OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement

Report No. 2003-P-00012

August 21, 2003

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Abbreviations

AEGL	Acute Exposure Guideline Level
AHERA	Asbestos Hazard Emergency Response Act
ATSDR	Agency for Toxic Substances and Disease Registry
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COPC	Contaminants of Potential Concern
EPA	Environmental Protection Agency
f/cc	Fibers per Cubic Centimeter
FEMA	Federal Emergency Management Agency
FRP	Federal Response Plan
HEPA	High Efficiency Particulate Air
HVAC	Heating, Ventilation, and Air Conditioning
NCP	National Contingency Plan
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute for Occupational Safety and Health
NYCDDC	New York City Department of Design and Construction
NYCDEP	New York City Department of Environmental Protection
NYCDOH	New York City Department of Health
OCEMR	Office of Communications, Education, and Media Relations
OIG	Office of Inspector General
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCM	Phase Contrast Microscopy
PDD	Presidential Decision Directive
PLM	Polarized Light Microscopy
PM	Particulate Matter
s/mm2	Structures Per Millimeter Squared
TEM	Transmission Electron Microscopy
TERA	Toxicology Excellence for Risk Assessment
TSP	Total Suspended Particulates
VOCs	Volatile Organic Compounds
WTC	World Trade Center

Cover photo: New York Police Department photograph

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

THE INSPECTOR GENERAL

August 21, 2003

MEMORANDUM

SUBJECT: Final Evaluation Report: EPA's Response to the World Trade Center Collapse: Challenges, Successes, and Areas for Improvement
Report No. 2003-P-00012

TO: Marianne L. Horinko
Acting Administrator

Attached is our final report regarding the Environmental Protection Agency's (EPA) response to the World Trade Center (WTC) collapse. This report contains findings that describe problems encountered in responding to the WTC collapse and corrective actions the Office of Inspector General (OIG) recommends. This report represents the opinion of the OIG and the findings contained in this report do not necessarily represent the final EPA position. Final determinations on matters in the report will be made by EPA managers in accordance with established procedures.

Action Required

In accordance with EPA Directive 2750, as the action official, you are required to provide this Office with a written response within 90 days of the final report date. The response should address all recommendations. For the corrective actions planned but not completed by the response date, please describe the actions that are ongoing and provide a timetable for completion. Where you disagree with a recommendation, please provide alternative actions for addressing the findings reported.

We appreciate the efforts of EPA officials and staff, as well as those of New York City, in working with us to develop this report. If you or your staff have any questions regarding this report, please contact me at (202) 566-0847 or Kwai Chan, Assistant Inspector General for Program Evaluation, at (202) 566-0827.

Nikki L. Tinsley

Attachment

cc:
Thomas J. Gibson, Chief of Staff, Office of the Administrator
Jane M. Kenny, Regional Administrator, EPA Region 2
Barry N. Breen, Principal Deputy Assistant Administrator, Office of Solid Waste and Emergency Response
Jeffrey R. Holmstead, Assistant Administrator for Air and Radiation
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Kathleen Callahan, Assistant Regional Administrator for New York City Response and Recovery Operations
Mary U. Kruger, Director, EPA Office of Homeland Security

Executive Summary

The September 11, 2001, terrorist attack on the World Trade Center in New York City and the environmental aftermath were unprecedented. Airborne dust from the collapse of the towers blanketed Lower Manhattan and was blown or dispersed into many of the surrounding office buildings, schools, and residences. This complex mixture of building debris and combustion by-products contained such ingredients as asbestos, lead, glass fibers, and concrete dust. Responding to this crisis required organizations from all levels of government to coordinate their response efforts and to make critical public health and safety decisions quickly, and without all of the data that decision-makers would normally desire.

Unfortunately, this country may experience more terrorist attacks, and a response to such a tragedy could be needed again. Accordingly, we initiated this evaluation, in consultation with the Environmental Protection Agency (EPA) Deputy Administrator, to evaluate EPA's response to September 11. During our evaluation, we sought to answer six specific questions that address how EPA responded and how it could better respond in the future. Those questions, along with summaries of what we found and recommendations for each, follow.

1. Did the available monitoring data and analyses of that data support EPA's major public communications regarding air quality and associated health risks resulting from the collapse of the World Trade Center (WTC) towers?

EPA's early public statements following the collapse of the WTC towers reassured the public regarding the safety of the air outside the Ground Zero area. However, 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. At that time, air monitoring data was lacking for several pollutants of concern, including particulate matter and polychlorinated biphenyls (PCBs). Furthermore, The White House Council on Environmental Quality influenced, through the collaboration process, the information that EPA communicated to the public through its early press releases when it convinced EPA to add reassuring statements and delete cautionary ones. An EPA draft risk evaluation completed over a year after the attacks concluded that, after the first few days, ambient air levels were unlikely to cause short-term or long-term health effects to the general population. However, because of numerous uncertainties – including the extent of the public's exposure and a lack of health-based benchmarks – a definitive answer to whether the air was safe to breathe may not be settled for years to come. Details regarding the handling of indoor contamination are discussed in relation to Objective 2 below.

EPA has initiated actions to strengthen its risk communication procedures for emergency situations, including the development of a draft Plan for Incident

Communication. We recommend that the EPA Administrator continue these efforts and develop procedures for emergency risk communication to ensure that public pronouncements regarding health risks and environmental quality are adequately supported with available data and analysis and are appropriately qualified.

2. Were EPA actions and decisions in regard to evaluating, mitigating, and controlling risks to human health from exposure to indoor air pollutants in the WTC area consistent with applicable statutes, regulations, policies, guidance, and practice?

EPA's actions to evaluate, mitigate, and control risks to human health from exposure to indoor air pollutants in the WTC area were consistent with applicable statutes and regulations. These statutes and regulations do not obligate EPA to respond to a given emergency, allowing for local agencies to lead a response, and New York City in fact exercised a lead role regarding indoor air. Nonetheless, we believe EPA could have taken a more proactive approach regarding indoor air cleanup. After the City was criticized for its response, EPA began to assume a lead role in February 2002. Prior to initiation of the EPA-led cleanup, many WTC area residents had returned to their homes, and a study indicated most of them had not followed recommended cleaning practices. The full extent of public exposure to indoor contaminants resulting from the WTC collapse is unknown.

We recommend that the EPA Administrator coordinate with other Federal, State, and local agencies to develop protocols for determining how indoor environmental concerns will be handled in large-scale disasters. We also recommend that EPA work with the Department of Homeland Security and other Federal agencies to develop and publish oversight criteria, including State and local agency reporting requirements, for handling indoor air contamination.

3. Were asbestos demolition and renovation work practice standards followed during WTC cleanup and recovery operations and, if not, why not?

We could not conclusively determine the extent to which required work practices regarding the control of asbestos were followed at the WTC site during demolition and debris removal. Since asbestos is a known human carcinogen, EPA has established stringent work practices to control emissions of asbestos resulting from demolition and renovation projects. We found that a significant requirement to reduce emissions in emergency demolitions – wetting damaged buildings before demolition and keeping the waste material wet after demolition – was followed. However, work practices applicable to the transport of debris from the site were employed inconsistently. The specific impact on air quality of any variance from EPA's asbestos emergency work practices is unknown.

We recommend that the EPA Administrator develop specific procedures for ensuring that Federal, State, and local responders follow the appropriate NESHAP work practices for catastrophic emergency situations involving asbestos.

4. To what extent were EPA and government communications regarding air quality and associated health risks: (a) received by the public; (b) understood by the public; and (c) effective in getting people to take the desired actions to reduce their potential health risks?

After the WTC terrorist attack, people received information from many different sources, and many factors – in addition to government communications – could have influenced their actions. Information is a critical component in helping the public minimize their exposure to potential health hazards. However, evidence gathered through government hearings, news polls, health studies, and our interviews indicated that the public did not receive sufficient air quality information and wanted more information on associated health risks. Also, evidence indicated that government communications were not consistently effective in persuading the public to take recommended precautions. Because of these concerns, the OIG conducted a survey of New York City residents regarding government communications. These results will be reported separately.

EPA has initiated several actions to improve its risk communications procedures during emergencies. Further, EPA is working with the Federal Emergency Management Agency to clarify roles and responsibilities for ensuring worker safety during an emergency response. We recommend that EPA continue to coordinate efforts to establish clear Federal roles.

5. What additional actions, if any, should EPA take to improve its response and recovery efforts in the WTC area related to ambient and indoor air quality?

The majority of officials contacted indicated EPA did not need to take additional actions to address outdoor ambient air quality concerns. However, concerns were expressed regarding indoor contamination, and several more measures can be taken to ensure that indoor cleanup effectively minimizes health risk exposure. We recommend that EPA implement a testing program to ensure the indoor cleanup effectively reduced health risks from all pollutants of concern, and implement a verification program to determine whether previously cleaned residences have been recontaminated.

6. Should EPA revise its preparation and contingency planning for dealing with air pollution resulting from environmental catastrophes?

The events of September 11 had national security ramifications not previously experienced, and many persons interviewed spoke highly of the response of EPA and its employees. Still, we, as well as EPA and others, have identified lessons learned from the response that can improve EPA's preparedness for future disasters. An overriding lesson learned was that EPA needs to be prepared to assert its opinion and judgment on matters that impact human health and the environment. Although many organizations were involved in addressing air

quality concerns resulting from the WTC collapse, subsequent events have demonstrated that, ultimately, the public, Congress, and others expect EPA to monitor and resolve environmental issues. This is the case even when EPA may not have the overall responsibility to resolve these issues or the necessary resources to address them.

EPA has initiated many actions as a result of its own internal lessons learned exercises. Based on our review, we our making a number of recommendations to improve EPA's emergency response capabilities in three areas: (1) contingency planning, (2) risk assessment and characterization, and (3) risk communication.

Agency and New York City Comments and OIG Evaluation

In her August 8, 2003 response to the draft report, the EPA Acting Administrator stated that she was proud of the men and women of EPA and that the Agency's response was extraordinary. Although she generally agreed with the recommendations of our draft report (with the exception of Chapter 6), she responded that our report lacked sufficient acknowledgment of EPA's efforts in several areas. For example, she noted that our report focused too heavily on the Agency's press releases and did not sufficiently consider the Agency's other forms of communication or the Agency's "lessons learned" efforts. She provided several specific comments outlining the Agency's disagreement with some of the report's findings and conclusions. A detailed summary of the Agency response and our evaluation is included at the end of each chapter. The Agency's complete response and our evaluation of that response are included as Appendices Q and R, respectively.

New York City officials responded to excerpts from the draft report and provided us with specific comments and clarifications which we incorporated into the final report, as appropriate. New York City's response is attached as Appendix S and our evaluation of that response is attached as Appendix T.

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Appendices

Chapter 1
Introduction

Purpose

The September 11, 2001, terrorist attacks on this country and their environmental aftermath were unprecedented. Unfortunately, further terrorist attacks on this country remain likely and a response to such a tragedy could be needed again. Accordingly, the Office of Inspector General (OIG) initiated this evaluation, in consultation with the Environmental Protection Agency (EPA) Deputy Administrator, to evaluate EPA's response to the collapse of the World Trade Center (WTC) towers on September 11. The objectives of our evaluation were to answer the following:

- Did the available monitoring data and analyses of that data support EPA's major public communications regarding air quality and associated health risks resulting from the collapse of the WTC towers?

- Were EPA actions and decisions in regard to evaluating, mitigating, and controlling risks to human health from exposure to indoor air pollutants in the WTC area consistent with applicable statutes, regulations, policies, guidance, and practice?

- Were asbestos demolition and renovation work practice standards followed during WTC cleanup and recovery operations and, if not, why not?

- To what extent were EPA and government communications regarding air quality and associated health risks: (a) received by the public; (b) understood by the public; and (c) effective in getting people to take the desired actions to reduce their potential health risks?

- What additional actions, if any, should EPA take to improve its response and recovery efforts in the WTC area related to ambient and indoor air quality?

- Should EPA revise its preparation and contingency planning for dealing with air pollution resulting from future catastrophes?

Background

On the morning of Tuesday, September 11, 2001, terrorists flew two hijacked commercial jets into the WTC towers. Both towers collapsed within 2 hours of impact, killing almost 2,800 people, including 343 firefighters and 60 New York City and Port Authority police officers. In addition to the devastating loss of life,

the dust and debris emanating from the collapse and the ensuing fires created environmental concerns for the public that have persisted more than a year after the disaster.

Airborne dust from the collapse of the towers blanketed Lower Manhattan and was blown or dispersed into many of the surrounding office buildings, schools, and residences. One person described the aftermath in Lower Manhattan as "looking like a blizzard" had hit. However, this blizzard did not deposit snow, but instead a complex mixture of building debris and combustion by-products. This mixture included, among other substances, asbestos, lead, glass fibers, and concrete dust.

Dust cloud from the WTC collapse. Source: NYPD

Street level conditions in Lower Manhattan after collapse.
Source: wtcphotos by flagsoncars.com

In addition to the initial dispersion of dust and debris, fires at the site created various emissions of potentially harmful pollutants. These fires were not officially declared extinguished until December 19, 2001, and debris continued to smolder and fires flared up for weeks after that. Emissions resulting from these fires included particulate matter, various metals, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and dioxin.

On September 11, 2001, the President signed a major disaster declaration for the five counties of New York City to provide assistance to New York State, thus activating the Federal Response Plan (FRP). The FRP establishes the process and structure for the Federal Government to provide assistance to local agencies when responding to the consequences of any major disaster or emergency declared under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (42 U.S.C. § 5121, et seq.). The FRP employs an operational

structure based on the principles of the Incident Command System,[1] a system adopted by the fire and rescue community.

The Federal Emergency Management Agency (FEMA) is responsible for administering the FRP. This plan includes 12 Emergency Support Functions, which describe the types of support provided to local authorities and identify the Federal agencies responsible for leading and assisting in providing that support. To obtain assistance under the FRP, a State requests assistance from FEMA, which in turn issues a mission assignment to the appropriate Federal lead agency as outlined in the Emergency Support Functions.

EPA is the designated lead agency for Emergency Support Function No. 10, "Hazardous Materials Annex." The intent of this function is to provide support to State and local governments in responding to an actual or potential discharge and/or release of hazardous materials following a major disaster or emergency, including the release of airborne contaminants. To ensure the most efficient and effective use of resources in responding to an actual or potential release of hazardous materials, this function also places the response mechanisms of the National Contingency Plan within the FRP coordination structure. The National Contingency Plan is the implementing regulation for EPA's Superfund program, and provides guidelines and procedures for responding to releases and threatened releases of hazardous substances, pollutants, or contaminants, including releases that threaten air quality.

Early Response

Various circumstances complicated the Government's and EPA's ability to respond to environmental concerns in what was an unprecedented and extremely difficult situation. The New York City Office of Emergency Management's Emergency Operations Center was destroyed in the attacks. EPA's Region 2 office, about a half-mile from the WTC site, was evacuated and not re-opened until 2 weeks after the attacks. Electrical power was lost in Lower Manhattan, as well as radio and telephone communications. Further, transportation to Lower Manhattan was halted, as well as commercial air travel nationwide.

As with most disasters, local authorities were the first responders. "Ground Zero," as the seven-building WTC area site would become known, was initially a search and rescue effort under the direction of the Fire Department of New York and, subsequently, a recovery operation under the jurisdiction of the New York City Department of Design and Construction (NYCDDC) and the Fire Department of New York. According to New York City's Deputy Assistant Chief

[1] Incident Command System Principles include use of common terminology, modular organization, integrated communications, unified command structure, action planning, manageable span of control, pre-designated facilities, and comprehensive resource management.

of the Fire Department, "the complexity of the activity performed at one site – rescue, recovery, demolition, and construction – at one time is unprecedented." The New York City Office of Emergency Management was responsible for coordinating the response efforts of approximately 150 governmental agencies and non-governmental organizations. Further complicating the situation was the fact that the area was treated as a crime scene, with law enforcement authorities strictly limiting access for agencies such as EPA, particularly in the first 48 hours.

Nonetheless, EPA officials immediately recognized the need to monitor environmental conditions after the attacks occurred. After the collapse, EPA on-scene coordinators collected bulk dust samples that were analyzed for asbestos and lead. EPA's Edison, New Jersey, location provided workspace for essential Region 2 personnel while EPA's New York City office was closed. The Environmental Response Team in Edison also collected ambient air samples in New Jersey and Brooklyn on September 11, which were analyzed for the presence of asbestos, lead, and VOCs. On September 12, nine ambient (outdoor) air samples were collected from Ground Zero.

As the first week progressed, the assessment of environmental conditions became a primary emphasis for EPA and other Federal, State, and local government organizations. An EPA air monitoring specialist in Research Triangle Park, North Carolina, took a team to New York and helped develop a monitoring network to assess the ambient air conditions for the general public around Lower Manhattan. In addition, a multi-agency task force was established to address environmental concerns, with EPA eventually being designated the lead agency for managing all of the ambient air data collected by the various government agencies.

In addition to responding to the air quality issues, which are the focus of this report, EPA conducted many other response activities. These included overseeing the removal of hazardous wastes, monitoring and assessing water quality, monitoring environmental conditions at the landfills, and establishing and operating personal and truck washing stations at the disaster site and landfills. Hazardous material removed from the site included an estimated 236 batteries, 802 containers, and 3,049 cylinders that had potential to cause environmental and human health damage. Further, approximately 639,465 gallons of fuel oil and/or oily water mixture were pumped from basements, manholes, trenches, and underground storage tanks. A NYCDDC official told us that EPA's response was "phenomenal" in his opinion and that EPA's response crews were on top of every issue.

Other Federal agencies in addition to EPA were involved in providing support to local authorities regarding environmental quality and safety. For example:

- FEMA was in charge of coordinating the FRP.

- The Occupational Safety and Health Administration (OSHA), within the Department of Labor, conducted ambient and bulk dust sampling within the immediate Ground Zero work zone and provided guidance to Ground Zero workers regarding the use of personal protective equipment.

- Within the Department of Health and Human Services:

  < The National Institute for Occupational Safety and Health (NIOSH) assisted in ensuring worker health and safety.

  < The Agency for Toxic Substances and Disease Registry (ATSDR) provided technical assistance to the New York City Department of Health by conducting an indoor residential sampling and assessment project.

  < The Public Health Service provided assistance to the New York City Department of Health.

Appendix A provides further details on the various tasks performed by these and other Federal Agencies.

Scope and Methodology

Our evaluation focused on EPA's response to air quality concerns – both ambient and indoor – for the period September 2001 through April 2003. Our work was performed at various EPA offices and the offices of several other Federal agencies, such as FEMA, OSHA, and ATSDR. We also performed work at various New York City offices. Further, we visited and consulted selected health research, air quality testing, academic, and environmental organizations.

Our approach included the independent review and verification of WTC air monitoring and bulk dust data. For example, we randomly selected monitoring results posted on EPA's web site and traced the test results back to the raw data to verify the accuracy of the information posted. Further, we selected certain data from EPA's "NYC Response" database and determined whether it was included on EPA's public web site.

Our approach included a synthesis of WTC-related research reports, independent legal interpretation of applicable statutes and regulations, and independent analysis of EPA technical decisions used in interpreting and presenting air quality information. We interviewed key officials within and outside of EPA who collected, analyzed, interpreted, or made decisions with WTC air monitoring and bulk dust data, as well as environmental and medical external experts. We conducted our field work during the period June 2002 through July 2003. We

conducted this review in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States.

A detailed description of our scope and methodology is in Appendix B.

Chapter 2
EPA Statements About Air Quality Not Adequately Qualified

EPA's early statements reassured the public regarding the safety of the air outside the Ground Zero perimeter area. However, when EPA made a September 18 announcement that the air was "safe" to breathe, the Agency did not have sufficient data and analyses to make the statement. The White House Council on Environmental Quality (CEQ) influenced, through the collaboration process, the information that EPA communicated to the public through its early press releases when it convinced EPA to add reassuring statements and delete cautionary ones. Conclusions from an EPA draft risk evaluation completed over a year after the attacks have tended to support EPA's statements about long-term health effects when all necessary qualifications are considered. However, EPA's statements about air quality did not contain these qualifications. (Details on indoor air are in Chapter 3.)

Communicating Information to the Public Critical

Communicating the potential health risks resulting from an environmental hazard is a key mechanism for warning the public to mitigate potential exposures and take other precautions to avoid unnecessary health risks. However, an emergency situation often presents significant challenges.

EPA has many years of experience in communicating environmental risks to the public, especially through its Superfund program. The Agency has issued numerous guidance documents on how to effectively communicate risks to the public, including EPA's "Seven Cardinal Rules of Risk Communication" (see box). EPA and the New York City Department of Health were significantly involved in communicating information on the air quality in Lower Manhattan after the WTC disaster.

Seven Cardinal Rules of Risk Communication

1. Accept and involve the public as a legitimate partner.
2. Plan carefully and evaluate your efforts.
3. Listen to the public's specific concerns.
4. Be honest, frank, and open.
5. Coordinate and collaborate with other credible sources.
6. Meet the needs of the media.
7. Speak clearly and with compassion.

What EPA Said in Its Major Public Communications

EPA used various methods to inform the public after September 11, including attending public forums; having interviews with newspaper, television, and radio reporters; and posting information on its public web site. Our analysis focused primarily on the information provided through press releases since the Agency develops its position through a deliberative process that represents the Agency's official position.

EPA issued five press releases within 10 days after September 11, 2001, four more through the end of December, and another four through the end of May 2002. EPA's WTC press releases from September through December 2001 reassured the public about air quality. Although EPA's press releases generally recommended that rescue and cleanup workers take precautions to reduce their exposure to pollutants, EPA's basic overriding message was that the public did not need to be concerned about airborne contaminants caused by the WTC collapse. This reassurance appeared to apply to both indoor and outdoor air.

For example, EPA Region 2 officials told us that the September 18 statement made by the EPA Administrator (see Appendix C) that the air was "safe" to breathe only applied to:

- long-term health effects – not short-term or acute health effects;
- the general public – not Ground Zero workers;
- outdoor air – not indoor air;
- healthy adults – not sensitive sub-populations such as children and the elderly; and
- asbestos – not other air pollutants.

However, except for the second point, the statements issued by EPA in press releases throughout 2001 generally did not contain the above qualifications. For the general public, EPA's overriding message was that there was no significant threat to human health.

Key air quality related statements from EPA press releases issued during 2001 following the WTC collapse are in Table 2-1. The full text of each of these press releases are available at our web site.[2]

[2] www.epa.gov/oig

Table 2-1: Key Air Quality Statements from 2001 Press Releases

Date	Key Statement
09-13-01	"Monitoring and sampling conducted on Tuesday and Wednesday have been very reassuring about potential exposure of rescue crews and the public to environmental contaminants. . . . EPA and OSHA will work closely with rescue and cleanup crews to minimize their potential exposure, but the general public should be very reassured by initial sampling."
09-16-01	"Our tests show that it is safe for New Yorkers to go back to work in New York's financial district" (quoting Assistant Secretary of Labor for OSHA). "The Agency is recommending that businesses in the area planning to reopen next week take precautions including cleaning air conditioning filters and using vacuums with appropriate filters to collect dust."
09-18-01	"I am glad to reassure the people of New York and Washington, D.C. that their air is safe to breath [sic] . . . " (quoting EPA Administrator).
09-21-01	"NYC Monitoring Efforts Continue to Show Safe Drinking Water & Air" (press release heading).
10-03-01	"Data Confirms No Significant Public Health Risks; Rescue Crews and Nearby Residents Should Take Appropriate Precautions. . . " (press release sub-heading).
10-30-01	"While we have fortunately not found levels of contaminants that pose a significant health risk to the general public, our efforts to monitor the area and keep the public informed of our findings have not waned. "

Agency officials stressed that press releases were only one of many forms of communication used to provide air quality information to the public, and that public forums and media interviews were also important. Further, EPA provided public access to its monitoring data through its public web site, which included interactive maps that could be used to identify monitoring results. In regard to the monitoring data, we found no evidence that EPA attempted to conceal data results from the public.

Data Available at the Time Did Not Fully Support EPA Press Releases

Information and the analyses of available data did not fully support the statement made in the September 18, 2001, release, which quoted the EPA Administrator as saying the air was "safe" to breathe. Four factors in particular posed limitations on the conclusions that could be made at that time about air quality:

- A lack of data results for many pollutants,
- An absence of health benchmarks for asbestos and other pollutants,
- Imprecise optical asbestos sampling methodologies, and
- Over 25 percent of the bulk dust samples collected before September 18 showed the presence of asbestos above the 1 percent benchmark.

EPA did not have monitoring data to support reassurances made in press releases up to September 18 because it lacked monitoring data for several contaminants, particularly PCBs, particulate matter, dioxin, and PAHs.

According to a draft evaluation entitled *Exposure and Human Health Evaluation of Airborne Pollution from the World Trade Center Disaster*, by EPA's Office of Research and Development, that Office was not able to make health risk evaluations for exposures in the first couple of days because of the lack of monitoring data. For several pollutants of concern, sampling did not begin until September 16, and in many cases the results were not known until after the September 18 press release was issued. EPA was not able to obtain samples and monitor air due to difficulties in access and security, power supply sources, equipment availability, and analytical capacity. As a result, data available before September 18 for making conclusions about air quality for pollutants other than asbestos was limited.

Table 2-2 shows when air monitoring began and when the data results first became available for each pollutant of concern.

Table 2-2: Outdoor Sampling Timeline for Pollutants of Concern

Pollutant	Sampling Source	Sampling Started	Results Available[1]
Lead	Dust	September 11	September 12
Asbestos	Bulk Dust Ambient Air	September 11 September 12	September 12 September 13
Benzene **[2]**	Air Grab Samples	September 16	September 17
Mercury	Ambient Air Dust	September 16 September 16	September 18 September 20
Lead	Ambient Air	September 16	September 20 **[3]**
PAHs Cadmium Chromium Manganese	Ambient Air	September 16	September 20
PAHs	Dust	September 16	September 22
Dioxin	Dust Ambient Air	September 16 September 16	September 24 **[4]** September 28
PCBs	Ambient Air	September 16	September 28
$PM_{2.5}$ PM_{10} **[5]**	Ambient Air	September 21	October 4
TSP **[5]**	Ambient Air	No Monitoring	No Monitoring

Notes:
[1] = Based on Daily Summaries of monitoring results prepared by Region 2 staff in Edison, New Jersey, which were used to brief management on data results.
[2] = EPA sampled for additional VOCs on this date as well.
[3] = EPA's Health Risk Evaluation reported lead results were known on September 18.
[4] = EPA's Health Risk Evaluation reported dioxin results were known on September 23.
[5] = "PM" stands for "Particulate Matter." $PM_{2.5}$ represents "fine" particulate matter less than or equal to 2.5 micrometers in diameter. PM_{10} refers to particulate matter less than or equal to 10 micrometers, with the fraction between 2.5 and 10 micrometers known as "coarse." "TSP" stands for "Total Suspended Particulates," and includes all sizes of particles.

Health-based benchmarks for short-term and acute exposures did not exist for pollutants of concern resulting from the collapse of the WTC. For asbestos, EPA used benchmarks originally designed for other purposes to assess potential health risks from breathing the air following the WTC collapse. Because health-based benchmarks for short-term exposures did not exist for most of the other pollutants, EPA revised benchmarks for lifetime (30-year) exposures to develop screening levels for short-term (1-year) exposures. Further, health-based benchmarks did not exist for assessing the risk to human health from exposure to the combination of air pollutants that were emitted.

EPA did not have health-based benchmarks for airborne asbestos nor for asbestos in bulk dust. Consequently, EPA used criteria from two programs originally developed for other purposes.

- ***Asbestos Hazard Emergency Response Act (AHERA):*** Criteria for this program were developed for air monitoring inside schools following an asbestos abatement program, to clear those schools for re-entry. For the WTC testing, EPA used AHERA criteria to evaluate the ambient (outdoor) air quality for asbestos. However, this is not a health-based standard. The AHERA standard for re-entering schools was established at 70 structures per millimeter squared (s/mm2) in 1987 because this was considered to be the amount of background contamination found on the filters used to collect air samples when the AHERA standard was issued. Due to filter improvements over the years, the amount of background contamination today is considerably less, but the AHERA standard has not been revised.

- ***Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP):*** Criteria for this program were developed to identify asbestos-containing material subject to demolition and renovation work practices. This criteria states that material containing at least 1 percent asbestos, by volume, is considered asbestos-containing material and subject to EPA's NESHAP regulations. The 1 percent threshold, based on the smallest amount that can be measured using Polarized Light Microscopy, is not a health-based standard. This was emphasized in a September 19 e-mail from an EPA Branch Chief, who has testified as an Agency expert at an asbestos penalty hearing that: "Additionally, 1% asbestos in a material **is not a safe level** of asbestos [*emphasis in original quotation*] . . . one-half percent asbestos-containing material (ACM) could be just as hazardous as 20% ACM depending on the condition of the material and how it is handled." New York City also recommended that building owners use this 1 percent benchmark in determining whether the interior of buildings should be cleaned for asbestos (see Chapter 3).

