. 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for Source Categories. http://www.access.gpo.gov/nara/cfr/waisidx_06/40cfr63_06.html. (accessed May 31, 2007).

22. 40 CFR Parts 300.3, 300.400, 300.410 and 300.420. http://www.epa.gov/oilspill/pdfs/40cfr300.pdf. (accessed May 31, 2007).

23. Federal Response Plan - Basic Plan. http://www.au.af.mil/au/awc/awcgate/frp/frpbasic.pdf (accessed May 31, 2007).

24. U.S. Department of Homeland Security. National Response Plan. December 2004. http://www.dhs.gov/xlibrary/assets/NRP_FullText.pdf (accessed May 31, 2007).

25. Presidential Decision Directive 62, Protection Against Unconventional Threats to the Homeland and Americans Overseas. Unclassified abstract, May 22, 1998 http://www.ojp.usdoj.gov/odp/docs/pdd62.htm (accessed May 31, 2007).

26. J. Nadler. White Paper - Lower Manhattan Air Quality. Office of U.S. Congressman Jerrold Nadler, April 12, 2002. http://www.house.gov/nadler/wtc/docs/EPAWhitePaper.pdf (accessed May 31, 2007).

27. C. Whitman. Testimony before the U.S. Senate Appropriations Committee, Subcommittee on VA, HUD, and Independent Agencies. November 28, 2001.

28. W. Mugdan. Environmental Law Issues Raised by Terrorist Events in 2001. Presentation to Environmental Law Section, New York State Bar Association, January 25, 2002. http://www.nyenvirolaw.org/PDF/EPA-1-25-02-Mugdan-EnvironmentalLaw IssuesRaisedByTerroristEventsIn%202K1.pdf (accessed May 31, 2007).

29. Resource Conservation and Recovery Act, U.S. Code, Title 42, Chapter 82. http://www.access.gpo.gov/uscode/title42/chapter82_.html (accessed May 31, 2007).

30. Toxicology Excellence for Risk Assessment (TERA). World Trade Center (WTC), October 21-22, 2002 Peer Review Meeting Notes, prepared for U.S. Environmental Protection Agency. February 7, 2003. http://www.tera.org/peer/WTC/WTC%20Peer%20 Review%20Meeting%20Notes.pdf (accessed May 31, 2007).

31. M. Gerrard, op. cit.

32. H. Kaufman, EPA, personal communication, February 23, 2002.

33. R. Forst, Lower Manhattan Construction Command Center, personal communication, July 20, 2006.

34. U.S. Environmental Protection Agency, Office of Inspector General, EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement, Washington, D.C. EPA 2003-P-00012, August 21, 2003. http://www.epa.gov/oig/reports/2003/WTC_report_20030821.pdf (accessed May 31, 2007).

35. W. Mugdan, op. cit.

36. P. Lioy, M. Gochfeld. Lessons Learned on Environmental, Occupational, and Residential Exposures From the Attack on the World Trade Center. *American Journal of Industrial Medicine*. Vol. 42, No. 6, December 2002.

37. J. Miele, Commissioner, N.Y.C. Department of Environmental Protection. Testimony before United States Senate Subcommittee on Clean Air, Wetlands, and Climate Change, February 11, 2002.

38. U.S. Environmental Protection Agency, Region 2, New York City Response and Recovery Operations. World Trade Center Residential Dust Cleanup Program, Draft Final Report. March 2004. http://www.epa.gov/wtc/draft_final_report.pdf (accessed May 31, 2007).

39. U.S. Environmental Protection Agency, Office of Inspector General, op. cit.

40. U.S. Environmental Protection Agency. EPA and OSHA Web Sites Provide Environmental Monitoring Data from World Trade Center and Surrounding Areas. EPA Press Release, October 3, 2001.

http://yosemite.epa.gov/opa/admpress.nsf/a16b318fd6d8e076852572a000650bff/a58e 3e62ff609f5185256ada00729977!OpenDocument. (accessed June 9, 2007).

41. New York City Department of Health. Response to the World Trade Center Disaster - Recommendations for People Re-Occupying Commercial Buildings and Residents Re-Entering Their Homes. September 17, 2001.