Guidelines were not available to assess the impact of acute (up to 8 hours) exposures. People caught in the initial debris and dust cloud on September 11 were potentially exposed to high levels of various pollutants for a short duration. EPA has been funding a program to develop Acute Exposure Guideline Levels (AEGLs), but none of these levels had been finalized at the time of the WTC disaster. The program had developed several draft AEGL's but these draft AEGLs were not applicable to the pollutants of concern at the WTC site.

In general, EPA did not have benchmarks to evaluate short-term exposures such as those experienced from the WTC collapse. For the WTC situation, EPA adjusted the Superfund 30-year exposure benchmarks to 1-year (short-term) exposure benchmarks. (See Appendix D for a list of benchmarks used by EPA in

assessing WTC ambient data.) Since this was done very quickly during an emergency situation, these benchmarks were not subjected to peer review.

In addition to not knowing the health impacts of certain individual pollutants, information was not available on the cumulative or synergistic impacts of being exposed to several pollutants at once. For example, one medical expert suggested there may be a synergistic effect between PAHs and asbestos, since PAHs resemble cigarette tar. Studies have shown the lung cancer risk from exposure to asbestos is increased exponentially for cigarette smokers. In addition, this expert noted that the combination of high pH and the small shards of glass found in WTC dust could have had a synergistic impact on the acute respiratory symptoms that many people experienced.

There were limitations with all three methods used to analyze asbestos concentrations in the ambient air and bulk dust in Lower Manhattan. These limitations, which were not noted in EPA's press releases, restricted EPA's ability to make definitive assessments about the health risks posed by asbestos. However, even with these limitations, sufficient data existed to identify the presence of asbestos in the dust and ambient air, and to warrant that persons working around the dust take necessary precautions to not inhale the dust. The three methods used and their limitations follow:

- Transmission Electron Microscopy (TEM) is a sensitive method generally used to analyze air samples collected from a relatively clean indoor environment. At the WTC site, many samples could not be analyzed because the filters being used to collect asbestos were overloaded with particulates. For example, 24 of the 69 samples collected as of September 17 could not be analyzed because the filters were overloaded.

- Phase Contrast Microscopy (PCM), which was used to analyze asbestos concentrations in ambient air beginning September 18, can only count fibers in the filter greater than 5 micrometers in length. A study at the WTC site found that the majority of the asbestos fibers at the site were less than 5 micrometers in length.

- Polarized Light Microscopy (PLM) was used to measure asbestos in bulk dust. This method is primarily an estimation method that is not very precise, and has a detection limit of 1 percent. Therefore, using this method against a strict benchmark is not reliable.

According to EPA, essentially all outdoor areas at the WTC site were vacuumed, and the detection methods did not impact the action actually taken to remove the dust from outdoor areas. See Appendix E for a summary of EPA's outdoor air asbestos sampling results.

Some Asbestos Readings Exceeded Levels of Concern

Over 25 percent of the bulk dust samples that EPA had collected and analyzed by September 18 showed the presence of asbestos above the 1 percent threshold used by EPA to indicate significant risk. In addition, New York City used the 1 percent threshold to determine whether the removal of indoor dust was subject to its Asbestos Control Program regulation. The level of asbestos in dust was a concern because of the potential for the dust to be disturbed and become airborne, and thus inhaled. As noted above, this level is not a health-based standard and dust that contains less than 1 percent could pose a health risk. See Appendix F for results of EPA outdoor asbestos bulk testing.

EPA and the New York City Department of Environmental Protection (NYCDEP) conducted extensive ambient air monitoring for asbestos around Ground Zero and Lower Manhattan after September 11. This sampling was conducted at up to 60 sites and a total of almost 10,000 samples were analyzed using TEM. During the month of September 2001, EPA and New York City monitoring recorded 30 exceedences of the AHERA standard of 70 s/mm2. However, after September 2001 the number of AHERA exceedences decreased significantly. For the period October 2001 through May 2002, seven exceedences of the AHERA standard were recorded, as shown in Table 2-3.

Table 2-3. Ambient Asbestos Readings in Lower Manhattan In Excess of 70 s/mm2

Date	Reading (s/mm2)	Location [1]
10/09/01	104.99	Chambers Street
11/28/01	124.44	North Side of Stuyvesant High School
12/27/01	204.44	Albany and Greenwich
01/14/02	72.00	Pier 6 bus sign
02/05/02	88.00	Liberty and Trinity
02/11/02	213.33	Church and Dey
05/25/02	336.00	West Street (near Stuyvesant H.S.)

[1] Excludes four exceedences at worker wash tent.

Council on Environmental Quality Influenced EPA Press Releases

Coordination and collaboration impacted the completeness of the information and the substance of the message EPA communicated to the public through its press releases. As a result of the White House CEQ's influence, guidance for cleaning indoor spaces and information about the potential health effects from WTC debris were not included in EPA's issued press releases. In addition, based on CEQ's influence, reassuring information was added to at least one press release and cautionary information was deleted from EPA's draft version of that press release.

EPA officials told us that EPA's WTC press releases issued during the weeks following September 11 were discussed in conference calls that included EPA officials, OSHA, and CEQ. Accordingly, the content of an EPA press release issued during this period could come from several different sources.

Few written records were available on the process used to prepare WTC press releases. We found draft versions for two of the press releases. However, the White House's role in EPA's public communications about WTC environmental conditions was described in a September 12, 2001, e-mail from the EPA Deputy Administrator's Chief of Staff to senior EPA officials:

> *All statements to the media should be cleared through the NSC [National Security Council] before they are released.*

According to the EPA Chief of Staff, one particular CEQ official was designated to work with EPA to ensure that clearance was obtained through NSC. The Associate Administrator for the EPA Office of Communications, Education, and Media Relations (OCEMR)[3] said that no press release could be issued for a 3- to 4-week period after September 11 without approval from the CEQ contact.

Although EPA's position has been that WTC area residents should obtain "professional cleaning,"[4] EPA's press releases did not instruct residents to do so. Instead they instructed residents to follow recommended and proper cleaning procedures and referred the public to the New York City Department of Health (NYCDOH) for recommended cleaning procedures. We asked the OCEMR Associate Administrator whether her office had considered advising the public through a press release that they needed to obtain professional cleaning for their indoor spaces. The Associate Administrator stated: "It was in a press release: it was removed by. . . [the CEQ contact]."

OCEMR's records contained a document, entitled "PM FACT SHEET," that discussed the health risk to "sensitive populations" from exposure to particulate matter. We asked the Associate Administrator whether she had considered putting any of this information in a press release. She said she had, but the CEQ official discouraged her from doing so. Her recollection was that he told her health effects information should not be included in EPA's press releases, and that anything dealing with health effects should come from New York because they were on the ground and they were already dealing with it.

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[3] EPA's Office of Communication, Education and Media Relations (OCEMR) issued the press releases. The OCEMR Associate Administrator left the Agency in December 2001 and OCEMR was renamed the Office of Public Affairs in July 2002.

[4] In this context, professional cleaning refers to the use of a certified asbestos cleaner trained in the proper use of personal protective equipment and procedures to prevent re-contamination.

The extent of the CEQ official's influence on EPA's WTC press releases was most clearly illustrated by the changes that were made to a draft press release dated September 14, 2001, that was issued on September 16, 2001. Every change that was suggested by the CEQ contact was made. The CEQ official's suggested changes added reassuring statements and deleted cautionary statements.

Details on these various revisions based on the CEQ contact's input, including comparisons of draft and issued versions, are in Table 2-4, while the actual press release is in Appendix G. It should be noted that our analysis of CEQ's input was limited because CEQ officials chose not to meet with us. Details on this limitation are in Appendix B.

Table 2-4: Impact of CEQ Instruction on September 16 EPA Press Release

Statement Deleted From the Draft and Not Replaced	
The concern raised by these samples would be for the workers at the cleanup site and for those workers who might be returning to their offices on or near Water Street on Monday, September 17, 2001.	
Statements Significantly Revised	
Draft Press Release	***Issued Press Release***
Recent samples of dust gathered by OSHA on Water Street show higher levels of asbestos in EPA tests.	The new samples confirm previous reports that ambient air quality meets OSHA standards and consequently is not a cause for public concern. New OSHA data also indicates that indoor air quality in downtown buildings will meet standards. EPA has found variable asbestos levels in bulk debris and dust on the ground, but EPA continue [sic] to believe that there is no significant health risk to the general public in the coming days. Appropriate steps are being taken to clean up this dust and debris.
Seven debris and dust samples taken Thursday, showed levels of asbestos ranging from 2.1 percent to 3.3 percent. EPA views a 1 percent level of asbestos as the definition for asbestos-containing material.	Debris samples collected outside buildings on cars and other surfaces contained small percentages of asbestors, [sic] ranging from 2.1 to 3.3 - slightly above the 1 percent trigger for defining asbestos material.
Statements Added to the Issued Press Release Based on CEQ Instructions	
CEQ Instructions	***Statements Added to Issued Press Release***
"Add sentence about OSHA monitors walking the streets yesterday and wearing personal monitors and coming up clean."	OSHA staff walked through New York's financial district on September 13th, wearing personal air monitors and collected data on potential asbestos exposure levels. All but two samples contained no asbestos. Two samples contained very low levels of an unknown fiber, which is still being analyzed.
"INSERT HENSHAW quote somewhere around here"	"Our tests show that it is safe for New Yorkers to go back to work in New York's financial district," said John L. Henshaw, Assistant Secretary of Labor for OSHA.
"Add OSHA indoor air sampling data sentence."	Air Samples taken on Sept. 13th inside buildings in New York's financial district were negative for asbestos.

We were unable to identify any EPA official who claimed ownership of EPA's WTC press releases issued in September and early October 2001. When we asked the EPA Chief of Staff whether she could claim ownership of EPA's early WTC press releases, she replied that she was not able to do so "because the ownership was joint ownership between EPA and the White House," and that "final approval came from the White House." She also told us that other considerations, such as the desire to reopen Wall Street and national security concerns, were considered when preparing EPA's early press releases. The OCEMR Associate Administrator said of the September 16 release: "I did not feel like it was my press release."

September 13 Press Release Also Revised to Eliminate Cautionary Statements

Cautionary statements in a draft version of the September 13, 2001, press release (see Appendix H) were removed and replaced with more reassuring statements. For example, the second clause of the caption to the draft press release, which noted that EPA was testing for environmental hazards, was replaced with a statement reassuring the public about environmental hazards. Further, the press release did not contain a statement in the draft version that EPA considered asbestos hazardous in this situation. We were unable to locate any record that explained why the changes were made, and the OCEMR Associate Administrator did not recall ever having seen the draft. The major differences between the draft and the issued press release are shown in Table 2-5.

Table 2-5: Significant Changes to the September 13 EPA Press Release

Draft Press Release	***Issued Press Release***
Caption to press release: EPA Initiating Emergency Response Activities, Testing Terrorized Sites For Environmental Hazards	**Revised caption to press release:** EPA Initiating Emergency Response Activities, Reassures Public About Environmental Hazards
Preliminary results of EPA's sampling activities indicate no or very low levels of asbestos. However, even at low levels, EPA considers asbestos hazardous in this situation and will continue to monitor and sample for elevated levels of asbestos and work with the appropriate officials to ensure awareness and proper handling, transportation and disposal of potentially contaminated debris or materials.	EPA is greatly relieved to have learned that there appears to be no significant levels of asbestos dust in the air in New York City," said Administrator Whitman. "We are working closely with rescue crews to ensure that all appropriate precautions are taken. We will continue to monitor closely." Public health concerns about asbestos contamination are primarily related to long-term exposure. Short-term, low-level exposure of the type that might have been produced by the collapse of the World Trade Center buildings is unlikely to cause significant health effects. EPA and OSHA will work closely with rescue and cleanup crews to minimize their potential exposure, but the general public should be very reassured by initial sampling.

Recent Conclusions About WTC Air Quality

The only formal risk evaluation of the health effects from exposure to the outdoor air in Lower Manhattan following the WTC collapse was performed by EPA's Office of Research and Development. This evaluation, still in draft form as of July 2003, concluded that, except for the rescue and cleanup workers at Ground Zero who were not wearing respirators, as well as unknown exposures to the public during the first few days, persons in the area were unlikely to suffer adverse heath effects from the outdoor air.

The report also had a caveat for the conclusions drawn in the report relative to human health risks. The draft report stated:

> *This report should be viewed as the first phase of an ongoing analysis, and the conclusions and findings cited below should not be considered the final EPA judgment. At this point, the available data and analysis are still too preliminary to support reliable quantitative predictions of potential human health risks.*

We spoke to a number of experts in the field of environmental monitoring, including physicians, industrial hygienists, and researchers These experts generally agreed that the levels of airborne asbestos detected in the air outside the perimeter of Ground Zero in Lower Manhattan did not present a significant increase in long-term health risk to the public. Appendix I lists the experts we interviewed during this evaluation.

We noted that several health studies pointed to potential problems for firefighters, rescue workers, and other persons working within the confines of Ground Zero who did not wear respirators:

- A study of firefighters with "World Trade Center Cough" concluded that "intense, short-term exposure to materials generated during the collapse of the World Trade Center was associated with bronchial responsiveness and the development of cough."[5]

- The preliminary results of a Mount Sinai School of Medicine study on workers directly involved in rescue and recovery found that 78 percent of those sampled had suffered lung ailments and 88 percent had experienced ear, nose, and throat problems in the months immediately following the attack.

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[5] "Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site," David J. Prezant et al, New England Journal of Medicine, Vol. 347, No. 11, September 12, 2002.

At the time we completed our report, no studies of the health effects of the WTC collapse on the general public had been completed, although we noted studies[6] were underway to determine the effects of the WTC collapse on pregnant women and their children. Further, in January 2003, New York City and Federal health officials announced a plan to study residents and employees in Lower Manhattan to identify whether there will be long-term pulmonary effects associated with exposure to WTC dust and air.

Recent Developments

EPA has initiated actions to strengthen its risk communication procedures for emergency situations. For example, EPA's Office of Public Affairs has prepared a draft "Plan for Incident Communication" that establishes basic incident procedures and assigns responsibilities and authorities. Further, the Agency intends to use this plan as the basis for more inclusive best-practices emergency communications guidance.

Conclusions

EPA's early statement that the air was safe to breathe was incomplete in that it lacked necessary qualifications and thus was not supported by the data available at the time. CEQ influenced the final message in EPA's air quality statements. Competing considerations, such as national security concerns and the desire to reopen Wall Street, also played a role in EPA's air quality statements. The "safety" of the air in Lower Manhattan after the collapse of the WTC towers is still being debated and studied. However, given the current lack of health-based benchmarks, the lack of research data on synergistic effects, and the lack of reliable information on the extent of the public's exposure to these pollutants, the answer to whether the outdoor air around WTC was "safe" to breathe may not be settled for years to come.

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[6] "Prospective Study of Pregnant Women and Infants Exposed in Utero to WTC Air Pollution," Columbia University; and "Study of Pregnant Women and Children Near WTC," Mt. Sinai School of Medicine.

Recommendation

We recommend that the EPA Administrator:

2-1. Develop procedures for emergency risk communication to ensure that EPA's public pronouncements regarding health risks and environmental quality are adequately supported with available data and analysis.

Additional recommendations regarding contingency planning, risk characterization and assessment, and risk communication are presented in Chapter 7.

Agency Comments and OIG Evaluation

In her August 8, 2003 response to our draft report, the EPA Acting Administrator stated that the report placed too much emphasis on EPA's press releases and did not sufficiently acknowledge EPA's many other communications. She further noted that EPA's early statement that the air was safe to breathe was made in direct response to the public's concern about asbestos contamination following the WTC collapse, and that the press release detailed the monitoring that led to the statement and made it clear that further monitoring would take place. The Acting Administrator also pointed out that EPA never withheld data from the public and made its extensive monitoring data available on its interactive web site. With respect to CEQ's involvement in the preparation of EPA's press releases, the Acting Administrator stated that the Agency coordinated with CEQ and that this coordination was neither unusual nor unexpected during a catastrophic disaster on the scale of the WTC attacks. Further, she noted that EPA acknowledges that mistakes were made and things could have been done better, and that there are lessons to be learned in the difficult area of risk communication. Improving risk communications is an Agency priority as it implements its "lessons learned."

In our opinion, Agency press releases are a very important form of communication. As detailed in our draft report, EPA press releases result from a deliberative process that should reflect the Agency's official position on significant issues. Press releases are made available to essentially all news media and may be quoted or paraphrased in radio, television, and other forms of communication. In our opinion, the Agency could have provided more complete and useful information in the press releases. Further, we reviewed other agency forms of communication including all communication-related documents provided by the Agency. These documents included videotaped interviews, newspaper articles, briefing notes, and other forms of communication. With respect to the Agency's early statement about the air quality, we fully recognize the extraordinary circumstances that existed at the time the statement was made about the air being safe to breathe. It continues to be our opinion that there was insufficient information to support the statement.

The Agency's complete written response to our draft report and our detailed evaluation of that response are contained in Appendices Q and R, respectively.

Chapter 3
EPA's Response to Indoor Environment Consistent With Statutes and Regulations But May Have Delayed Needed Health Protection

EPA's actions to evaluate, mitigate, and control risks to human health from exposure to indoor air pollutants in the WTC area were consistent with applicable statutes and regulations. EPA is not obligated to respond to a given emergency, and New York City exercised a lead role regarding indoor air. Nonetheless, we believe EPA could have taken a more proactive approach regarding indoor air cleanup. EPA began to assume a lead role in February 2002, when the Agency initiated a multi-agency task force to address concerns about the indoor environment. Prior to initiation of the EPA-led cleanup, many WTC area residents had returned to their homes, and a study indicated most of them had not followed recommended cleaning practices. The full extent of public exposure to indoor contaminants resulting from the WTC collapse is unknown.

Concerns Expressed Regarding Indoor Contamination Response

The public and elected officials began raising concerns about the extent that indoor spaces were contaminated with asbestos and other contaminants shortly after the WTC collapse. New York City, which initially took lead responsibility for addressing indoor air, was criticized for:

- Delegating testing and remediation efforts to building owners and residents.
- Not enforcing proper procedures for cleaning asbestos.
- Giving improper advice to the public on testing and cleaning procedures.

EPA was criticized for not initially taking a greater role in indoor testing and cleaning. U.S. Congressman Jerrold Nadler (D-NY), whose district includes Lower Manhattan, contended that EPA violated the law by allowing New York City to handle indoor air quality and not exercising oversight authority pursuant to the National Contingency Plan (NCP). EPA maintained that the NCP does not create a right to a Federal response and its approach to indoor air was a "proper and legal exercise of our discretion" under the NCP.

In the immediate aftermath of the disaster, EPA undertook several activities to address various issues related to indoor air. However, according to EPA documentation, New York City officials stated on September 30, 2001, that the City would not be requesting assistance from EPA regarding residential sampling or reoccupation issues, or roof debris cleanup.

Indoor dust contamination from WTC debris. Source: EPA/ORD - - photo courtesy of Dr. Lung Chi Chen - NYU

Responses to Indoor Contamination

Initially, building owners were held responsible for cleaning up their own buildings, including interiors and exteriors. According to New York City officials, the issue of funding the cleanup of privately owned buildings was discussed with FEMA and EPA; and the initial federal position was that the Stafford Act (the implementing statute for the FRP) did not provide direct funding to New York City for this cleanup. New York City officials said that during this discussion they informed the federal agencies that building owners would be responsible for funding the cleanup of their buildings and the federal agencies agreed with this position. Under this arrangement, owners of rental units were responsible for cleaning apartment walls, ceilings, and floors; common areas, such as hallways and lobbies; and heating, ventilation, and air conditioning (HVAC) systems, when deemed necessary as explained in guidance provided by New York City. Renters were responsible for cleaning personal belongings. In resident-owned condominiums, residents were responsible for cleaning their units, while building owners were responsible for cleaning common areas and HVAC systems.

Table 3-1 notes key instructions New York City provided to building owners and residents regarding the potential for indoor contamination resulting from the collapse of the WTC towers and steps for cleaning the indoor contamination. Copies of the instructions are available on our web site.

Table 3-1: Actions by New York City

Date	Key Statement
09-14-01	NYCDEP provided a notice to building owners entitled "Clean-up of Asbestos Containing Material." For "minimal dust accumulations (light coating)" the notice recommended using wet methods and/or vacuums equipped with HEPA (high efficiency particulate air) filters. For "accumulations of dust that included pieces of debris" the procedures provided for two options. Building owners could assume that the material was asbestos-containing material and have it cleaned in accordance with NYCDEP Asbestos Abatement Program removal procedures, or have the material sampled by a NYCDEP certified investigator or New York State Department of Labor inspector to determine whether the material was asbestos-containing material and subject to New York City's Asbestos Abatement Program removal procedures. Asbestos-containing material was identified as any material containing more than one percent asbestos.
09-16-01	The NYCDEP issued a "Public Notice" flyer to building owners that discussed building maintenance issues. The notice stated that building owners/managers should have possible contamination problems reviewed by competent professionals.
09-17-01	NYCDOH issued a press release that recommended that individuals reentering their residences and places of work remove dust by using a wet rag or wet mop, and vacuum with a HEPA filtration vacuum. If a HEPA vacuum was not available, the press release recommended using HEPA bags or dust allergen bags with a regular vacuum cleaner. EPA's web site also linked to these instructions.
09-26-01	NYCDEP issued a notice to building owners entitled "Clean-up of Debris inside Buildings" which was identical to the notice issued on 9-14-01 except for three items. First, the notice did not say "accumulations of dust that include pieces of debris . . may be assumed to be ACM (asbestos-containing material)." Second, the notice stated that such accumulations "can be sampled" (rather than "must be sampled") by a NYCDEP certified investigator or New York State Department of Labor inspector. Third, the notice stated that EPA had studied the situation and reported "that the potential presence of ACM in dust and debris is minimal."
10-25-01	NYCDEP described benchmarks and guidelines used to evaluate environmental conditions in a letter to Lower Manhattan residents dated October 25. In regard to cleaning indoor spaces the letter stated: "If more than 1 percent asbestos was found and testing and cleaning was necessary, it had to be performed by certified personnel." In addition, the statement indicated landlords should not reopen any building until a competent professional had properly inspected their building. The City's Asbestos Abatement Program requires that building owners file a written notification with the NYCDEP for asbestos abatement projects that do not require plan or permit approval from the City's Buildings Department. NYCDEP officials told us this notification applied to buildings owners who found more than 1 percent asbestos in bulk dust in their buildings (see Appendix J for a copy of the instructions).

NYCDEP officials told us that in September 2001 they began visually inspecting the exteriors of over 1,000 buildings and identified 323 with visible dust. NYCDEP documentation indicated that 102 of these 323 building exteriors were subsequently cleaned by the building owners. NYCDEP officials told us that the remaining owners stated they could not afford to clean their buildings, and these buildings were cleaned by NYCDEP with funding provided by FEMA.

To determine the extent of indoor contamination in Lower Manhattan residences,

the NYCDOH and ATSDR initiated an indoor air study in November 2001. The sampling phase was completed in December 2001, preliminary results released to the public in February 2002, and the final report issued by ATSDR in September 2002. The results of this study are discussed later in this chapter.

Indoor dust contamination from WTC debris. Source: EPA/ORD - Photo courtesy of Dr. Lung Chi Chen - NYU

In the weeks following the disaster, EPA was involved in testing various indoor spaces. EPA worked with the U.S. Coast Guard[7] to monitor offices in the Wall Street area so that employees could enter their offices and obtain needed files. On September 13, 2001, EPA tested for asbestos in its building located at 290 Broadway. Further, on September 17, 2001, EPA sampled dust in the Jacob Javits Convention Center complex, and on October 23, 2001, tested in the Department of Justice offices on 100 Church Street.

Details on the results of EPA's indoor testing, as well as General Services Administration testing of Federal buildings and three significant non-EPA studies, are in Appendix K.

Also, EPA conducted preliminary indoor assessments of 11 buildings at the request of the Ground Zero Elected Officials Task Force. These preliminary assessments included inspecting the interiors of the buildings, discussing cleanup plans with building owners/managers, and collecting dust samples from four of the buildings – three schools and one apartment building. An EPA Situation

[7] The U.S. Coast Guard maintains strike teams that typically deploy for responses to oil and hazardous chemical spills and were deployed in response to the WTC attacks.

Report for September 27-29, 2001, noted that a projected future action was to "finalize sampling plan for residential buildings." However, EPA's Situation Report for September 30 noted:

> *Residential sampling/reoccupation: On 9/30/01, EPA spoke to US Public Health Service and NYSDOH (New York State Department of Health) who have been discussing issue with NYCDOH. NYC will not be requesting State or Federal assistance for residential sampling or reoccupation issues. The Federal Response Plan assigns responsibility to the U.S. Public Health Service under ESF-8, Health and Medical Services, when state and local resources request Federal assistance for medical and public health assistance.*

In addition, correspondence from the Region 2 Regional Administrator indicated that in an October 9, 2001, meeting between FEMA, EPA, and New York City officials, City officials stated that they would not be requesting EPA's assistance for residential sampling or reoccupation issues. The September 30 report also indicated that New York City would not be requesting Federal assistance for cleaning roof debris. New York City officials disagreed with the characterizations of their statements presented in these documents and told us that they repeatedly expressed the position that the City welcomed any authorized federal assistance at that time.

Though EPA press releases through 2001 generally addressed outdoor air and not indoor contamination, the September 16 and October 3 releases discussed cleaning procedures that business owners and residents should take in cleaning indoor spaces. The press releases advised residents and business owners they could clean their own spaces if they used "appropriate" vacuum filters, and followed "recommended" and "proper" procedures. These press releases did not define what "appropriate," "recommended," and "proper" procedures meant.

Initially, EPA deferred to New York City to provide guidance for cleaning indoor spaces. As noted in Chapter 2, EPA was prepared to include recommendations in its press releases that residents obtain professional cleaning of their residences. The absence of instructions recommending that residents obtain professional cleaning in the initial weeks following the disaster may have increased the long-term health risks for those who cleaned WTC dust without using respirators and other professional cleaning equipment.

EPA's web site and press releases deferred to the NYCDOH guidance even though EPA's position on indoor cleaning was different than the City's. EPA's basis for deferring to New York City was summarized by the testimony of the Region 2 Administrator before the U.S. Senate Committee on Environment and Public Works on February 11, 2002. The Administrator, when asked if the

NYCDOH provided adequate cleanup directions to residents, answered as follows:

> *Consistent with their responsibility for the indoor environment, the City DOH, working with ATSDR and the Centers for Disease Control and Prevention (CDC) took the lead on the development and dissemination of public health recommendations related to building cleanups. DOH statements emphasizing wet wiping, moping and use of HEPA vacuums were reasonable. EPA's advice has been more conservative and suggested that people encountering more than minimal amounts of dust should consider this as a "worst case" and likely to be contaminated with asbestos. Under these circumstances, they should hire a certified asbestos cleanup contractor. . . "*

Asbestos medical experts we consulted agreed that professional cleaning was preferred for the asbestos contamination found. Further, the experts stated that, at a minimum, if members of the public were to clean residences themselves, they should have been instructed to wear respirators. A study by NYCDOH found that most residents did not follow the City's recommended cleaning practices. Although not specifically mentioned in the study, this conclusion would suggest that these residents did not obtain professional asbestos abatement contractors to clean their residences. The increased risk that residents placed themselves in by cleaning residences themselves is not known.

Although Agency press releases did not recommend professional cleaning of residences, EPA officials told us that they consistently recommended that residents obtain professional cleaning during interviews, public forums, and other communications. We were unable to determine when EPA first told the public that they should obtain professional cleaning for WTC-contaminated indoor spaces. The earliest instance we could locate was on October 26, 2001, when the EPA Administrator recommended professional cleaning in a televised interview on MSNBC:

> *However, again, as we said from the beginning, if you live there and you have any kind of breach - a window open, a broken window, anything like that in your apartment - or you have a heavy amount of dust - you should get a professional cleaner to clean it out . . . but just wiping it down, using your regular vacuum cleaner, that's not good enough. But - you know - we provided that information and it is up to the City Health Department and OSHA and others to follow-up. . .*

EPA also posted information on its public web site that recommended that indoor spaces with "more than a minimal amount of dust" be cleaned by a "professional asbestos contractor." We could not identify the exact date this information was posted, but determined that it was on EPA's web site by December 11, 2001.

In February 2002, EPA initiated a multi-agency task force on indoor contamination. The former EPA Chief of Staff told us that EPA initiated this effort because "Over time, we saw that New York City was not prepared to handle all the issues related to indoor air and offered to support them." The task force developed a plan in which EPA assumed the lead role for overseeing a FEMA-funded cleanup of residences in Lower Manhattan. EPA, New York City, and FEMA officials announced this plan to the public on May 8, 2002. Residents of Lower Manhattan living south of Canal Street could request testing and cleaning of their residences, or just testing. Public registration for the indoor testing and cleaning program ended December 28, 2002. This residential cleanup program is discussed in more detail in Chapter 6.

EPA Statutory and Regulatory Authority for Indoor Environment

EPA does not have clear statutory authority to establish and enforce health-based regulatory standards for indoor air. EPA is provided the authority to respond to releases of hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund). Specifically, under Section 104(a) of CERCLA, EPA is authorized, consistent with the NCP, to remove or remediate any hazardous substance that is released into the environment, or any pollutant or contaminant that may present an imminent and substantial danger to the public health or welfare. Asbestos is a hazardous substance under CERCLA.

Neither CERCLA nor the implementing regulations under the NCP obligate EPA to undertake response actions. As provided in the NCP, "activities by the Federal and State governments in implementing this subpart are discretionary governmental functions" that do not create "a right to federal response" nor "any duty of the Federal government to take any response action at any particular time" (40 CFR § 300.404(h)(3)). Moreover, CERCLA contemplates State participation in response actions (42 U.S.C. 9621(h)), and the NCP allows for States to assume the lead agency role.

CERCLA only applies to the release of hazardous substances "into the environment." CERCLA defines "environment" as "the navigable waters ... and ... any other surface water, ground water, drinking water supply, land surface or subsurface strata, or ambient air within the United States." Courts have held the emissions of dust within enclosed buildings are not releases "into the environment" and therefore are not CERCLA releases. However, in the WTC case, the contamination of indoor spaces was caused by an external event – the collapse of the WTC. The collapse itself caused a release of hazardous substances

into the "environment" when a huge dust plume was released into the ambient air. Matter from the dust plume then entered buildings in the surrounding area. In such a case, when the release "into the environment" ends up contaminating enclosed structures, CERCLA provides EPA the authority to take any actions necessary to eliminate or mitigate the threat to public health from the release.

A 1998 Presidential Decision Directive[8] (PDD 62) tasked EPA with the leadership role in cleaning up buildings and other sites contaminated by chemical or biological agents as a result of an act of terrorism. This leadership role was discussed in the EPA Administrator's November 28, 2001, testimony before a Congressional Subcommittee of the Committee on Appropriations, wherein she noted that:

> *Under the provisions of PDD 62, signed by President Clinton in 1998, the 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. This responsibility draws on our decades of experience in cleaning up sites contaminated by toxins through prior practices or accidents.*

The expectation that EPA should be the lead agency for responding to indoor contamination has been clarified since September 11, 2001. The July 2002 *National Strategy for Homeland Security* issued by the Department of Homeland Security states that:

> "*After a major incident, the Environmental Protection Agency will be responsible for decontamination of affected buildings and neighborhoods and providing advice and assistance to public health authorities in determining when it is safe to return to these areas.*"

Prior Responses to Releases of Hazardous Substances

Due to the magnitude of the WTC collapse, it is difficult to compare the WTC response with responses to other emergencies. However, we noted other emergencies involving indoor contamination in which EPA's and other government entities' response to those emergencies appeared more proactive or comprehensive than the response to the WTC incident.

- In 1989, a relevant emergency response occurred in Gramercy Park in New York City. A steam pipe exploded, disbursing asbestos-contaminated mud into nearby buildings. The NYCDOH declared a public health emergency and evacuated residents until their apartments were decontaminated. An EPA

[8] Presidential Decision Directive (PDD) 62, "Protection Against Unconventional Threats to the Homeland and Americans Overseas," May 22, 1998.

guidance document that addresses the applicability of the Asbestos NESHAP to emergency situations discussed the Gramercy Park incident and concluded that a Federal response under CERCLA could have been undertaken if deemed necessary. However, in this case a Federal response was not needed in light of the City's response.

- In 1999, under its CERCLA authority and in cooperation with local health authorities, EPA started testing homes in Libby, Montana, and conducting other emergency removal activities. Asbestos contamination in Libby and EPA's response to that incident have been compared to the WTC situation. The contamination in Libby resulted from many years of mining activity, as well as extensive community use of by-products from the mine. Cleaning of residences and businesses in Libby, which was designated a Superfund site on November 25, 2002, is projected to be completed in 2005.[9]

Conclusions

For indoor environment concerns resulting from the collapse of the WTC towers, EPA had the authority to act under CERCLA but was not obligated to do so. Guidelines exist for determining whether an emergency response is warranted; however, these guidelines are not definitive. Under the NCP, it was within EPA's discretion to defer to New York City the responsibility for responding to indoor contamination concerns. EPA's action was consistent with the FRP, which is intended to supplement local government response.

Although EPA acted within its discretion, a 1998 Presidential directive and the more recent National Strategy for Homeland Security task EPA with taking the leadership role in cleaning up buildings and other sites contaminated by chemical or biological agents as a result of an act of terrorism. EPA needs to work with the Department of Homeland Security and other agencies to determine the nature and form with which the Federal government should assume a more direct role in addressing indoor environment concerns, under what circumstances this direct role should occur, and the oversight mechanisms to be employed when local agencies undertake such responses. In the WTC case, the delay in providing a government-organized and adequately monitored cleanup in Lower Manhattan may have contributed to unnecessary exposures to asbestos and other pollutants by unprotected workers and residents.

[9] The indoor air clearance memorandum for Libby had not been finalized at the time we drafted this report. A preliminary clearance level of non-detect for asbestos was being used; based on the method detection limit used in Libby, the clearance level being used is similar to the clearance level being used for residences in Lower Manhattan.

Recommendations

We recommend that the EPA Administrator coordinate with the Department of Homeland Security, FEMA, other appropriate Federal agencies, and those State and local governments having jurisdiction over potential terrorist targets to:

3-1. Develop protocols for determining how indoor environmental concerns will be handled in large-scale disasters, to include addressing:

- The agency or agencies responsible for testing and/or overseeing testing of indoor spaces;
- Sampling methods to be used in analyzing indoor contamination;
- Benchmarks to be used in assessing whether the indoor contamination poses a threat;
- Under what circumstances government-assisted cleanups are warranted;
- How these cleanups will be funded; and
- The agency or agencies responsible for communicating testing results and appropriate cleaning instructions.

3-2. Develop and publish oversight criteria and State and local agency reporting requirements for those agencies involved in cleaning up buildings and other sites contaminated by pollutants resulting from terrorist attacks or other disasters.

Additional recommendations related to responding to indoor environmental concerns are in Chapters 6 and 7.

Agency and New York City Comments and OIG Evaluation

The Agency disagreed that unprotected workers and residents may have experienced unnecessary exposures to asbestos or other pollutants as a result of the delay in providing a government-organized and monitored cleanup, because (1) their recommended cleaning instructions (use of wet mops and HEPA vacuums) were proven effective in EPA studies, and (2) the Agency recommended professional cleaning when residents encountered more than minimal dust. The Agency generally agreed with the recommendations.

EPA's study of cleaning effectiveness concluded that 1 to 3 cleanings were needed to achieve the health-related benchmarks and did not address the exposure experienced by an unprotected person who may be performing these recommended cleaning procedures. Also, a NYCDOH study conducted in October 2001 concluded that the majority of households polled did not follow the recommended procedures of wet mopping and HEPA vacuuming. Also, a study of immigrant workers used to clean indoor spaces in Lower Manhattan around

Ground Zero reported that the workers often did not wear respiratory protection and experienced numerous respiratory symptoms. With respect to professional cleaning, EPA's press releases did not recommend this approach. Therefore, we continue to believe delays in implementing a government organized cleanup resulted in unnecessary exposure to asbestos and other contaminants. The Agency's full written response to our draft report and our detailed evaluation of that response are contained in Appendices Q and R, respectively.

New York City officials disagreed with some of the draft report's characterizations of its position on the indoor response and offered clarifications which we incorporated into the final report. New York City's response to draft report excerpts and our evaluation of that response are contained in Appendices S and T, respectively.

Chapter 4
Asbestos Emission Control Work Practices Inconsistent

Since asbestos is a known human carcinogen, EPA has established stringent work practices to control emissions of asbestos resulting from demolition and renovation projects. Evidence indicated that a significant requirement in emergency demolitions – wetting damaged buildings before demolition and keeping the waste material wet after demolition – was followed at the WTC site. However, work practices applicable to the transport of debris from the site were employed inconsistently. The specific impact on air quality of any variance from EPA's asbestos emergency work practices is unknown, although outdoor air monitoring showed seven asbestos readings above the AHERA standard after September 2001.

Application of NESHAP Demolition and Renovation Regulations to the WTC Disaster

The applicability of the Asbestos NESHAP regulations to the demolition of damaged WTC Complex buildings and the removal of WTC building debris was discussed by EPA officials as early as September 12, 2001. An EPA official told us that EPA did not want to insist on any NESHAP requirement that would impede or deter the WTC search and rescue operation. An EPA Office of Enforcement and Compliance Assurance official involved in these early discussions told us that, in theory, NESHAP would apply to all dust and debris from the WTC disaster and subsequent demolition and removal efforts if that material contained more than 1 percent asbestos. However, in his opinion, a literal interpretation of the requirements was not realistic under the circumstances. The Regional Counsel for EPA Region 2 told us that he concluded the Asbestos NESHAP was not applicable to the transport of steel from the towers since the collapse did not meet the definition of a NESHAP demolition. However, he did not render an opinion on the applicability of the NESHAP to the demolition and removal of the three buildings that had not fully collapsed.

The Asbestos NESHAP regulations (40 CFR Part 61 Subpart M) prescribe requirements for industries and operators of certain activities to reduce the emissions of asbestos, including the demolition and renovation of buildings that contain asbestos. Generally known as the asbestos NESHAP work practice standards, many of these are applicable to emergency situations involving asbestos, as explained in EPA's "Guidelines For Catastrophic Emergency

Situations Involving Asbestos"[10] issued in February 1992. For example, asbestos-containing buildings that are in danger of imminent collapse and are ordered by the government to be demolished must be wetted down to reduce emissions. Further, asbestos-containing waste must be adequately wetted at all times after demolition and kept wet during the handling and loading for transport to a disposal site.

Additionally, in response to questions about the proper handling of WTC dust and debris from a law firm representing Local 78, Asbestos, Lead and Hazardous Waste Laborers, OSHA issued an "interpretive letter" in January 2002 stating that the WTC dust was presumed to contain asbestos and the WTC demolition and salvage was subject to the Construction Asbestos Standard.

Asbestos Work Practices Used in the WTC Complex Demolition

The NESHAP emergency requirement – wetting damaged buildings before demolition and continuous wetting of the debris after demolition – appeared to have been followed. However, implementation of work practices to reduce asbestos emissions during transport of asbestos-containing debris appeared to be inconsistent.

The New York State Department of Labor is delegated responsibility for implementing all Federal regulations under the NESHAP program. NYCDEP is responsible for the asbestos abatement program in New York City. Even though authority to run the program in New York was delegated to the State and local agencies, EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

NYCDDC was responsible for demolition and debris removal at the site. NYCDDC retained four construction companies to perform the demolition and debris removal. In addition, wetting and misting operations at the site were arranged by one of the four companies. According to New York City officials, because of the unprecedented nature of the situation, formal written contracts with detailed statements of the work were not prepared. Instead, daily meetings were held to plan the day's activities and address any special work practices that may be required to reduce possible emissions of asbestos.

EPA and New York State asbestos NESHAP regulations require that a notification be filed by building owners even in emergency situations. The process provides an opportunity for government officials to discuss and agree to preferred work practices to be used in demolition and renovation operations.

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[10] This guidance was issued to assist EPA regional offices and State and local agencies in managing potential asbestos hazards resulting from a catastrophic accident or disaster after three emergencies involving asbestos occurred in 1989.

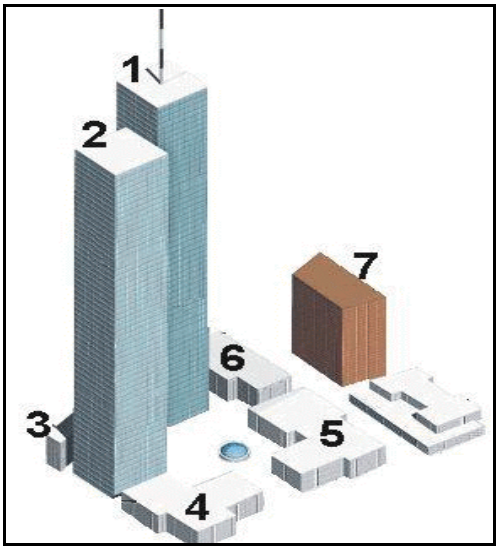
Notification of a NESHAP demolition and removal operation was not filed for the WTC. City officials stated that a written notification was not filed for WTC buildings 4, 5, and 6 because they were advised by the property owners that there was no asbestos-containing material in the above-ground structures. NYCDDC officials told us that they were advised by the Port Authority that subsequent to the WTC bombing in 1993, they initiated a program to remove asbestos-containing materials from the WTC complex. In regard to the WTC towers, the Port Authority advised the NYCDDC that one tower contained asbestos fire-proofing up to approximately the 40th floor while the other tower did not use asbestos-containing fire-proofing. An EPA On-Scene Coordinator's understanding was that only accessible asbestos-containing material was removed from WTC buildings 4, 5, and 6.

Although a formal notification was not filed, New York City officials told us that proper planning was ensured through the use of daily health and safety meetings. These meeting included representatives from a number of City, State, and Federal agencies, including EPA. New York City officials maintained that EPA had functional notice of NESHAP related activities through its participation at these meetings and that it was doubtful that notification would have changed the manner in which these activities were conducted.

Demolition of Damaged Buildings

In addition to WTC 1 and 2 (North and South Towers, respectively), WTC 3 (Marriott Hotel) collapsed from tower debris and WTC 7 also collapsed after burning for approximately 7 hours. The remaining three buildings in the WTC Complex – WTC 4 (South Plaza), WTC 5 (North Plaza), and WTC 6 (U.S. Customs) – were all significantly damaged. According to an EPA On-Scene Coordinator, the damaged buildings were considered in danger of collapse.

The demolition of all WTC complex buildings to ground level was completed by late December 2001. WTC 4 and WTC 5 were brought down by a weight that was suspended by a cable. Use of this wrecking device required a special approval from the New York City Department of Buildings, which was granted. WTC 6 was brought down with mechanical grapplers and cutting shears.



WTC complex. Source: New York Times

Both NYCDDC and OSHA officials told us that the WTC site was under continuous dust suppression, and the latter said this dust suppression was very successful. An EPA On-Scene Coordinator told us that once dust suppression began, water was sprayed wherever there was dust and, to the best of his knowledge, this practice was successful. OSHA officials further stated that it would have been too dangerous to send abatement contractors into WTC 4, WTC 5, or WTC 6 to remove asbestos-containing material before demolition.

Both NYCDDC and EPA officials told us that when asbestos-containing material (e.g., pipe wrapping, steel insulation) was encountered during the removal, it was tested and treated in accordance with asbestos abatement procedures. According to the NYCDDC official, the majority of the asbestos-containing material was encountered when removing the remnants of the basement levels of WTC 6.

EPA Situation Reports confirmed statements about asbestos abatements and recorded instances where asbestos was found during debris removal and asbestos abatements performed. For example, the EPA May 23, 2002, Situation Report noted that:

> *Twelve (12) bulk asbestos samples were taken in the B1, B2, B3, levels of (WTC) Building 6. The samples were taken from sprayed on insulation at the request of NYC DOI. Of the twelve samples, nine (9) should (sic) results were in excess of 1% Chrysotile asbestos, the results ranged from 1.30% to 30.80%. The three samples that were not above 1% were detect for Chrysotile asbestos.*

According to the April 5, 2002, Situation Report, bulk testing showed that one sample of the pipe wrap that was being removed as part of this abatement contained 66 percent amosite[11] asbestos.

Work Practices Related to Transporting Waste Not Always Followed

To minimize dust emissions, City, State, and Federal officials established procedures for trucks hauling debris from the site. These procedures included the use of tarps (nylon mesh) to cover debris and procedures for wetting down the trucks before they left the site. The truck wetting operation was performed by contractors for EPA. The large volume of traffic made ensuring compliance with procedures difficult. Particularly in the weeks immediately following the disaster, trucks hauling debris from the site did not consistently stop to be wetted down before leaving the site. As a result, New York City obtained assistance from the New York State Department of Environmental Conservation Police and the National Guard to ensure that trucks stopped at the wash stations before leaving

[11] Amosite is a form of amphibole asbestos. Several studies suggest that amphibole asbestos may be more harmful than chrysotile asbestos, particularly for mesothelioma. Test results from the site showed that the asbestos was predominantly chrysotile, not amphibole.

the site. Even after getting assistance, EPA Situation Reports indicated that the trucks were not stopping long enough to get completely wetted down.

Similar observations were reported in an October 6, 2001, report funded by the National Institute of Environmental Health Sciences, which discussed worker safety issues at WTC. The report noted that:

> *Vehicles leaving the site with debris, either dumps or lowboys with large sections of steel beams, are not deconned* (decontaminated)[12] *and the dumps do not have covers over the loads. As a consequence, potentially hazardous dust and debris is tracked off site or is blown from the loads during transit.*

EPA Situation Reports indicated that as late as October 13, 2001, this was still a problem. However, around this time period, New York City officials began issuing summonses to truck operators and their employers for failure to secure loads and to stop and be wetted down. City officials told us that approximately 300 summonses were issued and that compliance with the requirement for trucks to get wetted down before leaving the site was almost 100 percent by late October to early November 2001.

However, certain requirements for transporting debris from the site were suspended by the Governor of New York in an Executive Order dated October 9, 2001. This Order temporarily suspended regulations regarding the transportation and handling of certain solid waste resulting from the WTC disaster. The Order applied to persons working at the site under the supervision of New York State or the New York City government officials and suspended requirements to:

- Obtain permits for collection, transportation, and delivery of regulated waste to staging areas or disposal locations owned or operated by the City.

- Comply with hazardous waste management standards at the site, during the transportation of waste from the disaster site to staging areas or disposal locations owned by the City of New York, and in connection with the temporary storage of such waste at these staging area or disposal locations.

Once debris was loaded onto trucks at Ground Zero it was transported to piers and unloaded on barges that carried the debris to landfills. The manner in which these trucking and barge operations were conducted was discussed at hearings held by

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[12] New York City officials disagreed with the report's characterization of the debris removal operation. They stated that the requirement for dump trucks to be covered started September 12, and that this requirement was enforced. They also said that the vehicles did not require decontamination since they were not transporting hazardous waste as defined by EPA under 40 CFR Part 260-280; and while decontamination procedures were not required, wash down procedures were mandated.

the EPA Superfund Ombudsman, Congress, New York City Council, and New York State Assembly. Concerned citizens and local elected officials testified at these hearings that trucks hauling debris from Ground Zero were not marked as carrying hazardous material, nor were they covered in such a manner to prevent dust from escaping. In addition, people testified that the wetting of debris at the barge operation at Pier 25, which was located north of Ground Zero and near Stuyvesant High School and residences, was inconsistent and resulted in the release of dust into the air. Parents of children at Stuyvesant High School and other members of the public raised concerns that these barge operations were re-contaminating Stuyvesant High School and other buildings in that area.

EPA officials told us they asked New York City to consider alternatives for the placement of the barge, and while New York City officials were understanding of the concerns of the residential and school communities located nearby, viable alternatives were not available. Thus, emphasis was placed on ensuring use of appropriate work practices during unloading of debris-carrying trucks and transfer to barges. Further, the EPA Region 2 Regional Administrator advised us that EPA sampled for the potential air quality impact of these barge operations from September 22, 2001, through May 31, 2002, and found that "99.83% of samples were below the screening level." She further noted that the New York City Department of Education collected daily air samples at Stuyvesant and other nearby schools from October 4, 2001, to the end of June 2002, and found that "the overwhelming majority of daily sampling has resulted in no structures detected."

We contacted the president of a consulting firm hired by the Stuyvesant High School Parents' Association to review environmental test results for Stuyvesant High School. He told us that ambient asbestos testing at the school was conducted in accordance with AHERA standards and elevated levels of airborne asbestos were not found. However, he said that elevated levels of particulate matter were recorded that could have come from the debris off-loading operation or diesel fuel emissions from the trucks transporting the debris.

Asbestos Still in Many U.S. Buildings

Asbestos is present in many buildings across the country and is still used in some building materials. For example, a 1984 building study by EPA found that, on average, 20 percent of all buildings in the United Stated contained asbestos. These averages were higher for some cities. A 1988 building survey found that, overall, 68 percent of the buildings in New York City contained asbestos. Further, although the use of asbestos-containing material has been banned from some products, it is still used in others. For example, asbestos-containing material is still allowed in pipeline wrap, asbestos-cement corrugated sheet, asbestos-cement flat sheet, roofing felt, millboard, vinyl-asbestos floor tile, asbestos-cement shingle, and roof coatings.

Conclusions

Although many steps were taken to reduce asbestos emissions from the WTC site, problems were encountered in fully implementing the applicable NESHAP requirements for emergency situations, such as ensuring that trucks transporting debris were adequately wetted down before leaving the WTC site. Further, the placement of a WTC debris unloading and transfer operation near schools and residences compounded the potential impact of not implementing normally required NESHAP requirements. Given the likelihood that many buildings across the country may contain asbestos, EPA and State and local agencies need to establish improved monitoring and oversight procedures for ensuring that appropriate NESHAP work practices are followed in responding to situations that cause widespread building damage.

Recommendations

We recommend that the EPA Administrator:

4-1. Ensure that EPA Regional and Headquarters personnel are aware of the "Guidelines For Catastrophic Emergency Situations Involving Asbestos," including its application in the event of future terrorist attacks or other disasters.

4-2. Develop specific monitoring, reporting, and oversight procedures for ensuring that Federal, State, and local responders follow the appropriate Asbestos NESHAP work practices, including initiating enforcement actions when EPA observes violations of NESHAP work practices.

Agency and New York City Comments and OIG Evaluation

The Agency noted in its response that ensuring compliance with NESHAP work practices in the immediate aftermath of the WTC collapse and fires was "extremely difficult" not because of a lack of knowledge about what was required, but because of the practicality of implementing these practices under the extreme conditions of duress. Further, the Agency noted that over time, these problems were eliminated to the maximum extent possible. The Agency agreed with the recommendations. The Agency's full written response to our draft report and our detailed evaluation of that response are contained in Appendices Q and R, respectively.

New York City offered additional information and clarification as to how NESHAP work practices were discussed and implemented at the site. We added this information to the final report. New York City officials objected to the inclusion of testimony from the EPA Superfund Ombudsman hearing on the basis of it being unsubstantiated and to the discussion of lead levels at Stuyvesant High School on the basis of not being relevant to the Chapter. We disagree and have retained that information in the final report. New York City's response to draft report excerpts and our evaluation of that response are contained in Appendices S and T, respectively.

Chapter 5
Air Quality-Related Communications Not Effective in Getting Public and Workers to Take Recommended Precautions

A critical component in helping the public minimize exposure to potential health hazards resulting from a terrorist attack or other disasters involves communicating risk information to the public. Armed with such information, the public can take positive steps to mitigate potential exposures as well as other precautions to avoid unnecessary health risks. After the terrorist attack on WTC, government communications were criticized for not providing timely and accurate information to the public. Evidence gathered through studies and various governmental hearings indicates that the public and Ground Zero workers did not receive sufficient air quality information, wanted more information on the associated health risks, and did not consistently take precautions recommended by government communications to minimize their health risk. Because of these concerns, the OIG conducted a survey of New York City residents regarding government communications. These results will be reported separately.

NYCDOH Survey Found Residents Wanted More Air Quality Information and Did Not Use Recommended Cleaning Procedures

From October 25 through November 1, 2001, NYCDOH conducted a door-to-door survey of residents in Lower Manhattan's Battery Park City, Southbridge Towers, and Independence Plaza. All of these neighborhoods were in close proximity to the WTC towers. A representative sample of apartments from each of these three areas was selected and a total of 414 interviews were conducted. The survey reached two conclusions related to air quality:

- Residents of Lower Manhattan were worried about their health and safety. There was a tremendous concern about the air quality and its potential effects on health. The high proportion of the population experiencing symptoms likely to be related to respiratory irritants contributed to this concern.

- The majority of households had not been cleaned according to recommendations, possibly increasing the exposure to respiratory irritants.

Specifically, in regard to air quality information, the report noted that:

> *The topics of most interest to this population related to air quality, its safety and its effect on the physical health of both adults and children (70% said they wanted more information about air quality). There is a*

need for more information regarding the potential risks from exposure to the dust and debris that continues to be emitted from the WTC site. Related to this topic, 35% of the respondents reported that they needed more information regarding cleaning.

The report noted that only 40 percent of the residents said they cleaned their homes according to the recommended methods of wet moping hard surfaces and using HEPA vacuums on carpeting. The report noted two limitations on its results. First, the survey only included three selected neighborhoods in Lower Manhattan and did not include residents who had not re-occupied their apartments at the time of the survey. Second, the report noted that normally respiratory symptoms (e.g., symptoms related to allergies) increase during the time of year the survey was conducted.

Hearings held by a Congressional Subcommittee, the EPA Superfund Ombudsman, New York City Council, and New York State Assembly included testimony indicating that the public desired more information regarding air quality. Further, several reports detailing lessons learned from the WTC response noted problems with government communications regarding air quality. These reports and their conclusions are discussed in Chapter 7.

Telephone Poll Indicated Public Did Not Believe Air Was Safe

A telephone poll[13] conducted in March 2002, after many news articles were published questioning the air quality information that the government had issued, found that 70 percent of those surveyed did not believe environmental protection and other government agencies when they said the air quality around the WTC site was safe. The poll surveyed 511 randomly dialed residences from the five boroughs of New York City. We contacted one of the principals of the polling organization, who told us the answers to the lone question asked about air quality were consistent among all groups polled.

Unprotected Workers Cleaned Contaminated Offices and Residences

Preliminary results of an independent study[14] of the health of day laborers who cleaned indoor spaces near Ground Zero noted that these workers were generally not provided with respirators or any personal protective equipment. Further, the workers were not informed about the contents of the dust they removed from offices and apartments, nor were they informed of any environmental test results

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[13] Blum and Weprin Associates, New York Daily News, March 2002, margin of error plus or minus 4.5 percent.

[14] "Assessing the Health of Immigrant Workers Near Ground Zero: Preliminary Results of the World Trade Center Day Laborer Medical Monitoring Project"; Ekaterina Malievskaya, M.D., Nora Rosenberg, Steven Markowitz, M.D.; American Journal of Industrial Medicine; December 2002.

on the dust and debris that they removed. Moreover, most of these workers reported health symptoms that first appeared or worsened after September 11, 2001. These symptoms included coughing, sore throat, nasal congestion, chest tightness, headaches, fatigue, dizziness, and sleep disturbances. The results were based on examinations of 418 workers from January 15 through February 28, 2002.

Ground Zero Workers May Not Have Received Sufficient Information

A widely publicized aspect of the WTC response was the lack of respirator use by rescue and construction crews. It was beyond the scope of this review to determine the extent that respirators were not used and why this occurred. However, we reviewed EPA's efforts to provide respirators, reviewed accounts of respirator use in various articles and reports, and inquired about respirator use and availability during our interviews with EPA, other Federal agency, New York City, and non-government officials. Our limited work in this area indicated that respirators were generally available but were not worn for a number of reasons. A significant factor was the desire to save lives without regard for personal safety in the immediate aftermath of the disaster. Other reasons appeared to include the respirators' interference with the ability of emergency workers to communicate, lack of training, lack of enforcement of safety measures at the site, and conflicting messages about the air quality at Ground Zero.

A detailed discussion on the use of respirators by rescue and construction crews at Ground Zero, including EPA activities to encourage respirator use as well as the health impacts of the lack of respirator use, are in Appendix L.

A January 2002 report[15] concluded that respirator use was compromised, in part, due to mixed messages that workers received about the importance of respiratory protection. For example, the report noted that air monitoring information was often within OSHA permissible limits or below the analytical method limit of detection. Thus, on one hand workers had information suggesting that the air quality was not bad, but a message to wear respirators on the other. This report also noted the poor example set by political figures, celebrities, and even supervisors who visited the site but did not wear respirators.