42. U.S. Environmental Protection Agency, Office of Inspector General, op. cit.

43. U.S. Environmental Protection Agency. Whitman Details Ongoing Agency Efforts to Monitor Disaster Sites, Contribute to Cleanup Efforts. EPA Press Release, September 18, 2001. http://yosemite.epa.gov/opa/admpress.nsf/bf92f4e7d755207d85 25701c005e38d7/75aef680e69adf6585256acc007c2fc8!OpenDocument (accessed May 31, 2007).

44. U.S. Environmental Protection Agency, Office of Inspector General, op. cit.

45. Ibid.

46. Occupational Safety and Health Act of 1970, Public Law 91-596, 84 Stat. 1590, 91st Congress, S.2193, December 29, 1970, as amended through January 1, 2004. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=OSHACT&p_id=2 743 (accessed May 31, 2007).

47. 29 CFR 1910.1000 - Air Contaminants. http://www.osha.gov/pls/oshaweb/ owadisp.show_document?p_table=STANDARDS&p_id=9991 (accessed June 9, 2007).

48. Williams-Steiger Occupational Safety and Health Act of 1970, 984 Stat.1593, Section 5(a)(1). http://www.access.gpo.gov/uscode/title29/chapter15_.html (accessed June 9, 2007).

49. 29 CFR 1910.132 - Personal Protective Equipment, General Requirements. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_ id=9777 (accessed June 9, 2007).

50. 29 CFR 1910.134 - Respiratory Protection. http://www.osha.gov/pls/oshaweb/ow adisp.show_document?p_table=STANDARDS&p_id=12716 (accessed June 9, 2007).

51. 29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response. http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_ id=9765 (accessed June 9, 2007).

52. 29 USC 671a. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?db name= browse_usc&docid=Cite:+29USC671 (accessed June 9, 2007).

53. 29 CFR 1910.134 - Respiratory Protection, op. cit.

54. B. Lippy. Safety and Health of Heavy Equipment Operators at Ground Zero. *American Journal of Industrial Medicine*. Volume 42, Issue 6, December 2002.

55. E. Malievskaya, N. Rosenberg, et al. Assessing the Health of Immigrant Workers near Ground Zero: Preliminary Results of the World Trade Center Day Laborer Medical Monitoring. *American Journal of Industrial Medicine*. Vol. 42, Issue 6, December 2002.

56. B. Lippy. Protecting the Health and Safety of Rescue and Recovery Workers. in B. Levy, V. Sidel, eds. *Terrorism and Public Health—A Balanced Approach to Strengthening Systems and Protecting People*. Oxford University Press, New York, 2003.

57. D. Elisburg, J. Moran. Response to the World Trade Center Disaster: Initial WETP Grantee Response and Preliminary Assessment of Training Needs. National Institute of Environmental Health Sciences, Worker Education and Training Program (WETP), Contract #273-FH-013264, October 6, 2001.

58. B. Lippy. Protecting the Health, op. cit.

59. Ibid.

60. D. Guha-Sapir, M. Carballo. Medical Relief in Earthquakes. *Journal of the Royal Society of Medicine*. Vol. 93, February 2000.

61. M. Bruycker, D. Greco, et al. The 1980 Earthquake in Southern Italy: Rescue of Trapped Victims and Mortality. *Bulletin of World Health Organization.* Vol. 61, No. 6, 1983.

62. U.S. Department of Labor, Occupational Safety and Health Administration. A Dangerous Worksite: The World Trade Center. December 2003. http://www.osha.gov/Publications/dangerous_worksite.pdf (accessed October 13, 2006).

63. U.S. Environmental Protection Agency. Guidelines for Catastrophic Emergency Situations Involving Asbestos. EPA 340/I-92-010, February 1992.

64. U.S. Department of Labor, Occupational Safety and Health Administration. National Emergency Management Plan. Directive Number HSO 01-00-001. December 18, 2003. http://www.osha.gov/OshDoc/Directive_pdf/HSO_01-00-001.pdf (accessed May 31, 2007).

65. U.S. Environmental Protection Agency. Whitman Details Ongoing Agency Efforts to Monitor Disaster Sites, Contribute to Cleanup Efforts. EPA Press Release, September 18, 2001. http://yosemite.epa.gov/opa/admpress.nsf/bf92f4e7d755207d8525 701c005e38d7/75aef680e69adf6585256acc007c2fc8!OpenDocument (accessed May 31, 2007).

66. U.S. Department of Labor, Occupational Safety and Health Administration. OSHA, EPA Update Asbestos Data. Continue to Reassure Public of Contamination Fears. OSHA National News Release, September 14, 2001. http://www.osha.gov/pls/ oshaweb/owadisp.show_document?p_table=NEWS_RELEASES&p_id=93 (accessed May 31, 2007).