The experiences of the Laboratory Director of an environmental testing firm hired to conduct testing for one of the companies conducting the site clean-up was consistent with information presented in the report on respiratory usage at the WTC site. This individual, with many years experience in asbestos toxicology and applied environmental hygiene, told us that he interpreted EPA's statement that the air was safe to breathe to apply to Ground Zero. The Laboratory Director

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[15] "Respiratory Protection at the World Trade Center: Lessons From the Other Disaster," Bruce Lippy, CIH, CSP, January 15, 2002.

said that the construction company that hired him also interpreted EPA's statement to apply to Ground Zero, and on the basis of EPA's statements about air quality, company officials questioned the Laboratory Director's recommendations that workers wear respirators. Although he was able to convince his client that respirators were needed, he told us that it was difficult to convince workers to wear respirators.

A November 2001 report[16] prepared for the National Council of Structural Engineers Associations - Structural Engineering Emergency Response Plan Committee similarly noted that structural engineers at the site had concerns about environmental contamination at Ground Zero but proceeded with their work given the urgency of the situation. The report noted that although structural engineers assumed the air quality was being monitored by government agencies, specific information on the results of this monitoring did not filter down to the structural engineering teams. Further, structural engineers did not know if they were wearing the correct respirators. The report cited the following joint EPA and OSHA statement as an example of information that the authors concluded did not provide sufficient information on air quality or the proper respirators needed:

> *. . . EPA and OSHA are providing real-time analysis in the immediate vicinity of the debris pile at Ground Zero. . . . . This information helps response workers on the scene determine what level of respiratory protection is appropriate to use (U.S. Dept. of Labor Press Release 01-339)*

Recent Developments

EPA has initiated several actions to improve its risk communications to the public. These actions are discussed in Chapters 2 and 7. In regard to worker safety, EPA is participating in a FEMA-led Interagency Health and Safety Coordinating Committee to provide unified safety and occupational health leadership, guidance, and policy development for all Federal agencies under the Federal Response Plan. In particular, the Committee plans to develop an Emergency Support Function for Safety and Occupational Health.

Conclusions

The public wanted better information about air quality than they received from government sources. A NYCDOH study, other lessons learned reports, and testimony provided at various hearings suggest that the public did not receive adequate air quality information and that individuals cleaned their residences without using proper procedures and personal protection. In addition, workers at

[16] "World Trade Center Disaster: *Structural Engineers at Ground Zero,"* August Domel, Jr., Ph.D., S.E., P.E., November 2001.

Ground Zero may not have used respirators due, in part, to inadequate EPA and other government communication.

EPA was one of many governmental and non-governmental agencies that communicated health risk information to workers and the public. The levels of non-adherence to the risk communications of these governmental agencies suggests that all the participating levels of government need to re-examine their policies, procedures, and practices for ensuring that necessary precautions are consistently followed to reduce human exposure to contaminants.

Recommendation

We recommend that the EPA Administrator:

5-1. Coordinate with FEMA and other applicable Federal agencies to clearly establish Federal agency responsibilities, roles, and procedures during an emergency response that ensure that:

- Workers responding to emergencies are adequately protected by the development and strict enforcement of health and safety plans.
- Health hazard information is effectively communicated to emergency response crews.
- Sufficiently detailed health risk information is effectively communicated to the public, including actions that the public should take to reduce their potential exposure to harmful pollutants.

Additional recommendations relevant to the issues discussed in this chapter are included in Chapters 2, 3, and 7. Also, additional recommendations may be presented in our subsequent report on the results of our public survey.

Agency and New York City Comments and OIG Evaluation

EPA agreed with the recommendation but noted that it and other Agencies provided the public with the most comprehensive and up-to-date information available. In regard to worker safety, EPA noted that it supported OSHA in many ways, including a long-term effort to educate workers about the need to wear respirators. The Agency's complete written response to our draft report and our detailed evaluation of that response are contained Appendices Q and R, respectively.

New York City officials responded that our report should not discuss respiratory issues related to Ground Zero since this was OSHA's responsibility and not EPA's. New York City offered several revisions to this section if we were to retain it in our report. We incorporated New York City's suggested changes where appropriate but have retained our discussion of respiratory issues as Appendix L since EPA supported OSHA in this activity. New York City's response to draft report excerpts and our evaluation of that response are contained in Appendices S and T, respectively.

Chapter 6
Further Actions Needed to Address Current WTC Response

Monitoring data showed that ambient air levels in Lower Manhattan had generally returned to pre-September 11 levels in mid-2002 or earlier, and as such, EPA ceased outdoor monitoring in June 2002. Further, all debris had been removed from the site by June 2002. However, concerns about indoor contamination resulting from the collapse remained at the time we completed our review in April 2003, even though EPA, FEMA, and New York City had initiated a multi-million dollar Indoor Air Residential Assistance program that included testing and cleaning of residences in Lower Manhattan. Additional measures can be taken to ensure cleanup provides reasonable assurance that the public's exposure to asbestos and other contaminants in residences and workspaces in Lower Manhattan is within the acceptable risk guidelines.

WTC Outdoor Monitoring Ended June 2002

EPA ceased all WTC-related outdoor air monitoring in Lower Manhattan on June 20, 2002, with EPA concluding that, for the most part, outdoor ambient air pollution levels had returned to pre-September 11 levels. Generally, ambient pollutant levels in Lower Manhattan noticeably decreased in January 2002, once the fires at Ground Zero were essentially extinguished. Some spikes in benzene were recorded in January and February 2002, as a result of fires that flared up during removal operations. From March 2002 through June 20, 2002, the only elevated readings recorded were for asbestos. The elevated readings occurred in March and April 2002 at the worker wash station and in May 2002 at the monitoring site near the barge operation.

Our review of monitoring data as well as discussions with EPA, other Federal agencies, New York City, and selected external health research, air quality testing, academic, and environmental organization officials supported EPA's view that the outdoor ambient air pollution levels in Lower Manhattan had, for the most part, returned to pre-September 11 levels for those pollutants where pre-September 11 monitoring data existed.

Indoor Residential Cleanup Program

The testing and cleaning of residences was one of several activities included in an overall Indoor Air Residential Assistance Program funded by FEMA at an estimated cost of $60 to $80 million. In addition to testing and cleaning of residences, the program included:

- identifying contaminants of potential concern resulting from the WTC attack.
- conducting a confirmation cleaning study to evaluate the effectiveness of various cleaning techniques in achieving health-based benchmarks.
- conducting a study of Upper Manhattan to determine background (normal) levels of contaminants.
- inspecting and cleaning building exteriors in Lower Manhattan.
- cleaning two unoccupied residential buildings.

The indoor residential cleanup program was administered by EPA and New York City. FEMA officials told us that they normally do not fund indoor cleanups of private spaces related to a disaster unless an immediate hazard is declared. FEMA officials told us that New York City officials indicated a formal cleanup program was not needed. Therefore, in May 2002, the EPA Region 2 Administrator provided FEMA with a memorandum that furnished the necessary justification to authorize funding.

Public registration for the testing and cleaning program ended on December 28, 2002. As of July 17, 2003, EPA had reported the following test results.

Table 6-1: Test Results for Indoor Asbestos Testing as of July 17, 2003

Type of Request	Total Requests	Tests Completed	Residences Cleared[1]	Residences Not Cleared[2]	Not Determined [3]	Test Results Pending[4]
Test Only	730	729	691	8	30	1
Clean and Test	3,436	3,425	3,256	36	133	11

Notes
1 = Ambient levels were below the clearance standard of .0009 fibers per cubic centimeter (f/cc).
2 = Ambient levels were above the clearance standard of .0009 f/cc.
3 = Samples could not be analyzed because of overloaded filters or other reasons. Re-testing to be performed.
4 = Testing not begun or results not yet analyzed.

Residents could choose to have "testing only" of their residence or they could choose to have "cleaning and post-cleaning testing" of their residence. Residents requesting to only have their residence tested could choose between one of two sampling options: aggressive sampling or modified aggressive sampling. Aggressive sampling used a leafblower to stir up any settled dust by blowing air against walls, ceilings, floors, and other surfaces prior to collection of air samples. Modified aggressive sampling did not use leaf blowers. For either sampling option, the air samples were to be analyzed for asbestos only. In addition to testing indoor air for asbestos, EPA planned to collect pre- and post-cleaning wipe samples for a limited number of residences (approximately 250) and test these samples for dioxin, total metals, and mercury.

For residents requesting "cleaning and post-cleaning testing," two approaches were used to clean the residences. The cleaning approach was based on the extent

of dust contamination as determined through visual inspection. If a visual inspection of the residence and the building's common spaces (including elevator shafts) revealed minimal dust accumulations (light coating), "Scope of Work A" applied. If visual inspection indicated large or significant accumulations of dust or debris from the WTC collapse in residences, portions of the residence, or the building's common spaces, "Scope of Work B" applied. In general, "Scope of Work B" included additional cleaning of surfaces not included in "Scope of Work A." Appendix M describes the two approaches available for residents requesting cleaning and post-cleaning testing.

A significant issue with respect to developing health-related benchmarks (or clearance standards) is the extent of prior or background contamination, particularly in urban areas. This information is needed to determine the impact of a disaster on the indoor environment. Studies have shown that these background levels can exceed concentrations that may present a greater than 1-in-1,000,000 excess lifetime cancer risk (the desired cleanup goal for the Superfund program). In the WTC case, EPA's background study of Upper Manhattan suggests that the background concentrations for asbestos in indoor air and dioxin in settled dust were at levels that presented a greater than 1-in-1,000,000 excess cancer risk.

Concurrent with the start of the indoor cleanup, a multi-agency workgroup of Federal, State and city officials identified contaminants of potential concern (COPC) related to the WTC collapse and developed health-related benchmarks for these COPCs, including asbestos, lead, dioxin, PAHs, fibrous glass, and crystalline silica. Three of these COPCs are considered cancer causing: asbestos, dioxin, and PAHs. For each of the three carcinogens, the workgroup established a health-related benchmark that equated to an increased lifetime cancer risk of 1-in-10,000. This means that if 10,000 people are exposed to a single COPC at the established benchmark level for 30 years, there may be one more case of cancer than if the group had not been exposed.

In September 2002, the multi-agency workgroup published these COPCs in a peer review draft entitled "World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks," which was peer reviewed by the Toxicology Excellence for Risk Assessment (TERA) organization in October 2002. TERA's peer review report was issued on February 7, 2003. The group's suggestions included:

- Expanding the list of COPCs as appropriate,
- More clearly explaining the methodology for selecting the COPCs,
- Adding criteria to account for potential exposures through contact with dust in the risk-based screening for COPC selection,
- Adding parameters for children's exposure, and
- More fully describing the approach for considering the health effects of mixtures of COPC.

The workgroup issued a revised COPC document in May 2003 that included responses to the peer review panel's comments. Given the significance of the panel's comments, the fact that additional information has been developed since the peer review was conducted, and the potential for this document to be used as a basis for future indoor cleanups, we believe the revised COPC document should be submitted for a second peer review as suggested by the TERA panel.

Actions Can Be Taken to Provide Additional Assurance That Indoor Cleanup Is Protective of Human Health

The residential cleanup effort represents a significant undertaking by EPA, FEMA, and New York City. Nonetheless, it has been criticized by some groups. The geographical coverage of the cleanup, limited to residences south of Canal Street, has been questioned. The testing and cleanup procedures have been criticized, particularly the fact that EPA has not required all apartments within a building to be cleaned. In addition, not requiring the cleaning of all HVAC systems was criticized as a limitation that could lead to re-contamination of clean residences.

Additional actions can be taken to provide greater assurances that the program is fully protective of human health. These actions include:

- Ensuring that the cleanup meets minimum Superfund site cleanup goals,
- Treating impacted buildings as a system,
- Employing sampling methods (i.e., aggressive) to ensure that asbestos is at or below acceptable levels,
- Including workspaces as well as residential buildings, and
- Including all geographic areas impacted by WTC dust.

Discussions on each of these actions follow.

Indoor Cleanup Level Does Not Meet Minimum Superfund Levels

Although the indoor cleanup in Lower Manhattan was not being conducted as a Superfund cleanup, Superfund regulations and guidelines provide useful criteria for evaluating the health protectiveness of the Lower Manhattan cleanup and whether it provides reasonable assurance that the public's risk of exposure to asbestos and other contaminants had been minimized.

The NCP describes specific criteria for determining the cleanup goals for contaminated sites placed on the National Priorities List. The NCP requires that for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent between a 1-in-10,000 and 1-in-1,000,000 increased lifetime cancer risk. The NCP lists nine factors, including cost,

exposure, uncertainty, and technical limitations, that may justify a cleanup remedy that departs from the 1-in-1,000,000 cleanup goal.

In contrast to the above criteria, EPA's Lower Manhattan indoor cleanup established a 1-in-10,000 risk as the goal of the cleanup for asbestos. The program does not include monitoring for the presence of the other COPCs, including dioxin and PAHs, which are known carcinogens. The COPC document established benchmarks for these two pollutants that also correspond to a 1-in-10,000 increased risk. Although the assumption is that the cleaning methods prescribed for asbestos will clean the residence of other pollutants as well, the post-cleaning testing does not provide assurance that these other pollutants were removed. However, under Superfund guidance, the risk from exposure to multiple carcinogens is considered additive. Thus, if all three pollutants were cleaned up to levels that equate to a 1-in-10,000 risk for each pollutant, the combined risk would be considered greater than 1-in-10,000.

The TERA peer review addressed the risk level established for the COPCs. The panel suggested that the document more clearly explain how the impact of being exposed to mixtures of the COPCs was considered in developing the benchmarks. Further, panel members disagreed with the rationale for using an upper level excess lifetime cancer risk of 1-in-10,000. The workgroup's response to the peer review panel stated the risk level was appropriate because of practical sampling limitations for asbestos, noting a sampling time of 800 hours would be required to achieve the air monitoring results needed to support a 1-in-1,000,000 increased lifetime risk level. The workgroup acknowledged that running multiple pumps concurrently could reduce total sample time, but did not judge this practical since more than 6,000 individual residences signed up for the cleaning program.

Need to Treat Impacted Buildings as a System

Tests of indoor asbestos contamination have shown that the distribution of asbestos within indoor spaces is not consistent. Selective cleaning of apartments does not ensure that uncleaned residences or uncleaned objects in apartments are free of asbestos contamination. In the case of centralized HVAC systems, selective cleaning does not ensure that cleaned apartments will not be re-contaminated by uncleaned apartments through the HVAC system. Consequently, the cleaning of contaminated buildings should proceed by treating the building as a system.

This systematic approach to cleaning would require that the exterior of the building be cleaned first before the building is re-occupied. All possible entrances for outside air should be sealed off and the building HVAC shut down during exterior cleaning. Once the exterior is cleaned, interior cleaning can begin. For buildings with centralized air and heating, the interior surfaces of supply ducts and return air plenums, fan housings, and filter housings should be cleaned. Filters should be removed, filter tracks cleaned, and new filters installed. The above

actions are necessary to prevent uncleaned sub-parts of the HVAC system from re-contaminating the system. When cleaning individual rooms, each air supply or return register should be sealed to prevent re-entrainment of toxicants into the HVAC system.

According to EPA officials, as of July 2003, 143 buildings had been cleaned, including 28 HVAC systems.

Non-Aggressive Sampling Does Not Provide Assurance Residents Will Not be Exposed to Potentially Harmful Levels of Asbestos

The non-aggressive sampling option available to residents does not provide assurances that residents will not be exposed to potentially harmful levels of asbestos. AHERA protocols for building clearance after abatement require aggressive sampling to re-entrain (stir) settled dust before air samples are taken. The modified aggressive option available to residents may not re-suspend asbestos particles clinging to surfaces within the residence.

Comprehensive Health Protection Would Also Include Workspaces

EPA, FEMA, and New York City implemented a cleaning and testing program for residences but not workspaces. Some have complained about this limitation, noting that a program of comprehensive health protection would address indoor contamination in workspaces. The EPA Region 2 Assistant Administrator for WTC Recovery Operations told us that EPA had discussed this issue with OSHA, and that workers or employers could contact OSHA if they had concerns about possible asbestos contamination in their work places. Further, EPA indicated that OSHA was prepared to address any workplace issues brought to its attention.

Cleanup Boundary Not Scientifically Developed

The northern boundary of the cleanup area (Canal Street), coincides with the initial exclusion zone developed on September 11. However, this boundary was not based on systematic and representative sampling to determine the likely outer boundary of WTC contamination. Several indoor sampling efforts were conducted after September 11, but none were designed to determine the geographic extent of WTC dust contamination. Consequently, it has not been determined whether buildings north of Canal Street or east of Lower Manhattan, in Brooklyn, were contaminated.

EPA officials told us that the Canal Street boundary represented a conservative one based on visual inspection of how far dust and debris from the collapse traveled as well as their interpretation of various data, including images obtained by overhead flights. We also discussed the path of the dust and smoke plume with an Office of Research and Development researcher. He told us that his modeling demonstration as well as satellite images taken by the U.S. Geological Survey

indicated that dust from the collapse did not extend beyond Canal Street. Environmental experts told us that ideally a sampling plan should have been implemented that collected and analyzed samples starting at Ground Zero and radiating outward in concentric circles until the boundary of WTC contamination was determined.

Conclusions

Extensive ambient monitoring data collected after September 11 demonstrated that outdoor air quality levels around Lower Manhattan eventually returned to pre-September 11 levels. As such, EPA does not need to take additional actions to address outdoor ambient air quality concerns specifically related to the collapse of the WTC towers.

EPA, in cooperation with FEMA and New York City, initiated a large-scale indoor cleanup. In our opinion, this cleanup should meet the minimum criteria for protecting human health that EPA has established for Superfund cleanups. Also, the indoor cleaning and testing program should employ aggressive testing in all residences and treat buildings as a system. Additionally, EPA should evaluate the potential health risks for pollutants of concern in workspaces and for geographic areas north of Canal Street, in Brooklyn, and any other areas where meteorological data show pollutants of concern may have been deposited.

Recommendations

We recommend that the EPA Administrator ensure that EPA Region 2:

6-1. Submit the revised "World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks" document to TERA for a second peer review.

6-2. Implement a post-cleaning testing program to ensure that, in addition to asbestos, the indoor cleanup program has reduced residents' risk of exposure from all of the identified COPCs to acceptable limits.

6-3. Due to concerns over possible re-contamination of residences cleaned under the Indoor Air Residential Assistance program, EPA should treat buildings as a system and implement a post-cleaning verification program to ensure that residences cleaned by the program have not been re-contaminated.

6-4. Work with FEMA and OSHA to assess whether the ongoing residential testing and cleaning program should be expanded to address potential contamination in workspaces in Lower Manhattan, or whether other measures need to be taken to ensure that workspaces are not contaminated with WTC dust.

Agency and New York City Comments and OIG Evaluation

The Agency disagreed with the recommendations presented in this Chapter. The Agency responded that EPA's indoor cleanup program was sufficient and that EPA studies and data indicated a more widespread cleanup program is not warranted. Because asbestos is a carcinogen with no commonly accepted safe level of exposure, and approximately 18,000 residential units in Lower Manhattan have not been tested or cleaned through the indoor residential program, we continue to believe our recommendations are warranted to assure adequate health protection for residents in Lower Manhattan. The Agency's complete written response to our draft report and our detailed evaluation of that response are contained in Appendices Q and R, respectively.

New York City's response provided some technical clarifications which we made. New York City's response to our draft report excerpts is provided in Appendix S.

Chapter 7
EPA Should Continue Efforts to Improve Contingency Planning

The events of September 11 represented an attack on the U.S. mainland not previously experienced in this country's history. The response to this tragedy was trying and difficult for all parties involved, including environmental professionals. Many of the persons we interviewed spoke highly of the response of EPA and its employees. Still, lessons were learned from the September 11 response that can be used to improve the Agency's ability to respond to future disasters. The primary lessons learned from our evaluation relate to:

- Contingency planning
- Risk assessment and characterization
- Risk communication

An overriding lesson learned was that EPA needs to be prepared to assert its opinion and judgment on matters that impact human health and the environment. Although many organizations were involved in addressing air quality concerns resulting from the WTC collapse, subsequent events have demonstrated that, ultimately, the public, Congress, and others expect EPA to monitor and resolve environmental issues. This is the case even when EPA may not have the overall responsibility to resolve these issues or the necessary resources to address them.

Various Actions Initiated

EPA and several non-EPA groups and individuals prepared "lessons learned" reports on the government's response to environmental issues resulting from September 11. We generally agree with the recommendations made in these reports. A summary on the previous lessons learned areas follows in Table 7-1. Further details on the lessons learned as part of both EPA and non-EPA reviews are in Appendix N.

Table 7-1: Previous Lessons Learned Reviews

Type of Review	Lessons Learned Areas
EPA Office of Solid Waste and Emergency Response, per request by EPA Administrator, determined lessons learned between September 11, 2001, and October 19, 2001. Results were summarized in a final report dated February 1, 2002.	• Decision making and communication • Emergency response structure and plans • Data analysis and information management infrastructure • Public information dissemination • Resources • Safety and security • Environmental vulnerabilities
EPA Region 2 conducted a region-specific lessons learned analysis. The Region held an "after action session" in Edison, New Jersey, on January 9-10, 2002, and issued a final report dated January 8, 2003.	<u>Overarching Recommendation Areas</u> • Planning • Coordination • Resources <u>Specific Recommendation Areas</u> • Public risk communication • Data management • Regional crisis management structure
EPA Office of Research and Development held a data-oriented lessons learned workshop in November 2002. The report was still in draft as of our review.	• Quality assurance project plan • Mechanism for tracking monitoring tasks • Improved health-related benchmarks for asbestos and short-term exposures of pollutants in general • Identification of technical expertise teams that could be called on to assist with technical decisions
Environmental experts and others prepared lessons learned reports from September 2002 to December 2002.	• Better risk communication • Health-related benchmarks assessing exposure • Clearer lines of authority between government agencies in responding to environmental issues

In September 2002, EPA issued its "Strategic Plan for Homeland Security," which outlines the Agency's plan for meeting its homeland security responsibilities. This Strategic Plan includes many proposed actions recommended in EPA's February 2002 Lessons Learned report. The goals of the plan are grouped under four major mission areas:

- Critical Infrastructure Protection
- Preparedness, Response, and Recovery
- Communication and Information
- Protection of EPA Personnel and Infrastructure

The second and third mission areas – "Preparedness, Response, and Recovery" and "Communication and Information" – are particularly relevant to the issues

discussed in this report.[17] Within these two major areas, the Homeland Security plan lists several actions that were recommended in the February 2002 Lessons Learned Report as well as issues identified in this report.

OIG Observations for Improving Emergency Response

Observations developed by our evaluation, as well as any Agency actions already underway to address these observations, are summarized in Table 7-2, and discussed in detail in the sections that follow.

Table 7-2: Summary of OIG Observations

Contingency Planning
• Environmental Threats from Potential Terrorist Attacks Need to Be Assessed
• Roles and Responsibilities Within EPA Need to Be Delineated
• Roles and Responsibilities With Outside Agencies Need to Be Delineated
Risk Assessment and Characterization
• Health-Based Benchmarks Needed
• Sampling and Data Collection Protocols Needed
• Monitoring Capabilities Need to Be Increased
Risk Communication
• Better Communication Policies, Procedures, and Guidance Needed
• Risk Communications Need to Acknowledge Uncertainties
• Procedures Needed to Ensure Consistency in Communications
• Communications Need to Identify External Influences
• Environmental Data from Sources Outside EPA Need to Be Addressed

Contingency Planning

EPA has many years experience in responding to environmental emergencies and has established policies and procedures to deal with such emergencies. EPA's Lessons Learned Report identified issues related to contingency planning and made recommendations for improvements in this area. Additionally, EPA's Homeland Security strategy includes actions to address this area. Notably, the Agency has started efforts to upgrade the National Incident Coordination Team, which coordinates EPA's response to large-scale emergencies. The events of September 11 demonstrate the following areas where the Agency's emergency response mechanisms can be improved.

[17] OIG has ongoing and planned work to evaluate EPA's efforts related to the other major homeland security missions not addressed in this report.

Environmental Threats from Potential Terrorist Attacks Need to Be Assessed

It is understandable that the government and others were not fully prepared for what happened on September 11. Now that the country has experienced such an attack and lives under the threat of future attacks, it is important that the Agency anticipate and plan for different disaster scenarios. To the extent that EPA can anticipate various scenarios and plan for the type of environmental response needed before a disaster strikes, the Agency's response efforts can be more focused on appropriate implementation and avoid making interpretative, technical, and policy-setting decisions with potential public health implications during the stressful and time-demanding circumstances created by an emergency.

The experience of September 11 has provided the Agency with considerable information on what to expect of a large-scale disaster involving office and multi-family residential buildings in a densely populated urban environment. However, disasters involving other scenarios, other types of targets, and other locations may present different challenges. For example, New York City has significant emergency response and environmental resources - other cities may not and may require more assistance from EPA. In addition, EPA Region 2's office was located within New York City and close to the disaster site, and EPA's national Environmental Response Team was located in nearby Edison, New Jersey, approximately 30 miles away. This was important, because air travel was curtailed for several days after the attacks. EPA may not be as closely located to the next disaster.

Disasters in different parts of the country could present different, perhaps greater, environmental exposures than at WTC. EPA researchers told us the tall buildings in New York City combined to create a "chimney effect" that helped to push air and pollutants upward and away from street level. Winds also helped disperse and dilute WTC airborne emissions, and rain during the first week helped alleviate dusty conditions. If a similar disaster were to strike in a city with different geography and weather patterns, a more serious exposure scenario could develop.

Accordingly, EPA should work with the Department of Homeland Security and other agencies to share information on high-risk targets and areas, and develop plans for responding to an emergency situation in those areas. These plans should address the different scenarios anticipated from a disaster involving these targets and how EPA, other Federal, and the appropriate State and local agencies should respond to these different scenarios.

Roles and Responsibilities Within EPA Need to Be Delineated

EPA needs to delineate roles and responsibilities for its various programs offices when responding to emergencies, including how these roles and responsibilities fit within the incident command structure. Despite the commendable actions of many EPA personnel, the Agency should outline roles and responsibilities for its program offices beforehand to provide a more efficient and coordinated response to future disasters.

For example, within 3 days of the disaster, EPA officials within the Office of Radiation and Indoor Air and the Office of Air Quality and Planning Standards had developed a web site with such captions as "Protecting Yourself from Asbestos Exposure," "Health Effects of Dust and Smoke," and "Strategies for Clean Up Inside Residences and Businesses." However, this web site was not activated and made available to the general public. One EPA official told us there was an overwhelming amount of activity going on and that this information probably "got lost in the fray." EPA Region 2 officials could not recall why the web site was not activated.

Also, although EPA's National Exposure Research Laboratory team made it to New York on September 16 to help implement an ambient monitoring network, they were unable to gain access to the site and start monitoring until September 21. The Laboratory's monitoring team's abilities were especially needed since they had air monitoring equipment that could run on both electrical and battery power, and they had airborne particulate matter monitors.

In its lessons learned report, EPA Region 2 recommended that the Region identify a team of dedicated people who will respond in the event of a new crisis. In our opinion, other EPA regions should follow Region 2's lead and identify specific areas of expertise that may be needed in the event of an emergency, and assemble teams of experts that can be mobilized to quickly provide this support. These areas may include specialized sampling techniques, exposure modeling and assessment, and risk assessment. Also, EPA Headquarters should develop national teams to support or augment Regional response when needed, including guidelines for determining when a response should be elevated to a national level.

Roles and Responsibilities With Outside Agencies Need to Be Delineated

A response to an event the size of the WTC incident requires the efforts and coordination of numerous government organizations, including Federal, State, and local governments. Our discussions with EPA and non-EPA officials, as well as WTC "lessons learned" reports from other organizations, indicated that there were overlapping and sometimes confusing roles and responsibilities for the various responding organizations. For example, early in the response, various agencies were conducting numerous sampling efforts. Particularly for asbestos, different

sampling methods were being used with the results being reported in different metrics, which made the results more difficult to interpret. A senior New York City Office of Emergency Management official told us that roles and responsibilities of the Federal, State, and local agencies in responding to a disaster were unclear on September 11, 2001, and were still unclear when we met with him during the summer of 2002.

EPA has addressed coordination with other organizations in both its Headquarters and Region 2 lessons learned reports. For example, the Headquarters Report recommended that EPA collaborate with OSHA and the Department of Health and Human Services to clarify the Agency's role in protecting the health and safety of responders, and that EPA coordinate with Department of Homeland Security to develop a coordination strategy for all responders during national emergencies. Region 2 management and staff recommended that their Region clearly identify scope and boundaries of their work in an emergency; and educate EPA and other Federal and State officials about the scope, boundaries and authorities of the various emergency response plans and systems. We agree with these recommendations. These coordination efforts should also take place in all EPA regions and include FEMA, and should address likely sources of funding for these activities.

Risk Assessment and Characterization

The WTC disaster pointed to the need for better risk assessment and characterization procedures and tools for addressing the types of environmental concerns resulting from large-scale disasters. A significant challenge encountered by EPA and other organizations was how to characterize health risks to the public in the absence of health-based benchmarks. The need for consistent sampling protocols and special monitoring requirements was also demonstrated.

Health-Based Benchmarks Needed

Government entities, such as EPA, OSHA, ATSDR, and NIOSH, have developed guidelines for many of the contaminants found in Lower Manhattan. However, existing health benchmarks were not applicable to exposures experienced by the general public in Lower Manhattan. Many of the benchmarks available at that time to assess the exposure risks for contaminants found in the ambient air were: occupational standards based on an 8-hour-per-day exposure; guidelines based on long-term exposures; or standards, such as those for asbestos, that were not health based. Details on some of these issues are in Chapter 2.

OSHA and NIOSH have developed occupational standards to protect industrial workers from pollutant exposures, but these standards are based on an 8-hour-a-day exposure. In general, these standards were not applicable to characterizing risks for residents who experienced exposures greater than 8 hours a day in indoor

and outdoor settings. Some of the screening levels developed to assess the sub-chronic risks from the contaminants created by the WTC collapse were developed by adjusting emergency removal guidelines listed in EPA's Hazard Evaluation Handbook to take into account shorter exposure periods. These guidelines are based on a 30-year exposure period and correspond to a 1-in-10,000 increased lifetime cancer risk for carcinogens.

Further, some of the benchmarks used to assess air quality and bulk dust in Lower Manhattan were criteria- or condition-based standards and not health-based standards. For example, the benchmark used to assess asbestos risk from WTC dust was developed to determine when asbestos containing material was subject to demolition and renovation regulations. For future disasters, health benchmarks are needed to address the types of exposures experienced at the WTC site, which included:

- acute or high concentration exposures up to 8 hours
- sub-chronic (2 weeks to 1 year) exposures
- indoor air exposures
- exposure to asbestos
- synergistic or multiple pollutant exposures

Details on each of the above benchmarks are in Appendix O.

We recognize that it is not possible to anticipate all the scenarios and develop standards that address all possible pollutants that may result from a disaster. Thus, we believe an agreed-upon framework for quickly developing additional guidelines and benchmarks in an emergency situation is needed. This process could include a panel of scientific experts that would be available in an emergency to analyze the available risk data and establish appropriate health-based benchmarks for the pollutants of concern

As discussed above, a multi-agency workgroup developed health-related benchmarks for six pollutants of concern related to indoor environment contamination from the WTC collapse that underwent peer review in October 2002. We believe the Agency should expand on these efforts to identify benchmarks for other pollutants of concern and for outdoor and indoor exposures based on threat assessments discussed earlier in this chapter. Related to this effort, EPA should collect information on background levels (i.e., pollutant concentrations under normal conditions), to properly assess the impact that a disaster has on the concentration of these pollutants of concern in the environment.

Sampling and Data Collection Protocols Needed

EPA, other government organizations, and non-governmental organizations undertook extensive monitoring efforts in the months following September 11. Extensive sampling was done around the work zone to monitor conditions for first responders. To assess ambient conditions for the general public, EPA established an ambient monitoring network in coordination with New York City and New York State officials. EPA also developed a draft Quality Assurance Project Plan for the WTC ambient monitoring network; however, the plan was not finalized.

A comprehensive Quality Assurance Project Plan outlines the objectives of the monitoring, identifies the monitoring and sampling methodologies, identifies the siting of monitors, and outlines monitoring exit strategies. In essence, the Plan helps to ensure that sufficient data is collected of adequate quality for the decisions to be made.

The Quality Assurance Project Plan should also address the format and means of transmitting data. In the WTC response, various government agencies collected a large amount of environmental data for Lower Manhattan in the months following September 11. The Office of Environmental Information maintains the New York City Response Monitoring Data Retrieval database, which stores the monitoring data collected by the various Federal, State, and City environmental agencies involved in the response. According to a report prepared by an EPA contractor that analyzed trends in the data, the database contained 263,000 monitoring results for 605 contaminants through April 24, 2002. Because the data came in different formats, consistent sampling, monitoring, and quality assurance information was not provided for each of the pollutants monitored, and in many instances this data was not provided. Our review of information in the database confirmed the trends noted by the contractor.

Providing standardized guidance for the organizations reporting data to EPA would improve the consistency of the data. A complete data set would make future assessments of the data easier to complete. Both EPA Region 2 and EPA Headquarters' Lessons Learned reports made recommendations to improve data collection. The Region 2 Lessons Learned report recommended that all organizations submit data in an electronic format, and standardized formats should be used as much as possible. The report also recommended that easy-to-understand context and explanations be provided for the data, to allow data and risk assessments to be released to the public more quickly.

EPA's Office of Environmental Information has created a standardized template for future responses by making a generic shell of the New York City Monitoring Database. This Office is also exploring longer-term improvements. With regard to WTC data, Region 2 officials have been working to improve the data in the "NYC Response" database by requesting that organizations perform a quality assurance review of the data they submitted to EPA. Once this process is

completed, the data will become available to the public on a CD-ROM. We agree that EPA should continue to explore long-term improvements for data collection.

Monitoring Capabilities Need to Be Increased

The amount of monitoring data for pollutants other than asbestos was limited in the first few weeks following September 11. In the beginning, monitoring efforts were hampered by several factors. There were difficulties associated with getting access and security, power supply sources, equipment availability, and analytical capacity. One environmental monitoring expert who participated in environmental sampling and analysis after the WTC collapse suggested that emergency response monitors must be improved and recommended that lightweight and manageable battery operated air samplers be developed that are able to measure a wide range of particles and gaseous substances.

In the case of a major disaster that causes a significant dispersion of particulates, the levels of TSP can be a concern, particularly in regard to acute respiratory symptoms. However, in the WTC response, these particles were not monitored because of a lack of TSP monitors. The availability of TSP monitors has decreased over time as EPA's National Ambient Air Quality Standards program has shifted its focus from measuring TSP to measuring smaller particles. While health studies support measuring smaller particles from the standpoint of the National Ambient Air Quality Standards program, experts told us that it is useful to measure the levels of TSP in a disaster to determine potential short-term or acute health effects.

EPA Headquarters' Lessons Learned Report addressed equipment needs and recommended that EPA clearly identify such needs. In addition, the Office of Air Quality and Planning Standards acquired funding for a Mobile Rapid Response Laboratory to collect data quickly in emergency situations and transmit data to a central database via satellite. The Office of Air Quality and Planning Standards plans to establish two such mobile laboratories.

Risk Communication

The collapse of the WTC towers disrupted normal communication infrastructures, yet required that difficult decisions about the condition of the environment be made quickly and under extreme stress. Under these conditions, EPA made extraordinary efforts to successfully assemble an extensive amount of information on its web site and otherwise communicate to the public. Despite these efforts, the information EPA communicated was in some cases inconsistent with prior Agency positions, inconsistent with other communications regarding the WTC disaster, or incomplete. Some of these communication problems may have been avoided if the Agency had updated policies and procedures in place for communicating to the public and had followed existing risk communication

guidelines established for the Superfund program. Based on its experience with the WTC response and the subsequent anthrax contamination responses, EPA has initiated various actions to improve its communication practices.

Better Communication Policies, Procedures, and Guidance Needed

Officials from EPA's OCEMR and its successor office, the Office of Public Affairs, in Washington, D.C., were not able to provide us with current written policies or procedures for communicating with the public. Although not established as official Agency communication policy, EPA's Superfund program has issued several guidance documents regarding risk communication. EPA's risk communication principles and recommended practices are contained in EPA's *Superfund Community Involvement Handbook*. This Handbook identifies the "Seven Cardinal Rules of Risk Communication," presented in Chapter 2. As explained in the following, EPA's risk communications did not consistently adhere to the principles and guidelines discussed in its Superfund guidance.

Risk Communications Need to Acknowledge Uncertainties

EPA's *Superfund Community Involvement Handbook* specifically discusses uncertainties ("Be willing to discuss uncertainties"), and the fourth rule states:

> *If you do not know an answer or are uncertain, acknowledge it and respond with the answer as soon as possible. Do not hesitate to admit mistakes or disclose risk information. Try to share more information not less; otherwise, people may think you are hiding something.*

As detailed previously in this report, EPA's statement that the air was safe to breathe was not qualified (except for rescue and cleanup personnel at Ground Zero). Further, EPA's press releases did not discuss any of the uncertainties associated with this statement.

Dr. Peter Sandman, founder of the Environmental Communication Research Program at Rutgers University, provided 26 recommendations for risk communication. These include that one should "acknowledge uncertainty" and urged "never using the word 'safe' without qualifying it."

Procedures Needed to Ensure Consistency in Communications

EPA communications after the WTC catastrophe sometimes gave conflicting information in regard to the same issue or were inconsistent with prior Agency positions. Specifically, information provided orally about cleaning of indoor spaces was not consistent with the messages given in Agency press releases.

Also, EPA communications about the risk from asbestos were not entirely consistent with prior Agency public positions regarding asbestos risk.

EPA's communications during the WTC crisis – that the general public did not need to be concerned about short-term exposure to WTC asbestos – were inconsistent with the Agency's prior position that all asbestos exposure is hazardous to human health. EPA's historical position, as detailed in the Federal Register, has been that:

> *. . . short-term occupational exposures, have also been shown to increase the risk of lung cancer and mesothelioma. In addition, there are many documented cases of mesothelioma linked to extremely brief exposure to high concentrations of asbestos or long-term exposure to low concentrations. . . . EPA has concluded that it is prudent to treat all fiber types as having equivalent biological activity...Available evidence supports the conclusion that there is no safe level of exposure to asbestos*. (April 25, 1986 Federal Register Volume 51, page 15722)

However, EPA's position in its September 13, 2001, press release was that the public did not need to be concerned about short-term exposure to WTC asbestos. The confusion of some residents may have been reflected at a May 8, 2002, press conference, when the questioner quoted EPA's 1986 position and asked the Region 2 Administrator:

> *Available evidence supports the conclusion that there is no safe level for exposure to asbestos. So what science are you citing that there is a safe level?*

The EPA Region 2 Administrator replied:

> *We are talking about very short term exposure to quantities of [unintelligible word] that - we know exactly that these buildings came down and they contained asbestos. There are other places in the country perhaps where people have been exposed over long periods of time - based on using substances containing asbestos - and breathing them - as part of their household. We know this was a one time - you know buildings came down, and that is what needs to be cleaned up so there is not that risk of long term exposure.*

The research community has not reached consensus on the relative risk to human health from exposure to different types and sizes of asbestos, and EPA's approach has been to not distinguish between fiber types and sizes when characterizing the risk from asbestos exposure. Many experts and studies support the general message EPA conveyed about asbestos exposure and risk after the WTC

catastrophe, and research may ultimately prove these statements correct. However, this position was different from prior Agency pronouncements, and can create doubts in the public's mind about EPA's statements.

Communications Need to Disclose External Participation

As discussed previously in this report, EPA officials were not the sole determiners of the information that was included in its press releases, nor the information that was excluded. This was demonstrated by the EPA OCEMR Associate Administrator's statement that residential cleaning instructions were deleted from a draft press release by the CEQ contact official. The extent of outside influence was further illustrated by the statement from the EPA Administrator's Chief of Staff that she could not claim ownership of EPA's early WTC press releases because "the ownership was joint ownership between EPA and the White House."

In a time of disaster, EPA officials should be careful to ensure that EPA's press releases reflect EPA's professional judgment based on sound science, acknowledge the participation of outside parties, and provide accurate information about the environment to the public in accordance with EPA's mission.

Environmental Data from Sources Outside EPA Need to Be Addressed

In the aftermath of the WTC collapse, several entities were involved in collecting data on environmental conditions. This included private firms; research organizations; Federal agencies; and State, local, and city governments. Several days after the attacks, EPA was designated as the lead agency for collecting and storing all of the WTC monitoring data. This designation did not include being the sole spokesperson for communicating the results of this monitoring data.

EPA was subsequently criticized for not including other organizations' monitoring results in its public communications. For example, EPA was criticized for not putting the results of sampling done by the U.S. Geological Survey on EPA's web site, or at least discussing this data. The U.S. Geological Survey monitoring had found high pH levels in the WTC dust, which reportedly contributed to the burning of respiratory pathways experienced by first responders and others who breathed WTC dust. An EPA spokesperson stated that EPA had not intended to keep the information from the public, and EPA thought the information had been posted on the U.S. Geological Survey's web site. EPA officials also told us that the high levels of pH found in the dust was to be expected because of the pulverized concrete.

Another monitoring study was highly publicized by the media, but was not discussed in EPA communications. This study was conducted by a collaborative association of aerosol scientists that specialize in fine particulate ambient monitoring techniques. This group found that the air around Lower Manhattan contained high levels of fine particulates and metals, particularly in readings taken on October 3, 2001. We spoke to the author of this study who told us that he had tried to work with EPA regarding his group's test results before releasing it to the press, but was unsuccessful. EPA correspondence indicated the EPA officials were invited to the press release for this study, but were not aware of the study prior to that invitation.

EPA needs to develop a policy, in conjunction with other Federal agencies, outlining how organization(s) will coordinate the reporting of environmental data after a disaster. This policy should address the State and local government role in these communications, as well as how to address data collected by research or academic organizations.

EPA Actions to Improve Its Communications

Both EPA's Headquarters and Region 2 Lessons Learned Reports address communication issues and provide recommendations to improve the Agency's response in this area. EPA's Headquarters report recommended that EPA develop policies and procedures for disseminating public information during national emergencies within the established emergency response plans and structures. The report also recommended that EPA coordinate with other organizations outside to identify and address obstacles to timely and consistent presentation of environmental information during national emergencies. In regard to releasing monitoring data, the report recommended that EPA clearly define a process for approving and coordinating the release of information to other agencies and the public. Also, EPA's Lessons Learned report recommended that EPA work with the Department of Homeland Security to have EPA designated the lead agency for environmental data during national emergencies when both EPA and other agencies are conducting environmental analyses.

Region 2's lesson learned report recommended that Region 2 develop a comprehensive approach to handling crisis communications, and that this approach include other Federal and State partners. In addition, mechanisms should be in place for resolving differences about the interpretation of risk and the appropriate response.

These recommendations, if properly implemented, should help ensure technical consistency and accuracy in the Agency's public information, and accountability for press release content.

Recent Developments

In May 2003, EPA participated in a Department of Homeland Security-administered Top Officials exercise with other Federal, State, local, and Canadian government organizations. This exercise simulated weapons of mass destruction incidents with the goals of: (1) improving the nation's capacity to manage extreme events; (2) creating broader frameworks for the operation of expert crisis and consequence management systems; (3) validating authorities, strategies, plans, policies, procedures, and protocols; and (4) building a sustainable, systematic national exercise program to support the national strategy for homeland security.

Further, on June 27, 2003, EPA issued the *EPA National Approach to Response Policy* to implement a new approach to responding to Nationally Significant Incidents. The Policy calls for a multi-faceted and coordinated approach to managing EPA's emergency response assets during a Nationally Significant Incident. A key aspect of the policy is that it requires EPA to operate under an Incident Command System approach based on the National Interagency Incident Management System. EPA plans to supplement the Policy with guidance to fully characterize roles and responsibilities within the Agency to manage a Nationally Significant Incident. As noted in the Policy, Homeland Security Presidential Directive-5 calls for the development of a new National Response Plan and a single, comprehensive National Incident Management System. As standards, guidelines, and protocols are developed to implement the national system, EPA will modify its *National Approach to Response Policy* as necessary.

Conclusions

Although many organizations were involved in addressing air quality concerns resulting from the WTC collapse, subsequent events have demonstrated that, ultimately, the public and others expect EPA to monitor and resolve environmental issues, even though EPA may not have the overall responsibility to resolve these issues or the necessary resources to address them. These issues range from collecting, interpreting, and communicating environmental information to cleaning up any environmental contamination. EPA must be prepared to take a leadership role, within the evolving framework established by the Department of Homeland Security and existing statutes, in fulfilling its mission of "protecting human health and the environment," if another large-scale disaster occurs.

Recommendations

This chapter summarizes observations based on work conducted to answer the objectives discussed in Chapters 2 through 6. These prior chapters contain recommendations that address specific issues related to those objectives. Recommendations to address observations not covered in the prior chapters are included in this chapter.

We recommend that the EPA Administrator:

7-1. Work with the Department of Homeland Security and other agencies to share information on likely targets and threats and collaboratively develop approaches to address these threats. Such approaches should include, at a minimum:

a. Identifying the pollutants expected to be emitted from such targets,
b. Assessing the pathways of human exposure to those pollutants,
c. Developing approaches to monitoring and assessing environmental contamination from those targets, and
d. Establishing plans of action for reducing human exposure from these pollutants.

7-2. Define and clarify internal EPA organizational roles and responsibilities in responding to large-scale disasters. This should include designating teams of Agency experts – at both the National and Regional level – that can be mobilized to quickly provide needed technical support during a response. These areas may include specialized sampling techniques, exposure modeling and assessment, and risk assessment.

7-3. Develop and improve health-related benchmarks that can be used to assess health risk in emergencies. Specifically:

a. Continue agency work on Acute Exposure Guideline Levels,
b. Develop sub-chronic exposure guidelines for pollutants determined to be a high priority as a result of terrorist attacks or other large-scale disasters,
c. Develop health-related benchmarks for asbestos in air,
d. Develop benchmarks for assessing potential exposure from contaminant levels in dust,
e. Continue to develop and refine benchmarks for COPCs in indoor environments,
f. Conduct research to determine the synergistic impact of exposure to multiple pollutants, and
g. Develop expert panels that can be used to quickly develop health-related benchmarks in emergency situations.

7-4. Develop an emergency quality assurance sampling plan to be used as a guidance for monitoring environmental conditions after a large-scale disaster. This plan should address:

a. Monitoring objectives,
b. Preferred sampling and analytic methods for high-priority pollutants,
c. Siting of monitors,
d. Quality control, and
e. Data reporting formats

7-5. Improve monitoring capabilities by:

a. Making TSP monitors available for use in emergency situations, and acquiring other monitors as determined,
b. Continuing the mobile monitoring laboratory project, and
c. Exploring new technologies for monitoring in extremely dusty conditions

7-6. Require that the Office of Public Affairs develop emergency communications policy and procedures consistent with the principles of risk communication provided in EPA's "Seven Cardinal Rules of Risk Communication."

Agency Comments and OIG Evaluation

The Agency generally agreed with the recommendations in this Chapter. With respect to the conclusion, the Agency emphasized that it exercised its opinions and judgments on matters impacting human health and the environment and will continue to do so within the context of its authorities and its role under the Federal Response Plan. The Agency's complete written response to our draft report and our detailed evaluation of that response are contained in Appendices Q and R, respectively.

Federal Agencies Responding to the WTC Collapse

Agency	Role
Federal Emergency Management Agency	Managed and coordinated Federal Government response. Provided funding for response including cleaning of building exteriors and cleaning of indoor residential spaces.
U.S. Department of Health and Human Services National Institute for Occupational Safety and Health	Performed various activities related to worker health and safety, which included: • Assessing jobs and work locations for health potential hazards. • Helping site managers select appropriate equipment for sampling, use it properly, and institute procedures for analyzing data. • Helping select appropriate personal protective equipment and coordinate deployment of respirators. • Developing procedures for cleaning and sanitizing respirators. • Developing and disseminating written guidelines for worker safety and health. • Conducting health hazard evaluations to assess worker health. • Providing technical assistance to NYCDOH to develop voluntary registry of individuals who worked at, lived near, or responded to the WTC attack.
U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry	Provided various types of monitoring and health assessment support, including: • Assisting EPA and other agencies in sampling dust and air at Ground Zero and evaluating data to assess health risks. • Providing technical assistance to NYCDOH on environmental medicine, • Participating in the World Trade Center Environmental Assessment Workgroup, which was made up of representatives from ATSDR and other Federal agencies. • Using geographic information systems to map environmental sampling results and other data for Lower Manhattan.
U.S. Department of Health and Human Services National Institute of Environmental Health Sciences	Funded research and training to address health concerns resulting from the WTC collapse.

Agency	Role
U.S. Department of Labor Occupational Safety and Health Administration	Conducted various risk assessment and monitoring activities related to worker protection at the Ground Zero Site. This included: • Taking air and bulk samples to date for asbestos, silica, lead, and other heavy metals, carbon monoxide, noise, and numerous organic and inorganic compounds. • Providing 24-hour laboratory support to analyze air and bulk samples taken at the site. • Distributing sampling results to workers and other safety and health representatives at the site, and posting the sampling results on the agency's web site, and • Providing guidance on appropriate personal protection equipment and feasible control measures based on monitoring results. Distributed respirators and conducted fit testing for the Fire Department of New York and other rescue workers. Conducted initial safety assessment of the site within 24 hours of the attack to identify hazards and potential health and safety risks to workers involved in the recovery, and provided around-the-clock monitoring of the site to identify and alert workers to safety and health hazards. Provided various safety and health support functions such as helping develop an environmental, safety, and health plan; distributing personal protective equipment to workers; and conducting job hazard analyses. Provided support to promote site safety and health, which included sponsoring weekly meeting regarding safety and health issues.
United States Coast Guard	Operated Incident Command Center in Edison, New Jersey. Conducted air-monitoring operations in buildings in Manhattan's financial district.

Details on Scope and Methodology

Objective 1. Did the available monitoring data and analyses of that data support EPA's major public communications regarding air quality and associated health risks resulting from the collapse of the WTC towers?

We requested all data and correspondence used to support "major" EPA pronouncements regarding air quality. We defined "major" as press releases, testimony, television, and other public appearances. This effort primarily focused on, but was not limited to, data collected and pronouncements made during the period September 2001 through December 2001. The data we reviewed included "Daily Summary Sheets" prepared by EPA staff, and the raw data sheets that showed the results of air and dust samples and were the basis for the daily summaries. In addition, we obtained access to the "New York City Response" database maintained by EPA's Office of Environmental Information and downloaded selected data from the database and compared it to the raw data sheets. We also reviewed monitoring results from other organizations, including:

- New York State Department of Conservation
- New York City Department of Environmental Protection
- National Institute for Occupational Safety and Health
- New York City Board of Education
- Operating Engineers National Hazmat Program
- New York State Public Employees Safety and Health Bureau
- U.S. Geological Survey
- Occupational Safety and Health Administration
- DELTA Group
- New York University
- Environmental and Occupational Health Sciences Institute
- ConEd
- Turner Construction

We interviewed Region 2 officials to determine their views on what monitoring data showed and the messages conveyed by EPA press releases. In addition, we interviewed EPA officials within the Office of Research and Development, Office of Air and Radiation, and Office of Solid Waste and Emergency Response. We also interviewed officials outside EPA to obtain their views on EPA's statements about air quality and the support for these statements. These interviews included officials and researchers from OSHA, FEMA, NYCDOH, NYCDEP, the Mount Sinai School of Medicine, New York University, the Environmental and Occupational Health Sciences Institute, and the DELTA Group.

We also reviewed available correspondence and documentation related to the preparation of the EPA press releases. Further, we interviewed principal EPA officials involved in the preparation of press releases, including the EPA Associate Administrator for OCEMR, the Associate Administrator for the Office of Public Affairs (formerly OCEMR), the EPA Administrator's former Chief of Staff, and the Region 2 Communications Division Director.

Limitations: Our review of the process and the support for information in EPA press releases on air quality was limited since CEQ officials declined to meet with us to discuss their role in the preparation of press releases. Our written request for an interview was declined by a White House legal counselor, who noted there were "institutional concerns about interviewing White House employees." Further, there was a lack of documentation in general regarding preparation of press releases. We only found documentation regarding the preparation of two of six press releases issued during the period September 12, 2001, through October 3, 2001. This documentation included a draft copy of the EPA press release issued on September 16; a single e-mail about this draft press release from CEQ; and a draft copy of the September 13 EPA press release.

Objective 2. Were EPA actions and decisions in regard to evaluating, mitigating, and controlling risks to human health from exposure to indoor air pollutants in the WTC area consistent with applicable statutes, regulations, policies, guidance, and practice?

We reviewed applicable laws, regulations, and guidance related to emergency responses, including CERCLA (Superfund) and implementing regulations, and the FRP. We also reviewed EPA's authority to test and clean indoor spaces, and the applicability of this authority to the WTC response. We interviewed EPA and FEMA officials about the applicability and requirements of these statutes. We also identified EPA and other government actions taken in response to other disasters to compare prior indoor responses to the WTC indoor response.

We identified and reviewed reports of indoor testing conducted by both government and non-government entities. This included indoor air and dust testing conducted by EPA, ATSDR, contractors for the General Services Administration, consultants for the Ground Zero Task Force, and an environmental firm hired by one of the debris removal construction companies.

We also interviewed officials both within and outside the government to determine their views regarding the extent of indoor contamination and the adequacy of the government's response.

Objective 3. Were asbestos demolition and renovation work practice standards followed during WTC cleanup and recovery operations and, if not, why not?

To determine the requirement applicable to emergency situations, we reviewed the Asbestos National Emissions Standard for Hazardous Air Pollutants (40 CFR Part 61 Subpart M), EPA's "Guidelines For Catastrophic Emergency Situations Involving Asbestos," and other EPA background documents on NESHAP. We also reviewed New York City's "Asbestos Control Program" rules and New York State's Industrial Code Rule 56, which governs asbestos emission in the State.

We interviewed EPA and New York City officials to discuss the applicability of NESHAP rules to the WTC response. This included the EPA Region 2 Counsel, officials from the EPA Office of Enforcement and Compliance Assurance and the Office of Air Quality Planning and Standards, and officials from NYCDEP and NYCDDC. To determine the extent that NESHAP work practices were followed in demolishing damaged buildings and removing debris from the WTC site, we interviewed officials who were present at the site during these operations including EPA on-scene coordinators, and officials from New York City and OSHA. We also reviewed transcripts of EPA Superfund Ombudsman, United States Senate Subcommittee, New York State Assembly, and New York City Council hearings on this issue. Further, we reviewed reports from persons present at the site, EPA situation reports, and other reports of activities at the site.

Limitations: Information on which we based conclusions includes personal accounts of the work activities obtained from interviews and hearings, and reports describing work practices at the site. Further, it was beyond the scope of our review to determine whether all NESHAP regulations applicable to emergency situations were followed or the extent to which they may have been followed. We also did not evaluate compliance with worker protection requirements.

Objective 4. To what extent were EPA and government communications regarding air quality and associated health risks: (a) received by the public; (b) understood by the public; and (c) effective in getting people to take the desired actions to reduce their potential health risks?

To obtain information on the impact EPA pronouncements had on the actions of area residents and workers, we reviewed testimony at hearings before a United States Senate Subcommittee, EPA's Superfund Ombudsman, the New York State Assembly, and the New York City Council. In addition, we reviewed the results of surveys of people's actions and opinions, and reviewed reports prepared by officials present during the WTC response. At the time this report was prepared, we were in the process of conducting a random survey of New York City residents to obtain information on the public's satisfaction with the air quality information provided by the government after the WTC response, how the public interpreted

this information, and actions taken by the public to reduce their exposure to potential contaminants. The results of this survey will be presented in a separate OIG report.

Limitations: Except for a survey by NYCDOH and a random telephone poll of New York residents, the information we reviewed was not collected by statistical sampling methods and may not be representative of the public's and emergency crews' actions with respect to government communications**.**

Objective 5. What additional actions, if any, should EPA take to improve its response and recovery efforts in the WTC area related to ambient and indoor air quality?

This objective primarily focused on the indoor residential cleanup – the only significant EPA WTC recovery activity ongoing at the time we completed our review. We did not audit the results of the cleaning and testing to determine compliance with the prescribed procedures of the program or to determine the actual effectiveness of cleaning conducted. Our analysis was based on a review of the procedures for the testing and cleanup by our certified industrial hygienist, a comparison of those procedures to commonly accepted asbestos abatement procedures, and a comparison of the cleanup goals to remediation goals that would have been required if this were a designated Superfund site. We also reviewed a peer review report of COPCs developed by EPA for indoor cleanup.

Objective 6. Should EPA revise its preparation and contingency planning for dealing with air pollution resulting from environmental catastrophes?

To answer this question, we summarized lessons learned from the work we conducted to complete our other objectives. We also interviewed EPA officials, other government officials, and non-government environmental experts to obtain their suggestions for improving EPA's capability to respond to similar disasters in the future. We also reviewed EPA and non-EPA "lessons learned" reports.

Prior Audit Coverage

The OIG has not conducted any prior evaluations of EPA responses to large-scale disasters. However, our report on EPA's actions related to asbestos contamination in Libby Montana (*EPA's Actions Concerning Asbestos-Contaminated Vermiculite in Libby, Montana*; 2001-S-7; March 31, 2001) discussed several issues related to the regulation and analysis of health risks from asbestos that were relevant to this evaluation.