67. U.S. Environmental Protection Agency. Health Effects of the World Trade Center Collapse. March 25, 2005. http://www.epa.gov/wtc/factsheets/wtchealth.html#longterm_health_effects (accessed May 31, 2007).

68. R. Herbert, J. Moline, et al. The World Trade Center Disaster and the Health of Workers: Five-Year Assessment of a Unique Medical Screening Program. *Environmental Health Perspectives*. Volume 114, Number 12, December 2006. http://www.ehponline.org/members/2006/9592/9592.pdf (accessed May 31, 2007).

69. J. Herbstman, R. Frank, et al. Respiratory Effects of Inhalation Exposure among Workers during the Clean-Up Effort at the World Trade Center Disaster Site. *Environmental Research.* Volume 99, Issue 1, September 2005.

70. G. Banauch, C. Hall, et al. Pulmonary Function after Exposure to the World Trade Center Collapse in the New York City Fire Department. *American Journal of Respiratory and Critical Care Medicine*. Vol. 174, 2006.

71. G. Banauch, A. Dhala, et al. Bronchial Hyperreactivity and other Inhalation Lung Injuries in Rescue/Recovery Workers after the World Trade Center Collapse. *Critical Care Medicine*. Volume 33(1) Supplement, January 2005.

72. D. Prezant, M. Weiden, et al. Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site. *New England Journal of Medicine*. Vol. 347, September 12, 2002.

73. G Izbicki, R. Chavko, et al. World Trade Center "Sarcoid-Like" Granulomatous Pulmonary Disease in New York City Fire Department Rescue Workers. *Chest.* Vol. 131, No. 5, May 1, 2007. http://www.chestjournal.org/cgi/content/full/131/5/1414 (accessed may 31, 2007).

74. L. Tapp, S. Baron, et al. Physical and Mental Health Symptoms Among NYC Transit Workers Seven and One-Half Months after the WTC Attacks. *American Journal of Industrial Medicine*. Vol. 47, Issue 6, June 2005.

75. E. Malievskaya, N. Rosenberg, et al., op. cit.

76. J. Reibman, S. Lin, et al. The World Trade Center Residents' Respiratory Health Study: New Onset Respiratory Symptoms and Pulmonary Function. *Environmental Health Perspectives*. Vol. 113, No. 4, April 2005. http://www.ehponline.org/members/2004/7375/7375.pdf (accessed May 31, 2007).

77. S. Lin, J. Reibman, et al. Upper Respiratory Symptoms and Other Health Effects among Residents Living Near the World Trade Center Site after September 11, 2001. *American Journal of Epidemiology*. Vol. 162, No. 6, 2005. http://aje.oxfordjournals.org/cgi/content/full/162/6/499 (accessed May 31, 2007).

78. A. Szema, M. Khedkar, et al. Clinical Deterioration in Pediatric Asthmatic Patients after September 11, 2001. *Journal of Allergy and Clinical Immunology*. Volume 113, Issue 3, March 2004.

79. S. Lederman, V. Rauh, et al. The Effects of the World Trade Center Event on Birth Outcomes among Term Deliveries at Three Lower Manhattan Hospitals. *Environmental Health Perspectives*. Volume 112, Number 17, December 2004. http://www.ehponline.org/members/2004/7348/7348.pdf (accessed May 31, 2007).

80. Centers for Disease Control and Prevention. Self-Reported Increase in Asthma Severity after the September 11 Attacks on the World Trade Center—Manhattan, New York, 2001. *Mortality and Morbidity Weekly Report*. September 6, 2002. http:// www.cdc.gov/mmwr/preview/mmwrhtml/mm5135a1.htm (accessed May 31, 2007).

81. J. Samet, et al. The Legacy of World Trade Center Dust. *New England Journal of Medicine*. Vol. 356, No. 2, May 31, 2007.

82. H. Frumkin. Chapter 14 – Carcinogens. in B. Levy and D. Wegman, eds. Occupational Health – Recognizing and Preventing Work-Related Disease, Third Edition. Little, Brown, and Company, Boston, 1995.

83. R. Herbert. *New England Journal of Medicine*. Audio interview. May 31, 2007. http://content.nejm.org/cgi/content/full/356/22/2233/DC1 (accessed May 31, 2007).