EPA September 18, 2001 Press Release

September 18, 2001

Whitman Details Ongoing Agency Efforts to Monitor Disaster Sites, Contribute to Cleanup Efforts
[En Español]

EPA Administrator Christie Whitman announced today that results from the Agency's air and drinking water monitoring near the World Trade Center and Pentagon disaster sites indicate that these vital resources are safe. Whitman also announced that EPA has been given up to $83 million from the Federal Emergency Management Agency (FEMA) to support EPA's involvement in cleanup activities and ongoing monitoring of environmental conditions in both the New York City and Washington metropolitan areas following last week's terrorist attacks on the World Trade Center and the Pentagon.

"We are very encouraged that the results from our monitoring of air quality and drinking water conditions in both New York and near the Pentagon show that the public in these areas is not being exposed to excessive levels of asbestos or other harmful substances," 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 breath and their water is safe to drink," she added.

In the aftermath of last Tuesday's attacks, EPA has worked closely with state, federal and local authorities to provide expertise on cleanup methods for hazardous materials, as well as to detect whether any contaminants are found in ambient air quality monitoring, sampling of drinking water sources and sampling of runoff near the disaster sites.

At the request of FEMA, EPA has been involved in the cleanup and site monitoring efforts, working closely with the U.S. Coast Guard, the Centers for Disease Control (CDC), the Occupational Safety and Health Administration (OSHA) and state and local organizations.

EPA has conducted repeated monitoring of ambient air at the site of the World Trade Center and in the general Wall Street district of Manhattan, as well as in Brooklyn. The Agency is planning to perform air monitoring in the surrounding New York metropolitan area. EPA has established 10 continuous (stationary) air monitoring stations near the WTC site. Thus far, from 50 air samples taken, the vast majority of results are either non-detectable or below established levels of concern for asbestos, lead and volatile organic compounds. The highest levels of asbestos have been detected within one-half block of ground zero, where rescuers have been provided with appropriate protective equipment.

In lower Manhattan, the City of New York has also been involved in efforts to clean anything coated with debris dust resulting from Tuesday's destruction. This involves spraying water over buildings, streets and sidewalks to wash the accumulated dust off the building and eliminate the possibility that materials would become airborne. To complement this clean up effort, EPA has performed 62 dust sample analyses for the presence of asbestos and other substances. Most dust samples fall below EPA's definition of "asbestos containing material" (one percent asbestos). Where samples have shown greater than one percent asbestos, EPA has operated its 10 High Efficiency Particulate Arresting, HEPA, vacuum trucks to clean the area and then resample. EPA also used the 10 HEPA vac trucks to clean streets and sidewalks in the Financial District in preparation for Monday's return to business. The Agency plans to use HEPA vac trucks to clean the lobbies of the five federal buildings near the World Trade Center site, and to clean the streets outside of New York's City Hall.

Drinking water in Manhattan was tested at 13 sampling points, in addition to one test at the Newtown Sewage Treatment plant and pump station. Initial results of this drinking water sampling show that levels of asbestos are well below EPA's levels of concern.

While FEMA has provided EPA with a Total Project Ceiling cost of slightly more than $83 million for the Agency's cleanup efforts in New York City and in at the Pentagon site, EPA currently is working with emergency funding of $23.7 million. If costs exceed this level, FEMA will authorize EPA to tap additional funding in increments of $15 million. As part of the additional funding to be provided by FEMA, EPA will be responsible for any hazardous waste disposal, general site safety and providing sanitation facilities for many of the search and rescue workers to wash the dust off following their shifts. EPA is coordinating with both the U.S. Air Force Center for Environmental Excellence and the U.S. Coast Guard to quickly

implement these additional responsibilities to ensure that search and rescue personnel are provided with the maximum support and protection from hazardous materials that may be found during their mission.

At the Pentagon explosion site in Arlington Va., EPA has also been involved in a variety of monitoring of air and water quality. All ambient air monitoring results, both close to the crash site and in the general vicinity, have shown either no detection of asbestos or levels that fall well below the Agency's level of concern. Testing of runoff water from the disaster site does not show elevated levels of contaminants. Given the large numbers of Department of Defense (DOD) employees returning to work this week, EPA has worked closely with officials from DOD and from the Occupational Safety and Health Administration (OSHA) to evaluate air and drinking water quality and to be certain that the workplace environment will be safe.

While careful not to impede the search, rescue and cleanup efforts at either the World Trade Center or the Pentagon disaster sites, EPA's primary concern has been to ensure that rescue workers and the public are not being exposed to elevated levels of potentially hazardous contaminants in the dust and debris, especially where practical solutions are available to reduce exposure. EPA has assisted efforts to provide dust masks to rescue workers to minimize inhalation of dust. EPA also recommends that the blast site debris continue to be kept wet, which helps to significantly reduce the amount of airborne dust which can aggravate respiratory ailments such as asthma. On-site facilities are being made available for rescue workers to clean themselves, change their clothing and to have dust-laden clothes cleaned separately from normal household wash.

Appendix D

Screening Levels Used by EPA to Assess Outdoor Air Quality

Pollutant	Screening Level	Source
Asbestos (Ambient Air)	70 s/m2	AHERA clearance level to re-enter school after asbestos abatement. Represents minimum detection limit of method in use at time standard set.
Asbestos (**Bulk Dust**)	1% asbestos	The Asbestos NESHAP (40 CFR Part 61) level at which a material is considered asbestos-containing and subject to NESHAP removal regulations.
Benzene	0.02 ppm **[1]**	California-EPA toxicity studies.
	.21 ppm **[3]**	Region 2 **[2]**
PCBs	.73 ug/m3 **[1]**	Region 2 **[2]**
	9 ug/m3 **[3]**	Region 2 **[2]**
Chromium	.6 ug/m3 **[3]**	Region 2 **[2]**. Based on risk for Chromium Hexavalent (the most toxic form of Chromium).
Cadmium	.2 ug/m3 **[1]**	California-EPA toxicity studies
	3 ug/m3 **[3]**	Region 2 **[2]**
Manganese	.5 ug/m3 **[1]**	Region 2 **[2]**
Particulate Matter 2.5	40 ug/m3	Air Quality Index. Represents caution level for sensitive populations for 24-hour average exposure.
	65 ug/m3 (24 hr avg)	National Ambient Air Quality Standard
Particulate Matter 10	150 ug/m3	Air Quality Index and National Ambient Air Quality Standard
Lead	1.5 ug/m3 (3 mo avg)	National Ambient Air Quality Standard
	.1 ug/m3	Default value in EPA's Integrated Exposure Uptake/ Bio-kinetic Model for Lead in Children.
PAHs	6 ug/m3 **[3]**	Region 2 developed from EPA's "Hazard Evaluation Handbook: A Guide to Removal Actions," and EPA National Center for Environmental Assessment provisional inhalation Slope Factor for Benzo(a)pyrene.
Dioxin	.162 ng/m3 **[3]**	Region 2 **[2]**
Sulfur Dioxide	.14 ppm (24 hr avg)	National Ambient Air Quality Standard
Acetone	1.5 ppm **[1]**	Region 2 **[2]**
Benzaldehyde	860 ppm	Not identified
1,3 Butadiene	.01 ppm **[1] [3]**	Region 2 developed using EPA's "Hazard Evaluation Handbook: A Guide to Removal Actions," and proposed reference concentration.

Pollutant	Screening Level	Source
Chloro-methane	.4 ppm **[1]**	Region 2 **[2]**
	2.6 ppm **[3]**	Region 2 **[2]**
1,4 Dioxane	.5 ppm **[3]**	Region 2 **[2]**
Ethanol	45 ppm	American Conference of Government Industrial Hygienists Threshold Limit
Ethyl-benzene	2.5 ppm **[1]**	Region 2 **[2]**
Freon 22	140 ppm	Not Identified
Propylene	simple asyphyxiant	
Styrene	2.3 ppm **[1]**	Region 2 **[2]**
Alpha methyl styrene	.1ppm **[1]**	Region 2 **[2]**
Tetrahydro-furan	.9 ppm **[3]**	Region 2 **[2]**
Toluene	1.1 ppm **[1]**	Region 2 **[2]**
Xylenes	1 ppm	ATSDR Minimum Risk Level x 10. Represents screening level for chronic (over 365 days) exposure. Used to identify contaminants of potential concern.
Acetaldehyde	.05 ppm **[1]**	Region 2 **[2]**
	1.3 ppm **[3]**	Region 2 **[2]**
Formaldehyde	.04 ppm	ATSDR Minimum Risk Level for acute exposure. Represents screening level for acute (1- to 14-day) exposure to identify a potential concern.
	.35 ppm **[3]**	Region 2 **[2]**
Acrolein	.0001 ppm **[1]**	Region 2 **[2]**

Notes:

[1] = Represents risk of non-cancer disease based on a 1-year continuous exposure at screening level. The hazard quotient represents the ratio of the potential exposure to the substance and the level at which no adverse health effects are expected. If the quotient is greater than 1, then adverse health effects are possible. For WTC's response, the screening level established equals a hazard quotient of 10.

[2] = Region 2 developed the screening level using EPA's "Hazard Evaluation Handbook: A Guide to Removal Actions," and toxicity criteria from EPA's Integrated Risk Information System database.

[3] = Represents a 1-in-10,000 increased lifetime risk of cancer based on a 1-year continuous exposure at the screening level.

EPA Outdoor Air Asbestos Sampling for September 2001

Date Sample Collected	No. of Samples Collected	Sampling Location	No. of Samples Exceeding 70s/mm2	No. of Samples Not Analyzed [1]	Date Results Available
9/11	4	Brooklyn	**[2]**		9/12
9/11	4	New Jersey	**[2]**		9/12
9/12	9	Ground Zero	**[2]**		9/13
9/13	1	Lower Manhattan	**[2]**		9/14
9/15	16	Lower Manhattan	2 **[3]**	7	9/16
9/16	20	Lower Manhattan	1 **[4]**	9	9/17
9/17	23	Lower Manhattan	0	8	9/18
9/18	12	Lower Manhattan	0		9/19
9/18	13	Lower Manhattan	0	3	9/20
9/18	4	New Jersey	0	1	9/20
9/18	2	New Jersey	0		9/22
9/19	12	Lower Manhattan	0 **[5]**		9/20
9/19	11	Lower Manhattan	0		9/21
9/19	13	Lower Manhattan	0		9/23
9/19	3	New Jersey	0		9/22
9/20	18	Lower Manhattan	0		9/21
9/20	2	New Jersey	0		9/22
9/20	4	New Jersey	0		9/23
9/21	13	Lower Manhattan	0		9/22
9/21	4	New Jersey	0		9/24
9/22	13	Lower Manhattan	0		9/23
9/22	15	Lower Manhattan	1 **[6]**	1	9/24
9/22	4	New Jersey	0		9/26
9/23	29	Lower Manhattan	1 **[7]**	3	9/25
9/23	4	New Jersey	0		9/27
9/24	16	Lower Manhattan	0		9/25
9/24	16	Lower Manhattan	0		9/26
9/24	4	New Jersey	0		9/27
9/25	17	Lower Manhattan	0		9/28
9/25	4	New Jersey	0		9/28
9/26	17	Lower Manhattan	0		9/28
9/26	16	Lower Manhattan	3 **[8]**		9/29
9/26	4	New Jersey	0		9/29
9/27	18	Lower Manhattan	0		9/29
9/27	17	Lower Manhattan	0		9/30
9/28	17	Lower Manhattan	0		9/29

Date Sample Collected	No. of Samples Collected	Sampling Location	No. of Samples Exceeding 70s/mm2	No. of Samples Not Analyzed [1]	Date Results Available
9/28	17	Lower Manhattan	0		10/01
9/28	4	New Jersey	0		9/30
9/29	16	Lower Manhattan	0		10/01
9/29	17	Lower Manhattan	1 **[9]**		10/02
9/29	4	New Jersey	0		10/01
9/30	17	Lower Manhattan	2		10/02
TOTALS	**474**		**11**	**32**	

Notes:

[1] = Not analyzed due to filter overloading or other sampling problems.
[2] = No sample results reported for this method.
[3] = Results were 128 and 160 s/mm2.
[4] = Result was 90 s/mm2.
[5] = TEM results were reported in fibers per cubic centimeter. Results in s/mm2 not reported on daily summary sheet.
[6] = Result was 80 s/mm2.
[7] = Result was 88.89 s/mm2.
[8] = Results were 177.78, 97.78, and 71.11 s/mm2.
[9] = Result was 80 s/mm2.

EPA Outdoor Bulk Dust Asbestos Test Results for September 2001 [1]

Date Sample Collected	No. of Samples Collected	Location	No. of Results > 1% Asbestos	Date Results Reported in Daily Summary
9/11	4	Ground Zero	1	9/12
9/12	7	Ground Zero	0	
9/12	5	Brooklyn	0	9/13
9/13	0			
9/14	12	Financial District	0	9/15
9/15	29	West of Broadway	13	9/16
9/16	5	South of Ground Zero	5	9/17 and 9/18
9/17	13	Perimeter of Ground Zero	0	9/18
9/18	11	Perimeter of Ground Zero	6	9/20
9/19	16	Various Lower Manhattan locations	12	9/21
9/20	7	Various Lower Manhattan locations	0	9/21
9/21	11	Around WTC	0	9/22
9/21	1	Beam from South Tower	0	9/23
9/22	0			
9/23	11	Around Ground Zero	0	9/25
9/24	0			
9/25	13	Various Lower Manhattan locations	0	9/28
9/26	0			
9/27	0			
9/28	0			
9/29	0			
9/30	0			
Totals	**145**		**37**	

1 = Excludes bulk testing at landfill.

EPA September 16, 2001 Press Release

September 16, 2001

EPA, OSHA Update Asbestos Data, Continue to Reassure Public about Contamination Fears [En Español]

The U.S. Environmental Protection Agency and the Department of Labor's Occupational Health and Safety Administration today announced that the majority of air and dust samples monitored at the crash site and in lower Manhattan do not indicate levels of concern for asbestos. The new samples confirm previous reports that ambient air quality meets OSHA standards and consequently is not a cause for public concern. New OSHA data also indicates that indoor air quality in downtown buildings will meet standards.

EPA has found variable asbestos levels in bulk debris and dust on the ground, but EPA continues to believe that there is no significant health risk to the general public in the coming days. Appropriate steps are being taken to clean up this dust and debris.

"Our tests show that it is safe for New Yorkers to go back to work in New York's financial district," said John L. Henshaw, Assistant Secretary of Labor for OSHA. "Keeping the streets clean and being careful not to track dust into buildings will help protect workers from remaining debris."

OSHA staff walked through New York's financial district on September 13th, wearing personal air monitors and collected data on potential asbestos exposure levels. All but two samples contained no asbestos. Two samples contained very low levels of an unknown fiber, which is still being analyzed.

Air Samples taken on Sept. 13th inside buildings in New York's financial district were negative for asbestos. Debris samples collected outside buildings on cars and other surfaces contained small percentages of asbestors, ranging from 2.1 to 3.3 - slightly above the 1 percent trigger for defining asbestos material.

"EPA will be deploying 16 vacuum trucks this weekend in an effort to remove as much of the dust and debris as possible from the site where the samples were obtained," said EPA Administrator Christie Whitman. "In addition we will be moving six continuous air monitoring stations into the area. We will put five near ground zero and one on Canal Street. The good news continues to be that the air samples we have taken have all been at levels that cause us no concern."

The continuous monitoring stations will augment the ambient air quality monitoring located in Brooklyn. EPA and OSHA will remain on site and continue to monitor for levels of asbestos, PCBs, lead and polycyclic aromatic hydrocarbons (PAHs) in the area throughout the long weeks of cleanup ahead. In addition, EPA will move in a bus that has the equipment to do instant analysis of volatile organic compound samples from air at the site. It is called a Total Atmospheric Gas Analyzer and is similar to a unit used during the Gulf War to sample emissions from the oil fires in Kuwait.

The Agency is recommending that businesses in the area planning to reopen next week take precautions including cleaning air conditioning filters and using vacuums with appropriate filters to collect dust. Vacuuming will reduce the chance of re-entering workers tracking dust into the buildings. This work is already underway by city agencies.

The U.S. Coast Guard will be assisting EPA in monitoring impacts, if any, of today's rainstorms on the water quality. However, most of the rainflow is expected to be handled by the City's waste water treatment facility, since there will be only limited sewage in the combined sewer system. EPA has a vessel on site in New York to handle any necessary testing.

Additional technical support has been offered to EPA in New York from the U.S. Air Force Surgeon General's Office of Environmental and Occupational Health. That support would involve five engineers and/or environmental technicians and equipment if needed.

EPA September 13, 2001 Press Release

September 13, 2001

EPA Initiates Emergency Response Activities, Reassures Public About Environmental Hazards [En Español]

U.S. Environmental Protection Agency Administrator Christie Whitman today announced that EPA is taking steps to ensure the safety of rescue workers and the public at the World Trade Center and the Pentagon disaster sites, and to protect the environment. EPA is working with state, federal, and local agencies to monitor and respond to potential environmental hazards and minimize any environmental effects of the disasters and their aftermath.

At the request of the New York City Department of Health, EPA and the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) have been on the scene at the World Trade Center monitoring exposure to potentially contaminated dust and debris. Monitoring and sampling conducted on Tuesday and Wednesday have been very reassuring about potential exposure of rescue crews and the public to environmental contaminants.

EPA's primary concern is to ensure that rescue workers and the public are not exposed to elevated levels of asbestos, acidic gases or other contaminants from the debris. Sampling of ambient air quality found either no asbestos or very low levels of asbestos. Sampling of bulk materials and dust found generally low levels of asbestos.

The levels of lead, asbestos and volatile organic compounds in air samples taken on Tuesday in Brooklyn, downwind from the World Trade Center site, were not detectable or not of concern.

Additional sampling of both ambient air quality and dust particles was conducted Wednesday night in lower Manhattan and Brooklyn, and results were uniformly acceptable.

"EPA is greatly relieved to have learned that there appears to be no significant levels of asbestos dust in the air in New York City," said Administrator Whitman. "We are working closely with rescue crews to ensure that all appropriate precautions are taken. We will continue to monitor closely."

Public health concerns about asbestos contamination are primarily related to long-term exposure. Short-term, low-level exposure of the type that might have been produced by the collapse of the World Trade Center buildings is unlikely to cause significant health effects. EPA and OSHA will work closely with rescue and cleanup crews to minimize their potential exposure, but the general public should be very reassured by initial sampling.

EPA and OSHA will continue to monitor and sample for asbestos, and will work with the appropriate officials to ensure that rescue workers, cleanup crews and the general public are properly informed about appropriate steps that should be taken to ensure proper handling, transportation and disposal of potentially contaminated debris or materials.

EPA is taking steps to ensure that response units implement appropriate engineering controls to minimize environmental hazards, such as water sprays and rinsing to prevent or minimize potential exposure and limit releases of potential contaminants beyond the debris site.

EPA is also conducting downwind sampling for potential chemical and asbestos releases from the World Trade Center debris site. In addition, EPA has deployed federal On-Scene Coordinators to the Washington, D.C. Emergency Operations Center, Fort Meade, and FEMA's alternate Regional Operations Center in Pennsylvania, and has deployed an On-Scene Coordinator to the Virginia Emergency Operations Center.

Under its response authority, EPA will use all available resources and staff experts to facilitate a safe emergency response and cleanup.

EPA will work with other involved agencies as needed to:

- procure and distribute respiratory and eye protection equipment in cooperation with the Dept. of

Health and Human Services;

- provide health and safety training upon request;
- design and implement a site monitoring plan;
- provide technical assistance for site control and decontamination; and
- provide some 3000 asbestos respirators, 60 self-contained breathing apparatuses and 10,000 protective clothing suits to the two disaster sites.

New York Governor George E. Pataki has promised to provide emergency electric generators to New York City in efforts to restore lost power caused by Tuesday's tragedy, and EPA will work with State authorities to expedite any necessary permits for those generators.

OSHA is also working with Consolidated Edison regarding safety standards for employees who are digging trenches because of leaking gas lines underground. OSHA has advised Con Edison to provide its employees with appropriate respirators so they can proceed with emergency work, shutting off gas leaks in the city.

Appendix I

Non-Governmental Environmental Experts Interviewed

Philip Landrigan, M.D.	Director/Attending, The Mount Sinai Hospital Chairman & Professor, Mount Sinai School of Medicine
Stephen Levin, M.D.,	Assistant Attending, The Mount Sinai Hospital Associate Professor, Mount Sinai School of Medicine
George Thurston, Sc.D.	Associate Professor of Environmental Medicine, New York University School of Medicine
Paul Lioy, Ph.D.	Director, Exposure Measurement and Assessment Division, Environmental and Occupational Health Sciences Institute
Hugh Granger, Ph.D., CIH	Toxicologist and Laboratory Director, HP Environmental, Inc.
Piotr Chmielinski, M.S., CIH	Director of Industrial Hygiene, HP Environmental, Inc.
Thomas Cahill	Professor of Atmospheric Science/Physics, University of California–Davis, Director, DELTA Group
Michael Beard	Research Environmental Chemist, Center for Environmental Measurements, Research Triangle Institute
Michael Gallo, PhD.,	Director, Toxicology Division, Environmental and Occupational Health Sciences Institute
Howard Bader, P.E.	President, H.A. Bader Consultants, Inc.

NYCDEP October 25, 2001 Instructions to Residents

Department of Environmental Protection
Executive Offices
59-17 Junction Boulevard-19th floor
Corona, New York 11368-5107
www.nyc.gov/dep

Joel A. Miele Sr., P.E., Commissioner
(718) 595-6565 Fax #: (718) 595-3525
E-mail: Jmiele@nysnet.net

October 25, 2001

Dear Residents of Lower Manhattan:

Since September 11th, the U.S. Environmental Protection Agency (EPA), NYC Department of Environmental Protection (DEP), NYC Department of Health (DOH), and the Occupational Safety and Health Administration (OSHA), have been taking samples of the air, dust, water, river sediments and drinking water and analyzing them for the presence of pollutants. The samples are evaluated against a variety of benchmarks, standards and guidelines established to protect public health under various conditions. These agencies consider the amount of time a person is exposed to a particular pollutant and where—a school, workplace or home—in creating these criteria.

The following is a description of some of the benchmarks, standards and guidelines these agencies are using to evaluate environmental conditions in the aftermath of the World Trade Center disaster.

Asbestos in the Air / in Open Spaces

EPA is requiring the strictest protective standard under AHERA, the Asbestos Hazard Emergency Response Act, for asbestos in outdoor and indoor areas. (This standard is used to determine whether children may reenter a school building after asbestos has been removed or abated.) To be as protective as possible, EPA, together with NYCDEP and all the other health and environmental agencies, are requiring school reentry standards in tests around the World Trade Center site. NYCDEP, USEPA, and NYC Department of Sanitation worked to perform cleanups of all dust in exterior areas with HEPA vacuums and wetwashing. **NYCDEP and EPA have both conducted tests in exterior spaces and all exterior areas of Lower Manhattan that were closed passed their strict protective standards before being opened again to the public.**

Asbestos in Dust in Buildings

If a substance contains more than 1% asbestos, it is considered to be an "asbestos-containing material." There are Federal, State, and City regulations in place to ensure the proper handling and disposal of asbestos-containing material. If a substance contains 1% or less asbestos, these regulations do not apply.

EPA is using the 1% definition in evaluating exterior dust samples in the Lower Manhattan area near the World Trade Center. All affected landlords have been instructed to test dust samples within their buildings utilizing this standard. **Landlords were notified that they should not reopen any *building until a competent professional had properly inspected their premise. If more than* 1% asbestos was found and testing and cleaning was necessary, it had to be performed by certified personnel.**

Drinking Water

NYC DEP continuously tests drinking water every day for multiple parameters. After the World Trade Center disaster, DEP expanded the number of tests taken and the parameters of testing. EPA *also conducted separate tests.* ***Before and after the event, New York City drinking water has*** **met and continues to meet all Federal, State, and City standards. Testing at a heightened level is continuing.**

NYC Department of Health

The New York City Health Commissioner Neal L. Cohen, M.D. has reviewed the findings of the various testing agencies and issued the following statements to residents. He said "despite *the smoky conditions in areas of lower Manhattan that are close to the World Trade Center* site, test results from the ongoing monitoring of airborne contaminants indicate that the levels continue to be below the level of concern to public health. Nonetheless, while debris continues to be disturbed, and while flare-ups of smoke continue to permeate the downtown area, air-testing results will continue to be monitored, and appropriate health recommendations will be issued as necessary." Dr. Cohen added, "As work continues at the disaster site, the presence of dust and smoke odor in the downtown area has been of understandable concern to residents. **However, air monitoring by Federal, State and City agencies has indicated that the levels of particulate *matter* being detected are below the level of public health concern and do not pose long-term health risks to the general public."**

In addition to air monitoring activities, efforts are being made daily to suppress dust and smoke at the World Trade Center disaster site. Results of daily dust sampling conducted by the U.S. Environmental Protection Agency is available online at epa.gov. Factsheets detailing Health Department recommendations pertaining to air quality, asbestos, safely reoccupying homes and buildings, and worker safety are available online at nyc.gov/health. For more information about all Health Department activities, New Yorkers can call (212) 227-5269. For information about asbestos issues, you can consult our website at nyc.gov/dep or call the New York City Department of Environmental Protection at (718) DEP-HELP and ask to be referred to our asbestos staff.

Very truly yours,

Joel A. Miele Sr., P.E., Commissioner

Indoor Air and Dust Test Results

EPA conducted indoor air monitoring and indoor dust wipe sampling in the weeks after the collapse. This EPA indoor air monitoring (prior to the FEMA-funded residential cleanup) was limited primarily to testing for asbestos in buildings. EPA's dust wipe sampling tested for metals, PCBs, and dioxin.

On September 13, 2001, 14 air samples were collected from 26 Federal Plaza, 290 Broadway, and Chase Manhattan Plaza, and analyzed for asbestos. All samples were analyzed by TEM and the results converted to PCM equivalent readings in fibers per cubic centimeter (f/cc). One of the 14 samples exceeded the New York City standard for asbestos clearance of .01 f/cc (see Table K-1).

Table K-1: Indoor Air Test Results from September 13, 2001

Address	Sample ID	Sample Volume [1]	PCM Analysis		TEM Analysis			
			f/cc	f/mm2 [2]	f/cc	s/mm2	s = .5- 5 [3]	s > 5 [4]
Chase Manhattan Plaza	571	np	na	na	0.0098	na	na	na
26 Federal Plaza (13th floor)	16370	np	na	na	0.0064	na	na	na
26 Federal Plaza (13th floor)	16371	np	na	na	<0.0033	na	na	na
26 Federal Plaza (Lobby S.)	16372	np	na	na	0.0072	na	na	na
26 Federal Plaza (Lobby W.)	16373	np	na	na	0.0037	na	na	na
26 Federal Plaza (39th floor)	16374	np	na	na	<0.0038	na	na	na
26 Federal Plaza (38th floor)	16375	np	na	na	<0.0039	na	na	na
26 Federal Plaza (26th floor)	16376	np	na	na	<0.0038	na	na	na
290 Broadway (8th floor)	27490	np	na	na	0.0042	na	na	na
290 Broadway (Lobby)	27491	np	na	na	<0.0043	na	na	na
290 Broadway (22nd floor N.)	27492	np	na	na	<0.0041	na	na	na
290 Broadway (22nd floor S.)	27493	np	na	na	0.004	na	na	na
290 Broadway (LL-1)	27494	np	na	na	0.013	na	na	na
290 Broadway (LL-2)	27495	np	na	na	0.0044	na	na	na

KEY:
np = sample volume not provided on data sheets.
na= not analyzed for this metric.

NOTES:
[1] = sample volume for TEM (AHERA method) is 1200 liters for 25 mm filter
[2] = fibers per millimeter squared
[3] = structures equal to or greater than 0.5 micrometers and less than or equal to 5 micrometers in length
[4] = structures greater than 5 micrometers in length

During the period September 17 to November 3, 2001, EPA collected dust wipe samples within four buildings: Stuyvesant High School, Public School 234, Manhattan Borough Community College, and the Jacob Javits Convention Center. The samples were analyzed for various metals at all locations, while at Stuyvesant and the Community College samples were also collected and analyzed for PCBs and dioxin. Fifty-four percent of the sample results were below the minimum

detection limit, while the remaining 46 percent detected contaminants in varying levels. The highest recorded amount for each pollutant at each location is shown in Table K-2.

Table K-2: Highest Recorded Readings for Dust Wipe Samples

Analyte	Stuyvesant High School	Jacob Javits Convention Center	Manhattan Borough Community College	Public School 234	Unit
Aluminum	320	220	570	83	ug/wipe
Antimony	0.81	1	0.79	0.15	ug/wipe
Arsenic	0.1	0.24	0.38	<0.1	ug/wipe
Barium	4.2	9.3	9.4	2.1	ug/wipe
Beryllium	<0.1	<0.1	<0.1	<0.1	ug/wipe
Cadmium	0.59	0.47	2	<0.25	ug/wipe
Calcium	3300	1900	5000	1400	ug/wipe
Chromium	3.3	2.1	4.4	0.6	ug/wipe
Cobalt	<0.5	<0.5	1.1	<0.5	ug/wipe
Copper	5	7.3	9.8	6.1	ug/wipe
Iron	360	580	840	200	ug/wipe
Lead	4.5	6.3	9.7	1.5	ug/wipe
Magnesium	370	240	670	160	ug/wipe
Manganese	15	8.9	28	3.9	ug/wipe
Mercury	.01		0.02	<.01	ug/wipe
Nickel	1.5	1.9	2.4	<0.5	ug/wipe
Potassium	110	380	220	<100	ug/wipe
Selenium	<.01	<.01	<.01	<.01	ug/wipe
Silver	<.25	0.26	<.25	<.25	ug/wipe
Sodium	<25	1300	280	250	ug/wipe
Thallium	<.01	<.01	<.01	390	ug/wipe
Vanadium	<0.5	<0.5	1.2	0.81	ug/wipe
Zinc	55	93	150	39	ug/wipe
PCBs-totals	0	na	0	<5	ng/100cm2
TEQ (ND=1/2)	0.0046	na	.0055	0.0082	ng/100cm2

na = samples not analyzed for this pollutant.

On September 26, 2001, bulk dust samples from 110 Greenwich were collected and analyzed for various pollutants. For those pollutants where a screening level existed, the test results were all below the applicable soil screening levels contained in EPA's Hazard Evaluation Handbook. Table K-3 presents the results of testing at 110 Greenwich.

Table K-3: Bulk Dust Sampling at 110 Greenwich

Analyte	Result [1]	Screening Level [2]
Aluminum	18900 mg/Kg	780000 mg/kg
Antimony	< 5.75 mg/Kg	310 mg/kg
Aroclor 1016	< 740 ug/kg	
Aroclor 1221	< 740 ug/kg	
Aroclor 1232	< 740 ug/kg	
Aroclor 1242	< 740 ug/kg	
Aroclor 1248	< 740 ug/kg	
Aroclor 1254	< 740 ug/kg	
Aroclor 1260	< 740 ug/kg	
Asbestos	**[3]**	
Arsenic	< 0.96 mg/Kg	43 mg/kg
Barium	195 mg/Kg	
Beryllium	1.76 mg/Kg	15 mg/kg
Cadmium	3.8 mg/Kg	390 mg/kg
Calcium	186000 mg/Kg	
Chromium	71.5 mg/Kg	3900 mg/kg
Cobalt	5.6 mg/Kg	47000 mg/kg
Copper	93.2 mg/Kg	31000 mg/kg
Iron	7410 mg/Kg	230000 mg/kg
Lead	97.7 mg/Kg	
Magnesium	19100 mg/Kg	
Manganese	757 mg/Kg	18000 mg/kg
Mercury	0.37 mg/Kg	78 mg/kg
Nickel	15.5 mg/Kg	16000 mg/kg
Potassium	5400 mg/Kg	
Selenium	< 0.96 mg/Kg	3900 mg/kg
Silver	4.91 mg/Kg	3900 mg/kg
Sodium	3880 mg/Kg	
TEQ (ND =1/2)	60.9pg/g	410 pg/g
Thallium	< 0.96 mg/Kg	55 mg/kg
Vanadium	18.3 mg/Kg	5500 mg/kg
Zinc	791 mg/Kg	230000 mg/kg

[1] = All samples collected on September 26, 2001.
[2] = Residential soil screening level from EPA's Hazard Evaluation Handbook. Only accounts for health risk from ingestion.
[3] = No result reported in NYC Response database.

On October 10, 2001, two bulk dust samples inside 100 Church Street were collected and analyzed for asbestos. The results of this testing, done at the Department of Justice's request, found that one of the samples contained 1.1 percent asbestos while the other was non-detect.

On October 23, 2001, 10 air samples were collected at 100 Church Street and analyzed for asbestos. The samples were analyzed by both the TEM and PCM methods. All TEM results were below the AHERA standard of 70 s/mm2 and all PCM results were below .01 f/cc. This testing was performed on the 18th and 19th floors after these floors had been cleaned.

Table K-4: Indoor Air Test Results from October 23, 2001

Address	Sample ID	Sample Volume [1]	PCM Analysis		TEM Analysis			
			f/cc	f/mm2 [2]	f/cc	s/mm2	s = .5- 5 [3]	s > 5 [4]
100 Church St (front of 1927/8)	11931	2400	0.002	9.55	na	<20	0	0
100 Church St (Lobby)	11932	2400	0.002	11.46	na	<20	0	0
100 Church St (1909/1910)	11933	2160	0.003	15.92	na	<20	0	0
100 Church St (1902/1903)	11934	2400	0.001	7.64	na	<20	0	0
100 Church St (Alley 1960)	11935	2400	<0.001	<7	na	<20	0	0
100 Church St (Alley 1941)	11936	2400	<0.001	<7	na	<20	0	0
100 Church St (1935/1937)	11937	2400	0.004	21.66	na	<20	0	0
100 Church St (1835/1837)	11938	2400	<0.001	<7	na	<20	0	0
100 Church St (18FL-SW corner)	11939	2400	<0.001	<7	na	<20	0	0
100 Church St (18th main lobby)	11940	2400	0.005	30.57	na	<20	0	0

KEY:
np = sample volume not provided on data sheets.
na= not analyzed for this metric.

NOTES:
[1] = sample volume for TEM (AHERA method) is 1200 liters for 25 mm filter
[2] = fibers per millimeter squared
[3] = structures equal to or greater than 0.5 micrometers and less than or equal to 5 micrometers in length
[4] = structures greater than 5 micrometers in length

General Services Administration Monitoring of Federal Buildings

From September 13, 2001, through January 2, 2002, the General Services Administration, which is responsible for Federal building management, arranged for indoor environmental testing at Federal buildings located at 290 Broadway, 26 Federal Plaza, 201 Varick Street, and 1 Bowling Green. Over 100 air samples were analyzed and all samples were below the AHERA standard of 70 s/mm2. All but four air samples analyzed by TEM were non-detect for asbestos. The four samples that detected asbestos all occurred between September 13 and September 19, 2001. Two samples showed 25 s/mm2 and two samples could not be analyzed because the filters were overloaded. The only testing for asbestos in dust was conducted on September 14, 2001. Three dust samples collected in the lobby of 290 Broadway and two collected outside the building on September 13, 2001, showed the presence of chrysotile asbestos by TEM analysis. The results for these tests only reported whether asbestos was present or not, not the percentage of asbestos in the sample. Table K-5 through K-7 provide more information on the results of indoor testing of Federal buildings.

K-5: Asbestos Air Testing

Location	Sampling Period	PCM Results (0.01 f/cc)		TEM Results (70 s/mm2)	
		No. of Samples	No. above 0.01 f/cc	No. of Samples	No. above 70 s/mm2
290 Broadway	09/13/01 - 09/28/01	18	0	58	0
	10/09/01- 10/23/01	16	0	16	0
	12/03/01 - 01/02/02	21	0	21	0
1 Bowling Green	10/12/01- 10/25/01	18	0	16	0

Note: All results were non detect except for 4 of the 58 samples collected between 9/13/01 and 9/28/01. Two of these sample showed asbestos levels of 25 s/mm2 by TEM and 2 samples could not be analyzed because of overloaded filters.

K-6: Asbestos Dust Testing at 290 Broadway

Sample Collection Information			PLM	TEM
Date	Type	No.	No. of Samples Asbestos Detected	No. of Samples Asbestos Detected
09/14/01	Vacuum	5	Not Analyzed	5
09/14/01	Tape	5	0	0
09/14/01	HVAC Filter	3	0	0

K-7: Non-Asbestos Air Sampling Results

Pollutant	Screening Level	Test Method	290 Broadway		500 Pearl Street	
			No. of Samples	No. Above Screening Level	No. of Samples	No. Above Screening Level
Lead	50 ug/m3	NIOSH 7082	3	0	6	0
Respirable Dust	5.0 mg/m3	NIOSH 0600	3	0	6	0
Carbon Dioxide	5000 ppm	Telaire CO2	3	0	6	0
Carbon Monoxide	50 ppm	SGA91	3	0	6	0
VOCs	1 ppm **[1]**	H-Nu Photo	3	0	6	0

[1] = Method Detection Limit

Other Indoor Air Studies

"Characterization of Particulate Found in Apartments After Destruction of the World Trade Center."[18] This study was conducted at the request of the Ground Zero Elected Officials Task Force. This study selected two residential apartment buildings for sampling – one presumed to have significant WTC dust contamination and the other not – based on their locations. Six air samples were collected from inside one apartment building and five from the other. All 11 samples were analyzed by the TEM method. The study found higher levels of

[18] Eric J. Chatfield, Ph.D., Chatfield Technical Consulting Limited, and John R. Kominsky, M.Sc.,CIH, CSP, CHMM, Environmental Quality Management, Inc.; October 12, 2001.

airborne asbestos in apartment building expected to have WTC dust contamination. Further, the study found that asbestos levels in both buildings exceeded the AHERA standard of 70 s/mm2:

- Asbestos concentrations ranged from 6,277 to 10,620 s/mm2 in the building expected to experience significant WTC dust contamination.

- Asbestos concentrations ranged from 141 to 379 s/mm2 in the building not expected to experience significant WTC dust contamination.

"Health Risks from Exposures to Asbestos and Inorganic Metals Due to Collapse of the World Trade Center.[19] The results of the aforementioned "Characterization of Particulate Found in Apartments After Destruction of the World Trade Center" study were analyzed by a consultant for the Ground Zero Elected Officials Task Force to address possible health risks to residents and workers from exposure to the levels of inorganic metals and asbestos contamination found in the study.

"Final Report of the Public Health Investigation to Assess Potential Exposures to Airborne and Settled Surface Dust in Residential Areas in Lower Manhattan, NYCDOH, and ATSDR."[20] This was the largest study in terms of buildings analyzed and was conducted by ATSDR and NYCDOH. The final report was issued in September 2002. The study collected dust and air samples in and around 30 residential buildings (encompassing 59 apartment units) in Lower Manhattan, along with 4 buildings north of 59th Street for comparison purposes. Of the 59 apartments sampled, 50 – or 85 percent – had been reportedly cleaned (professionally or otherwise) prior to ATSDR's sampling.

The study concluded that the increased risk of cancer or other adverse lung health effects from prolonged exposure to WTC dust was greater than 1-in-10,000 for those areas sampled. This risk was based on several worst-case scenario assumptions. These worst-case assumptions were that apartments tested would not be cleaned after sampling, all fibers detected were asbestos, and the levels detected in the study represented long-term levels. The report noted that for individuals who frequently clean their apartments using HEPA vacuums and damp cloths/mops or take part in the EPA cleaning program, it was unlikely their exposure would resemble worst-case conditions. The report noted that when evaluating the health risks from indoor contamination, it did not take into account the potential effects of high doses of dust, fibers, and other materials that people in the WTC area at the time of the attacks may have experienced. The report noted these exposures could add to the public's risk of long-term health effects.

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[19] Dr. E.B. Ilgren, MD, MA, D Phil, October 11, 2001.

[20] New York City Department of Health and Mental Hygiene and U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, as part of the World Trade Center Environmental Assessment Workgroup, September 2002.

Details on Use of Respirators at Ground Zero

Reports on Lack of Respirator Use

An October 2001 report[21] by the National Institute of Environmental Health Sciences discussed worker safety issues at the WTC site for the period up to October 5, 2001. The report's observations generally focused on construction workers at the site and not Fire Department rescue team or Federal disaster assistance personnel. According to the report:

- Respiratory protection was rare with the exception of heavy equipment operators. Further, workers were observed in the smoke plume emanating from the pile without hard hats, eye wear, or respirators.

- Workers did not decon [decontaminate] after leaving the site. The hand/face and boot wash stations did not appear to be used by most of the workers.

- During the September 22-26, 2001, period, an increase in worker protection was observed, notably respiratory protection. Vehicles leaving the site began to be hosed down.

- There was no evidence that any safety and health program was operating at the site. The lack of an operating safety and health program was confirmed by various support personnel, workers, and government officials.

A January 2002 report[22] prepared by a certified industrial hygienist for the Operating Engineers National Hazmat Program noted that during the period October 2 -16, 2001, less than half of the heavy equipment operators regularly used respirators when working on the "pile" at Ground Zero, and often this use decreased to less than one-third of the workers This report, which discussed respiratory protection lessons from the WTC disaster, concluded that the respirators NIOSH recommended for use at the site were correct and sufficiently protective provided that they were properly tested and conscientiously worn.

In contrast to the recovery operation at the WTC site, the January 2002 report noted that workers conducting WTC debris sorting and inspection at the Fresh Kills landfill were wearing half-face respirators, hard hats, eye protection, and Tyvek suits. The author noted that respiratory protection compliance by workers at Fresh Kills was reported to be approximately 90 percent as

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[21] "Worker Education and Training Program (WETP) Response to the World Trade Center Disaster: Initial WETP Grantee Response and Preliminary Assessment of Training Needs," Donald Elisburg, John Moran, National Institute of Environmental Health Sciences WETP, National Clearinghouse for Worker Safety and Health Training, October 6, 2001.

[22] "Respiratory Protection at the World Trade Center: Lessons From the Other Disaster," Bruce Lippy, CIH, CSP, January 15, 2002.

opposed to 30-50 percent compliance at the WTC site. The author observed that:

> "*. . . debris is pulled by workers from the smoking, twisted wreckage of the World Trade Centers and then wetted and hauled to a site where the debris is carefully sorted by workers wearing more protective clothing, much more consistently.*"

Moreover, the author noted that workers at the landfill were officially informed that not wearing respirators would result in disciplinary action. OIG investigators from our New York office who participated in the recovery operations confirmed the report's conclusions about the difference in respiratory use between the WTC and landfill sites.

EPA Actions to Encourage Respirator Use

As demonstrated by a fact sheet prepared on September 11, 2001, EPA's emergency response officials immediately recognized the need for and recommended the use of air purifying respirators[23] at Ground Zero (a copy of this document is available on our OIG web site). EPA officials told us this fact sheet was provided to a FEMA official, but was not issued. We contacted a FEMA representative who told us that the flyer was not issued because it was decided that New York City should handle worker protection issues.

EPA also provided respirators for workers at the site. According to a May 1, 2002, letter from EPA's Region 2 Administrator to Senator Joseph Lieberman (D-CT) and Senator George Voinovich (R-OH), EPA had distributed 22,100 air purifying respirators and 30,500 sets of P100 particulate cartridges to New York City by September 22, 2001. Additionally, 600 respirators (MSA and 3m brand) and 2,000 cartridges (GME-P100) were provided to the New York State Department of Environmental Conservation and the New York State Department of Health. The bulk of EPA-procured equipment was transported from EPA's Edison facility by the New York National Guard to the New York City Office of Emergency Management for distribution to response workers.

As the rescue phase progressed, EPA emergency response officials told us they were concerned about the lack of respirator use at Ground Zero and outlined these concerns in a letter to NYCDOH dated October 5, 2001. This letter outlined the threat of potential exposure of workers to hazardous substances. The letter noted that EPA "... has recommended, and continues to recommend, that workers utilize personal protective equipment and the personal wash stations to prevent the spread of asbestos and other hazardous substances from the WTC to their homes, cars, public transportation, food service locations, etc." The letter stated that EPA had observed very inconsistent compliance with its recommendations, but did not have the authority to enforce compliance with non-EPA/United States Coast Guard employees. The letter concluded by recommending that the Incident Commander adopt and enforce a site-wide Health and Safety Plan. A copy of the letter is in Appendix P.

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[23] NIOSH recommended the use of half-face negative pressure respirators with P-100, organic vapor/acid gas (P-100/OV/AG) cartridges. Respirators must be properly fitted to provide adequate protection against airborne hazards.

Health Impacts of Lack of Respirator Use at Ground Zero

Two studies documented acute health effects suffered by emergency and construction workers at Ground Zero. A study[24] of firefighters who responded to the collapse concluded that intense, short-term exposure to material generated during the collapse of the World Trade Center was associated with bronchial responsiveness and the development of cough. The study found that the following percentages of firefighters developed "World Trade Center cough" that was severe enough to require at least 4 weeks of medical leave:

- 8 percent of the firefighters with a high level of exposure to contaminants at the site (i.e., present at the WTC collapse).

- 3 percent of the firefighters with a moderate level of exposure to contaminants at the site (i.e., present within first 2 days after the collapse).

- 1 percent of the firefighters with a low level of exposure to contaminants at the site (i.e., present within 3-7 days of the collapse).

Initial findings of medical examinations of workers directly involved in rescue and recovery efforts also found evidence of acute health impacts. Preliminary results of these examinations released in January 2003 and reported in the Washington Post concluded that 78 percent of those sampled had suffered lung ailments and 88 percent had experienced ear, nose, and throat problems in the months immediately following the attack. Further, a September 2002 report[25] by the Mount Sinai School of Medicine concluded that protection of workers at Ground Zero was "seriously inadequate." The report noted that the response of workers in the first few hours and days after the attack without regard to their personal safety was laudable and understandable. However, according to the Mount Sinai report, a lack of enforcement of worker protection measures in the weeks and months that followed was not excusable.

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[24] "Cough and Bronchial Responsiveness in Firefighters at the World Trade Center Site," David J. Prezant, M.D., et al, New England Journal of Medicine, Vol. 347, No. 11, September 12, 2002.

[25] "Lesson Learned for Public Health from September 11, 2001: *A One-Yar Perspective,"* Philip J. Landrigan, M.D., M.Sc., et al, September 2002.

Cleaning Procedures for Residents Opting to Have Their Residences Cleaned

Cleaning Procedures	Scope of Work	
	A	**B**
Common Areas	Cleaned if requested by the building owner. Procedures included vacuuming, wet wiping, and cleaning of carpets using a water extraction cleaner. Surface not cleaned by wet methods to be vacuumed two times.	Cleaned if requested by the building owner. Procedures included vacuuming, wet wiping, and cleaning of carpets using a water extraction cleaner. Additionally, all surfaces except for carpet and fabric covered furniture to be cleaned a second time.
HVAC Systems	HVAC systems determined to be impacted by WTC dust to be cleaned in accordance with a site-specific scope of work prepared by the monitoring contractor and approved by EPA. In the event that the entire HVAC system needs cleaning, a separate site-specific contract will be awarded by NYCDEP for the work. Work to be completed before initiation of cleaning of common spaces and residences in the building.	HVAC systems determined to be impacted by WTC dust to be cleaned in accordance with a site-specific scope of work prepared by the monitoring contractor and approved by EPA. Work to be completed before initiation of cleaning of common spaces and residences in the building.
Residences	Cleaned using HEPA vacuums, water extraction cleaners, and wet wiping. First foot of all exhaust duct work to be vacuumed.	Cleaned using HEPA vacuums, water extraction cleaner, and wet wiping. First foot of all exhaust duct work to be vacuumed. Additionally, all surfaces except for carpet and fabric covered furniture to be cleaned a second time.
Worker Protection	No specific measures described in the scope of work.	Residents not allowed in work areas, except residents may be present in their residence during cleaning when the work area can be isolated by barriers. Asbestos abatement procedures to be employed include, among others: use of personal protective equipment including respirators, a properly enclosed decontamination system, posting of warning signs, isolation barriers to seal off openings, and all waste generated during the cleaning being treated as asbestos-containing waste and disposed in accordance with applicable rules and regulations.

Appendix N

Details from EPA and Non-EPA Lessons Learned Reports

Recommendations of EPA Lessons Learned Reports

Headquarter's Lessons Learned Report

1. Clarify Involvement of Senior EPA Leaders, and Confirm Authority of Emergency Response Personnel in Decision-Making and Communications During National Emergencies

1. Issue a national policy for EPA's implementation of a NIIMS-type ICS structure to meet its needs in responding to national emergencies.
2. Ensure all EPA emergency personnel are trained and equipped to effectively implement EPA's ICS (including relevant portions of the NCP).
3. Develop a process to involve senior EPA management in policy and strategic decision-making as appropriate for national emergencies.
4. Revise Regional and area plans to incorporate national ICS policy.
5. Develop a national terrorism training and exercise strategy/program using ICS to strengthen on-scene and management response coordination.

2. Revisit, and Revise as Needed, Existing Internal and External Emergency Response Coordination Plans and Structures; Conduct Interagency Training and Exercises to Solidify Government-wide Understanding of Roles, Responsibilities, and Capabilities

1. Examine existing coordination structures within the Agency (e.g., NICT, Regional Incident Coordination Team (RICT)) to ensure adequate participation and efficient operational capability.
2. Consider how to better use the NRT and the Catastrophic Disaster Response Group (CDRG) during national emergencies, and ways to quickly access the senior leadership of member organizations**.**
3. Better educate EPA's responders in the existing EPA, OSHA, and State roles for the protection of the health and safety of all responders.
4. Collaborate with OSHA and U.S. Department of Health and Human Services (HHS) agencies to clarify the Agency's role in assuring protection of the health and safety of all responders.
5. Develop a structure for intra-agency coordination that encompasses all levels of management during national emergencies.
6. Communicate new and revised structure and processes to emergency response staff and all involved levels of agency leadership.
7. Coordinate with the OHS to develop a coherent coordination strategy for all responders during national emergencies; specifically, address the need to improve emergency coordination with the FBI.

3. Develop an Emergency Response Infrastructure to Address both Data Analysis Issues and Information Management

1. Clearly define a process for approving and coordinating the release of information to other agencies and the public; ensure program staff on AA and Office level (e.g., OSWER and OERR) review information before it is released.
2. Establish a forum for Regional emergency response, Regional labs, and OERR's analytical staff to specify and address analytical needs during emergencies.
3. Ensure that prompt communication of analytical results to emergency response staff is addressed in response procedure revisions.
4. Continue the Environmental Assessment Workgroup (EAWG) to address interagency sampling and analysis needs.
5. Ensure laboratory analysis and data management of health, safety, and risk information are incorporated in emergency response plans.
6. Work with OHS and other emergency response organizations to have EPA designated the lead agency for environmental data during national emergencies when both EPA and other agencies are conducting environmental analyses.
7. Ensure that sufficient laboratory capabilities for national emergencies are readily available to all Regions.

4. Develop EPA Policies and Procedures for Public Information Dissemination During National Emergencies, Within Established Emergency Response Plans and Structures

1. Continue developing a network of tools to facilitate public communication.
2. Clarify roles, authorities, protocols, and contingency plans for Headquarters, Regional, Community Outreach, and Regional Press Office staff during national emergencies.
3. Coordinate with OHS, CEQ, and other response partners to identify and address obstacles to timely and consistent presentation of environmental information during national emergencies.

5. Increase the Agency's Emergency Response Resources, and Address the Unique Demands of OSC Positions in Human Resource Processes

1. Assess additional personnel needs for responding to national emergencies while maintaining emergency response preparedness.
2. Establish Western Environmental Response Team (WERT)
3. Pursue personnel classification and associated human resource practice changes to acknowledge the unique expectations and demands placed on OSCs during national emergencies.
4. Support WERT readiness needs.
5. Identify geographic distribution and readiness of supplies, equipment, and contractor capacity.
6. Identify and meet emergency response staff personal safety needs, including providing both equipment and training/exercises.
7. Assess additional analytical program resource needs for national emergencies.
8. Establish a process to support responders logistically during national emergencies.
9. Clearly articulate additional equipment response resource needs in the budget requests for FY 2003 and beyond.

6. Invest in the Safety and Security of EPA Staff and Facilities, Including Telecommunications Needs

1. Review all COOPs to ensure all facilities are included, and bring COOP planning, training, and exercises in line with current threats.
2. Improve and update employee evacuation planning.
3. Review stress management assistance provided to Headquarters, Regions 2 and 3, and ERT. Assess stress levels of EPA emergency response employees, and determine whether additional action should be taken.
4. Address, using currently available resources, all possible facility security needs, at both government-owned and private buildings.

5. Provide telecommunications redundancy nationwide that will provide for ongoing communication (voice and data) to EPA's workforce during a national emergency, as well as emergency notification systems.
6. Provide central communication principles using the web to ensure EPA employees are given the latest, most recent information.
7. Determine whether a Headquarters-sponsored stress management system should be more formally deployed in future national emergencies.
8. Broaden health monitoring for OSCs and other Agency response personnel to make it consistent nationwide.
9. Systematically follow through on facility security improvements requiring additional resources**.**

7. Identify and Address National Environmental Vulnerabilities

1. Complete EPA efforts to identify national environmental vulnerabilities posed by public and private utilities/facilities.
2. Coordinate with State, local, and other environmental regulators to plan for reducing environmental vulnerabilities.
3. Increase technical support by EPA and States to identify and assist in corrective actions to reduce vulnerabilities
4. Increase inspections to identify and oversee corrective actions to reduce environmental vulnerabilities caused by permit or regulation violations.
5. Examine EPA's authorities and regulations to identify any changes needed to effectively address vulnerabilities.

Region 2 Lessons Learned Recommendations

Overarching Recommendations

1. EPA Region 2 should undertake an effort to connect with senior officials of the Federal Emergency Management Agency, U.S. Army Corps of Engineers, and the Department of Health and Human Services on a routine basis to ensure EPA mission is clearly understood.

2. Region 2 needs to develop a comprehensive approach to emergency management and response, perhaps based upon the NFPA 1600 Standard, that includes all divisions in the region. This would:

   - Spread responsibility across the organization so that one division is not the sole source of information, staffing responsibilities, decision making, and documentation.
   - Provide for a consistent, expandable and contractible structure and process for the Region that is understood across organizational boundaries.
   - Routinize emergency/disaster response.

3. Region 2 should identify a team of dedicated people who will respond in the event of a new crisis. This would limit the stress on personnel who might otherwise be pulled from the current response to another, as well as allowing designated staff to prepare, to the extent possible, for the possibility of mobilization. This could be accomplished by assigning an individual to a particular task until they are directly and explicitly relieved. In addition, a feedback mechanism could be established to encourage and solicit concerns during and after a response.

4. The Region's Continuity of Operations Plan (COOP) needs to be reviewed and updated.

5. Senior leadership of Region 2 and Regional staff not currently assigned to emergency response who might respond in a disaster, should participate in introductory training and education on basic disaster management and response. This would include intergovernmental relationships that are inherently different than typical Superfund emergency response and removal.

6. Public information, risk communications, and crisis communications must be organized and strategized in advance of a disaster. Region 2 should develop a comprehensive approach - which includes Headquarters and regional Federal and State partners - on how to handle crisis communications. Then, in a disaster event, relationships are established, lines of coordination and communication are established, and communications/public affairs officers can focus on tactics rather than trying to develop a framework in the midst of the emergency. Mechanisms should be in place for resolving differences about the interpretation of risk and the appropriate response.

7. Nationally, EPA should examine policies and procedures for ESF #10 activation and coordination with USCG to ensure roles and responsibilities are executed according to the FRP.

Additional Recommendations

1. As soon as possible, educate Region 2 personnel and management on Agency and Region responsibilities and authorities during a disaster or crisis with emphasis on the relationship between the Stafford Act, FRP, National Contingency Plan (NCP) and ICS. Include suggested peer relationships with counterpart agencies at all levels, but especially at the senior management level (e.g., regional administrators).

2. National Issue - Adopt an incident management system that is consistent across all regions, has common terms and plugs into other crisis/consequence management structures. National and regional management systems should be compatible

   Regional Issues - Create Regional crisis management structure, staffed by people with authority, commitment and qualifications, to improve roles and communication between management and OSCs. **Develop an incident management** system for Region 2 that:
   - Expands or contracts as needed to address both crises and routine events.
   - Prescribes specific people to fill roles during an event. The Coast Guard "watch quarter station bill" or synchronization matrix may serve as a model.
   - Includes mechanism for provision of resources, "protect" incident managers.
   - Has agreements, plans and procedures for internal communications during a crisis.
   - Includes a crisis management team that supports the incident management system in terms of the Region 2 operating principles.

   Regional Interagency Coordination Team (RICT)
   - Training for backup staff
   - Mobilize Regional resources
   - Signed agreement by Division Directors
   - Ensures leadership/managerial backup

   Regional Incident Command System (ICS)
   - Dedicated and known backup
   - Clear commander
   - Known ability to expand and contract

   Emergency Operations Center (EOC)
   - Physically separate from branch

3. Develop a Regional Strategy and Standard Operating Procedures (SOP) for communicating risk to the public during a crisis.
   - Include processes and resources needed to obtain and manage information.
   - Include links to incident management structure, data management mission.
   - Include defined up-front risk parameters and benchmarks.

4. Develop a logistics and support capability for incident management system that:
   - May include standing/expedient contracts, especially for sampling and analytical services, as well as data management.
   - Obtains facilities and other support resources.
   - Includes resource management and contracts in the development.
   - Include processes for intra and inter-agency coordination.

5. Develop agreements and processes for the emerging data generation and management mission including:
   - Developing methods and demonstrating a commitment to plan (identify data monitoring objectives, sampling and analytic methods, and benchmarks).
   - Ensure the process/system is flexible and could include external contributors and users. Define users and contributors.

6. Need a corporate philosophy on how to manage expectations in a crisis (internally outside of Region 2 emergency responders and externally). Consider:
   - Expectations of elected officials and the public
   - Part of incident management system specific to health and well-being

7. Develop a crisis management plan. SOPS, COOP, should address all issue categories
   - Mechanism for elevating to Incident of National Significance
   - Separate policy and communications priorities from operational priorities
   - Establish protocol for continuing response if local/State counterparts are unavailable for any reason
   - Inventory of regional resources
   - Expedited contract authorities

8. Clearly identify scope and boundaries of work within authorities and expertise. (e.g. logistical tasks) (e.g. accept only Mission Assignment with authority?)

   - Educate Region 2, EPA Headquarters, and other Federal and State agencies about scope, boundaries and authorities with emphasis on the relationship between the Stafford Act, FRP, NCP and ICS.
   - Manage expectations
   - Establish and maintain relationships and contacts

Major Conclusions of Non-EPA Lessons Learned Reports

Lessons Learned for Public Health from September 11, 2001: *A One Year Perspective;* Philip J. Landrigan, M.D., M.Sc., Jordan Slutsky, Angali Garg, M.S., Mona Lisa Mouallem, Lauri Boni; Center for Children's Health and the Environment of the Mount Sinai School of Medicine; September 2002:

- Inadequate preparation for disaster as public health authorities had not established partnerships with agencies outside the health field
- Unclear lines of authority which resulted in poor risk communications, a disorganized approach to worker health and safety, and failure to agree on who should clean up residences.
- Neither workers or the public were provided accurate information on health risks in the first weeks after the attacks.
- Protection of workers was seriously inadequate
- Lack of exposure standards for chemicals in settled dust or on surfaces inside buildings

Lessons Learned on Environmental, Occupational, and Residential Exposures From the Attack on the World Trade Center; Paul J. Lioy, Ph.D. and Michael Gochfeld, M.D., Ph.D; American Journal of Industrial Medicine, December 2002:

- Improved data collection for emergencies is needed. This should include development of :
  - < improved portable and flexible emergency response monitors,
  - < strategies for the rapid acquisition of settled particulate material samples in catastrophic events that yield resuspendable dust/smoke, and
  - < a rapid method for determination of site-specific and event-specific analytes that could cause acute or chronic effects.

- Need to develop emergency response standards for :
  - < community evacuation, worker re-entry, and residential/commercial re-entry, in various community or occupational zones at increasing distances from a disaster site, and
  - < Short-term exposure in establishing evacuation and restricted entry zones, and determining an "all clear" based on potential acute health outcomes.

- Need to develop a formal post-disaster cleanup protocol and a lead agency to implement the program so that cleanup can proceed without delay. Also need to develop a set of residential dust/smoke clearance levels to permit safe re-entry after cleanup.

- Need to conduct research on the design of respirators to ensure that they will be used in emergency response. Many of the existing non-air pack respirators are heavy and not easily worn over the nose and mouth during complex operations.

Risk Communication in the Aftermath of the World Trade Center Disaster, George D. Thurston, S.cD. and Lung Chi Chen, PhD, American Journal of Industrial Medicine, December 2002:

- The public wants facts upon which they can make individual decisions, not just reassurances.
- The government needs to develop peer-reviewed pollution benchmarks of "acceptable" and "unacceptable" exposures applicable to such disaster situations and make them available to the public and media.
- Physicians, scientists, and other exposure/health effects experts need to be consulted regarding the appropriateness of government monitoring and health effects assessments on a real-time basis.

Perspective on the Tragedy at the World Trade Center, Joel Shufro, American Journal of Industrial Medicine, December 2002:

- A new regulatory framework regarding potentially toxic exposures is needed,
- Government agencies saw their role as reassuring the public or said little, rather than use their position as a bully pulpit to provide the public with information they could use to make informed decisions,
- The absence of strong enforcement and leadership on the part of EPA, OSHA, PESH, the New York City Department of Health and New York City Department of Environmental Protection resulted in unnecessary exposure of workers and community residents to toxic substances,
- A uniform sampling protocol and centralized collection of all testing results is needed, and
- Government agencies appear to have ignored their own precedents [e.g. government intervention in Gramercy Park and Libby, Montana].

Health Effects of World Trade Center Site Workers, Stephen Levin, MD, Robin Herbert, MD, Gwen Skloot, MD, Jamie Szeinuk, MD, Alvin Teirstein, MD, David Fischler, MD, Debra Milek, MD, George Piligian, MD, Elizabeth Wilk-Rivard, MD, and Jacqueline Moline, MD; American Journal of Industrial Medicine, December 2002:

- The importance of an advisory to health care providers ASAP to assist with their evaluation and clinical management of the physical and psychological problems WTC-related patients experienced.
- Immediate capture of registry (contact) information for volunteers and workers.
- Rapid distribution of appropriate respiratory protection and a peer-based structure for encouraging consistent use.
- Rapid mobilization of resources for pro-active medical evaluation/treatment–respiratory, musculoskeletal, and psychological–during the weeks following exposure at the disaster site.
- Testing of indoor settings, including analysis of settled dust and aggressive air monitoring, to establish a gradient of exposure with distance from Ground Zero to guide recommendations regarding clean-up and reoccupancy.
- Communication by public health agencies regarding exposure hazards in lay language, with focus not only on long-term cancer risks, but on short-term health consequences as well.
- Greater attention to human health experience, rather than exclusive focus on air monitoring for the usual suspects.

Respiratory Protection at the World Trade Center: Lessons From the Other Disaster, Bruce Lippy, CIH, CSP, January 15, 2002:

- The chosen respirators were correct.
- Compliance with the requirements was poor at Ground Zero.
- Workers received mixed messages about the importance of wearing respiratory protection.
- Achieving high compliance with respiratory requirements in not unrealistic in these situations**.**

Safety and Health of Heavy Equipment Operators at Ground Zero, Bruce Lippy, CIH, CSP, American Journal of Industrial Medicine, December 2002:

- Except for asbestos, the few excess pollutant readings at the site were almost always associated with specific tasks.
- In the eagerness to declare the New York Financial District safe for re-occupancy, Government communications blurred the distinctions between the OSHA and EPA asbestos standards.
- The lack of a clear command structure at the site thwarted efforts to enforce the use of personal support equipment and other risk-reduction measures.
- Need to consider the use of OSHA's Hazardous Waste Operations and Emergency Response Standard in responding to terrorist incidents.

Firefighter Safety and Health Issues at the World Trade Center Site, Ronald Spadafora, Deputy Assistant Chief, Fire Department of New York, American Journal of Industrial Medicine, December 2002:

- Safety controls must be instituted by the uniformed services for the protection of the rescuers no matter how great the life hazard,
- The Site Safety Officer role in the FDNY's Incident Command Structure is a crucial one. This position must be filled immediately at the scene of a terrorist attack or similar event,
- Schedule an adequate number of Safety Chiefs on duty at any given time,
- Firefighters must be informed of the dangers in their work environment prior to the start of the detail, when possible,
- A universal-fit respirator cartridge should be available to rescue workers,
- Respirators should have built-in voice emitters to enhance communication, and
- Lighter personal protective equipment (hard hat, military fatigues/boots, safety glasses/goggles) for rescue and recovery workers must be made readily available.

Details on Health-Based Benchmarks Needed

Acute Exposure Guideline Levels. EPA is responsible for a program involving entities inside and outside the government to develop Acute Exposure Guideline Levels (AEGLs). These guidelines are developed by the National Advisory Committee for Acute Exposure Guideline Levels for Hazardous Substances. The AEGLs address exposures to pollutants that last for 10 minutes, 30 minutes, 1 hour, 4 hours, and 8 hours, and are established to address three potential types of health impacts from these acute exposures: non-disabling, disabling, and death. This program has finalized a limited number of AEGLs; however, none of the finalized guidelines addressed the primary pollutants of concerns for Lower Manhattan after September 11. EPA's Office of Research and Development and the Office of Prevention, Pesticides and Toxic Substances are currently working to establish needed AEGLs.

Sub-Chronic Guidelines. EPA also did not have sub-chronic guidelines for the contaminants found in Lower Manhattan on September 11. ATSDR defines sub-chronic as exposures lasting 2 weeks to 1 year. In general, EPA's benchmarks have focused on lifetime cancer risk over a 30-year exposure period. Because sub-chronic guidelines did not exist for the WTC pollutants of concern, these 30-year benchmarks were adjusted to fit the situation found at WTC. For example, to assess sub-chronic (1 year) exposure to dioxin in the ambient air, EPA took the dioxin 30-year exposure benchmark and adjusted it to reflect a 1-year exposure by multiplying the 30-year exposure benchmark by 30. These guidelines should be developed, to the extent possible, before a disaster strikes so that the process can be properly peer reviewed and any necessary revisions made before they are needed.

Indoor Air Benchmarks. EPA also did not have risk-based indoor air or bulk dust benchmarks for the pollutants found in dust deposited indoors. A work group formed after September 11, consisting of officials from Federal, New York State, and New York City agencies, developed indoor air benchmarks for COPCs resulting from the WTC towers collapse. These benchmarks, identified in a document entitled "World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks," were initially published in draft in September 2002. The document was peer reviewed and a revised interim final version was published in April 2003. The COPC report could be used as a starting point in developing health benchmarks for additional pollutants that may be encountered in future disasters. EPA's Homeland Security Strategy includes plans to identify chemical and biological substances for which indoor air reference levels (benchmarks) may be needed, and establish advisory indoor air reference levels for the substances identified.

Health-Based Benchmarks for Asbestos. As addressed in Chapter 2, health-based asbestos standards for indoor and outdoor air do not exist. The AHERA standard, used as a primary WTC benchmark to communicate asbestos risk for ambient air, is the filter background contamination level estimated when the TEM protocol was developed. Filters with smaller asbestos contamination levels are now available, so that smaller concentrations of asbestos can now be

reliably measured. The TEM analysis of asbestos data in response to the WTC disaster suggests that the minimum detection limit may now be approximately 15 to 20 s/mm2.

A significant issue with regard to indoor spaces was the potential exposure from asbestos in dust. In assessing the need for asbestos abatements in indoor spaces in New York City, the City relied on the NESHAP definition of asbestos-containing material, which defines asbestos-containing material as 1 percent or more asbestos by volume. This is not a health standard, and dust with less than 1 percent asbestos could pose a health risk. Risk assessors employ a mathematical formula to estimate the amount of asbestos in dust that can be expected to become airborne in order to evaluate the potential risk to human health from asbestos in dust. This factor is known as the "K Factor." However, this factor is not deemed reliable at this time. The panel that completed the peer review for EPA's indoor standards did not endorse the asbestos-settled dust benchmark because the "the K-factor methodology is, at this time, inadequate for predicting inhalation exposure from asbestos surface loading measurement."

We believe EPA should review the AHERA standard and determine whether the standard needs to be revised in light of the fact that better filters are available today, and continue the work of the indoor COPC group to develop health-related screening levels for asbestos in dust

Benchmarks for Exposure to Multiple Pollutants. The synergistic impacts of multiple pollutants on human health in the aftermath of an air quality emergency, such as occurred on September 11, are unknown. Synergistic effects have been documented between asbestos and cigarette smoke. For example, the lung cancer risk from exposure to asbestos is increased if the individual exposed to asbestos is a cigarette smoker. Researchers interviewed indicated that there could be other synergistic effects caused by the wide array of pollutants generated by the collapse of the WTC, but research is not available to make this determination.

EPA Letter Concerning Worker Protection

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
EDISON, NEW JERSEY 08837

OCT 05 2001

Mr. Kelly R. McKinney, P.E.
Associate Commissioner
Bureau of Regulatory and Environmental Health Services
The City of New York
DEPARTMENT OF HEALTH
125 Worth Street, Room 616, CN-32
New York, NY 10013

Dear Mr. McKinney:

Health and safety concerns for workers at the World Trade Center Disaster Site (WTC) has been a concern from the beginning of the response. In addition to standard construction/demolition site safety concerns, this Site also poses threats to workers related to potential exposure to hazardous substances. Sources of hazardous substances include (1) building materials from the destroyed buildings (primarily asbestos), (2) hazardous materials that were stored in the buildings (refrigerants, hazardous wastes, ethylene glycol, compressed gas cylinders, etc.), and (3) products of combustion being emitted from the fires that continue to burn within the debris piles. EPA, along with a number of other federal, state and your agency, has been gathering information about these threats to worker health. Air sampling by EPA and others indicates that asbestos and other contaminants are present in the air at the WTC. EPA has recommended, and continues to recommend, that workers at the Site wear respiratory protection.

In addition, EPA has recommended, and continues to recommend, that workers utilize personal protective equipment and the personnel wash stations to prevent the spread of asbestos and other hazardous substances from the WTC to their homes, cars, public transportation, food service locations, etc. We have observed very inconsistent compliance with our recommendations, however, we do not have authority to enforce the worker health and safety policies for non-EPA/USCG employees. Therefore, EPA believes the Incident Commander should adopt and enforce a site-wide Health and Safety Plan. If there is anything I can do to assist you concerning this matter, please feel free to call me at (732) 321-6656.

Sincerely yours,

Bruce Sprague

Bruce Sprague, Chief
Response and Prevention Branch

cc: FCO, FEMA

EPA Response to the Draft Report

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 8 2003

OFFICE OF THE
ADMINISTRATOR

MEMORANDUM

SUBJECT: Transmittal Memorandum for EPA's Response to Inspector General's (Draft) Evaluation Report: "EPA's Response to the World Trade Center Collapse -- Challenges, Success, and Improvements." (Assignment Number: 2002-0000702)

FROM: Marianne Lamont Horinko
Acting Administrator

TO: Nikki Tinsley
Inspector General

This memorandum transmits the Agency's consolidated response to the subject draft report ("Draft Report"). With this memo, I formally request that EPA's comments be included as part of the final version of the official report.

The unprecedented terrorist attack on the World Trade Center (WTC) and the enormity of its aftermath compelled responding government agencies to write a new book on disaster response. While the Draft Report acknowledges the situation that the nation -- and New York City in particular -- confronted following the disaster, the nature of its criticisms, conclusions and recommendations do not reflect those circumstances. In fact, this document is infected with the attitude that somehow "business as usual" conduct should have prevailed.

See Appendix R Note 1

I am exceedingly proud of the response that the men and women of EPA made in the aftermath of the World Trade Center collapse. Along with other first responders, our people were there within hours of the attack and hundreds of our specialists devoted long hours under difficult conditions to provide assistance and information. EPA responded with its heart as well as its science to protect the health of the public and the workers involved in rescue and recovery. In all, we took over 25,000 samples and conducted a quarter of a million measurements of nearly 700 potential contaminants.

See Appendix R Note 2

EPA's response was extraordinary, especially when examined in the chaotic context in which we and other governing bodies found ourselves. EPA began monitoring immediately for contaminants – without benchmarks or standards that applied to the disaster situation such as ambient asbestos – and we did it without electricity, in the midst of firefighting and rescue

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operations, in the midst of high security concerns, and surrounded by construction equipment moving debris. The New York City Emergency Command Center was destroyed, agencies' New York offices were closed, communications services in Lower Manhattan were inoperative, and airlines were shut down.

Given the magnitude of the disaster, the massiveness of the response, the very real security issues at stake, and the many entities involved, it was essential that the Executive Branch coordinate the federal response. At a time of national emergency, the people expect the government to speak with one voice.

See Appendix R Note 3

Indeed, one of the key lessons learned is the need for centralized communications during times of national crisis. The creation of the Department of Homeland Security institutionalized the coordination of communications in one Department. The Draft Report, however, goes to great length to erroneously criticize federal efforts, specifically the Council on Environmental Quality (CEQ), to coordinate health and safety communications.

EPA, along with other agencies and departments responsible for environment, health and safety, acted to provide the best health and safety guidance to those who lived and worked in Lower Manhattan, based on available data and using our best professional judgement under extraordinary circumstances. We continuously monitored the environmental effects of the explosion, fire and ultimate collapse of the WTC buildings. We made this data available as widely and as transparently as possible. Our public statements at every stage conveyed our best professional advice based on the most current data available.

See Appendix R Note 4

We continue to evaluate our response to identify improvements that can be made in how we manage and respond to future situations of this magnitude. A few weeks after the attacks, EPA commissioned a formal report, conducted by an objective outside contractor, to assess the "lessons learned" from these events. Many of the "lessons learned" that we have been implementing since 2002, anticipated most of those the Draft Report now highlights. We are making every effort to strengthen our planning and response systems to be as ready as possible for any unforeseen catastrophic event, and we are committed to continuing to provide the public with the best possible environmental information and assistance in times of national crises.

See Appendix R Note 5

The Report lacks sufficient acknowledgment of our efforts to implement our "lessons learned," and is flawed in its lack of recognition in other areas such as:

- EPA's message was communicated to different audiences.
  - For the "general public," EPA stated from the beginning that people living and working in lower Manhattan were not exposed to levels of contaminants in the outdoor air that EPA believed would pose a significant long-term health threat.
  - EPA advised people experiencing acute health problems to see their physician, and stressed that workers at the site faced a higher risk and must wear protective respiratory gear (supplied by EPA and other agencies).

See Appendix R Note 6

- EPA also emphasized that people returning to dusty homes and workplaces should have these spaces professionally cleaned by asbestos contractors

- The Report erroneously focuses on five early Agency press releases, neglecting the extensiveness of EPA's communications.

See Appendix R Note 7

  - EPA undertook a massive outreach program, which included hundreds of media interviews (print, radio, TV), participation in public forums, distributions of tens of thousands of fact sheets and handouts, and extensive usage of the Internet (including information in three languages).

- An immediate and continuing problem in measuring and communicating environmental risk associated with the WTC dust/debris cloud was the fact that for many of the contaminants of concern, there were no health based standards.

See Appendix R Note 8

  - The need for such standards could not have ever been reasonably anticipated.
  - Even for asbestos, the contaminant of greatest concern, there was no applicable standard covering the situation in Lower Manhattan.
  - In exercising its professional judgement, EPA consulted with experts in environmental health and science at federal, state and local levels.

Could things have been done better? Certainly. Were mistakes made? Without a doubt. But like other agencies of government in the wake of this event, EPA has reviewed its response, asked tough questions about its conduct, and begun the process the process of change and improvement.

To be a valid basis for planning, the Draft Report needed to capture the things that went right - and the vast majority of our efforts did - as well as what needs to be improved. This Report simply seems out of touch with the reality of what took place at the World Trade Center, and thus it trivializes both the horrendous event that occurred and the extraordinary efforts of EPA and other responders.

See Appendix R Note 9

By ignoring that good work, the Report leaves a bruised population wondering once again if their government properly served them at their time of greatest need. The fact is, the dedicated people of the EPA – and government at all levels – rose to the challenge of the World Trade Center disaster... and performed with courage and distinction.

EPA's Response to the World Trade Center Collapse:
Challenges, Successes, and Areas for Improvement
Draft Report
Office of the Inspector General

GENERAL OBSERVATIONS

Response to the World Trade Center collapse was unprecedented in the challenges it presented to federal, state and local emergency responders. EPA undertook immediate efforts to ascertain the presence of contaminants from the collapse and fires, and to assist FEMA and New York City in all phases of the subsequent recovery and cleanup. EPA's activities included sampling and analysis of ambient air and water; wash down and decontamination of vehicles; removal and disposal of hazardous materials; vacuuming of dust and debris from streets; supplying personal protective equipment; assisting Financial District in retrieval of electronic files/papers; and provision of data and health information to the public. To illustrate the magnitude of the activities conducted at the site, over 25,000 samples were taken representing 227,000 measurements of 692 potential contaminants. The initial response continued until May 2002 and at times, involved as many as 290 EPA and US Coast Guard personnel, and 200 Agency contractors.

See Appendix R Note 10

While the report acknowledges the unprecedented nature of the response to the terrorist attack upon the WTC, many of its findings and recommendations imply that the response could have been conducted in a manner consistent with a standard regulatory approach, e.g. implementation of NESHAPs asbestos regulations. Further, the report does not recognize that the WTC response and clean up efforts were conducted in the absence of adequate background concentrations for the contaminants of potential concern, e.g., typical levels of asbestos or dioxin in an urban apartment. Having such information available would have greatly simplified the effort to delineate areas that were impacted and determine when indoor residential environments were cleaned to pre-event condition. Additionally, the report does not acknowledge the Agency's massive campaign to provide quality information to the public -- through hundreds of media interviews, tens of thousands of fact sheets and handouts and innovative use of the internet, including information in three languages. Lastly, and most importantly the report fails to recognize the nature of decision making in a catastrophic emergency. We must accept that a future incident may involve a scenario or contaminant that we simply cannot foresee. This means that while work can and should be done to develop protocols, standards and benchmarks – when an event of the magnitude of the World Trade Center attack occurs, many decisions will based on the best professional judgement of emergency responders from all branches and levels of government, through the leadership ranks of the Department of Homeland Security.

See Appenidix R Note 11

CHAPTER 2

EPA STATEMENTS ABOUT AIR QUALITY NOT ADEQUATELY QUALIFIED

Report Conclusions/Recommendations:

- **Conclusion:** "EPA's early statements about air quality were incomplete in that they lacked necessary qualifications and not supported by data available at the time. CEQ influenced the final message in EPA's air quality statements. Competing considerations, such s national security concerns and the desire to reopen Wall Street, also played a role in EPA's air quality statements. The "safety" of the air in Lower Manhattan after the collapse of the WTC towers is still being debated and studied. However, given the current lack of health-based benchmarks, the lack of research data on synergistic effects, and the lack of reliable information on the extent of the public's exposure to these pollutants, the answer to whether the outdoor air around WTC was "safe" to breathe may not be settled for years to come."

- **Recommendation:** That the EPA Administrator develop procedures for emergency risk communication to ensure that EPA's public pronouncements regarding health risks and environmental quality are adequately supported with available data and analysis.

EPA Response:

The EPA "statement" referred to in the report was made days after the attack, based on air sampling at seven sites surrounding the WTC site. The Agency knew, from testing conducted at the time of the 1993 WTC bombing, that asbestos was the primary contaminant of concern outside the WTC site. Following 9/11, the news media was filled with stories about possible asbestos contamination of the air. Tens of thousands of residents and hundreds of thousands of workers were displaced and scared. EPA's initial statement was made in direct response to the public's concern about asbestos contamination. The EPA press release from which the statement was quoted detailed the monitoring that led to the statement and made it clear that further monitoring for asbestos and other contaminants would take place. EPA subsequently made this and extensive additional monitoring data available on an interactive Web site that allowed people to track data at mapped monitoring stations.

See Appendix R Note 12

EPA never withheld data from the public and sampling results were reported out as soon as they were reviewed. Results were communicated in discussions with media representatives, federal, state and local officials, elected officials and interested citizens. The Agency did coordinate press releases with the Council for Environmental Quality (CEQ). This is neither unusual nor unexpected during a catastrophic disaster on the scale

See Appendix R Note 13

of the WTC attacks. EPA acknowledges that there are lessons to be learned about how to communicate more effectively, especially in the difficult area of risk communication, and and has made this a priority as it implements "lessons learned" from both 9/11 and the Columbia accident. EPA's *Homeland Security Strategic Plan* includes goals which commit EPA to use reliable information to ensure informed decision-making and to disseminate timely, quality environmental information to all levels of government, industry and public.

See Appendix R Note 13

CHAPTER 3

EPA's RESPONSE TO INDOOR ENVIRONMENT CONSISTENT WITH STATUTES AND REGULATIONS BUT MAY HAVE DELAYED NEEDED HEALTH PROTECTION

Report Conclusions/Recommendations:

- **Conclusion:** "For indoor environment concerns resulting form the collapse of the WTC towers, EPA had the authority to act under CERCLA but was not obligated to do so, Guidelines exist for determining whether an emergency response is warranted; however, these guidelines are not definitive. Under the NCP, it was within EPA's discretion to defer to New York City the responsibility for responding to indoor contamination concerns. EPA's action was consistent with the FRP, which is intended to supplement local government response.

  Although EPA acted within its discretion, a 1998 Presidential directive and the more recent National Strategy for Homeland Security task EPA with taking the leadership role in cleaning up buildings and other sites contaminated by chemical or biological agents as a result of an act of terrorism. EPA needs to work with the Department of Homeland Security and other agencies to determine the nature and form with which the Federal government should assume a more direct role in addressing indoor environment concerns, under what circumstances this direct role should occur, and the oversight mechanisms to be employed when local agencies undertake such responses. In the WTC case, the delay in providing a government-organized and adequately monitored cleanup in Lower Manhattan may have contributed to unnecessary exposures to asbestos and other pollutants by unprotected workers and residents."

- **Recommendations:** That the EPA Administrator coordinate with the Department of Homeland Security, FEMA, and other appropriate Federal agencies, and those State and local governments having jurisdiction over potential terrorist targets to :

  Develop protocols for determining how indoor environmental concerns will be handled in large-scale disasters, to include addressing:

The agency or agencies responsible for testing and/or overseeing testing of indoor spaces;

Sampling methods to be used in analyzing indoor contamination;

Benchmarks to be used in assessing whether the indoor contamination pose a threat;

Under what circumstances government-assisted cleanups are warranted;

How these cleanups will be funded; and

The agency or agencies responsible for communicating testing results and appropriate cleaning instructions.

Develop and publish oversight criteria and State and local agency reporting requirements for those agencies involved in cleaning up buildings and other disasters.

EPA Response:

EPA disagrees that unprotected residents and workers may have experienced unnecessary exposures to asbestos or other pollutants as a result of delay in providing a government-organized and adequately monitored cleanup in Lower Manhattan. From the beginning, FEMA, New York City and State, as well as EPA provided advice to residents on cleanup methods (wet wiping/mopping, HEPA vacuuming) that has proven effective. In addition, residents with more than minimal dust, were urged to use professional, asbestos abatement cleaners. FEMA provided financial assistance to residents to enable them to relocate while cleanup was being done, and New York City provided guidance and cleanup requirements to building owners. All this took place in the absence of a "Government-organized cleanup." Subsequent EPA studies show that the basic cleaning techniques that were recommended were effective in reducing dust and reducing dust to below health based benchmarks where these could be identified. In summary, EPA feels that the advice and assistance provided was sufficient to enable the affected population to take appropriate action to minimize further risk.

See Appendix R Note 14

With respect to the outside environment, EPA provided personal protective equipment, repeatedly stated that workers at Ground Zero should use this equipment and were at greater risk than the surrounding population. Additionally, the Agency consistently raised concerns over the use of protective equipment to local officials. Additionally, EPA repeatedly advised anyone with acute symptoms to consult with their physicians and acknowledged that sensitive populations, such as those with respiratory illnesses might react differently than the general population, and also should consult their physicians.

See Appendix R Note 15

In summary, EPA's initial role in support of New York city and State officials in no way created additional health risk to workers or residents. In fact, EPA and other federal, state and city agencies responded to the best of their abilities to reduce potential risk as quickly and as reasonably as possible. EPA generally agrees with the recommendations concerning coordination with the Department of Homeland Security and other federal agencies, and that the topic of roles and responsibilities for all levels of government regarding potential contamination of indoor spaces should be further explored. The Agency further agrees that consideration should be given to possible identification of sampling methods, benchmarks, circumstances where government-assisted cleanups are appropriate, funding support and communications.

See Appendix R Note 14

CHAPTER 4

ASBESTOS EMISSION CONTROL WORK PRACTICES INCONSISTENT

Report Conclusion/Recommendation:

- **Conclusion:** "Although many steps were taken to reduce asbestos emissions from the WTC site, problems were encountered in fully implementing the applicable NESHAP requirements for emergency situations, such as ensuring that trucks transporting debris were adequately wetted down before leaving the WTC site. Further, the placement of WTC debris, unloading and transfer operation near schools and residences compounded the potential impact of not implementing normally required NESHAP requirements. Given the likelihood that many buildings across the country may contain asbestos, EPA and State and local agencies need to establish improved monitoring and oversight procedures for ensuring appropriate NESHAP work practices are followed in responding to situations that cause widespread damage."

- **Recommendation:** The EPA Administrator ensure that EPA Regional and Headquarters personnel are aware of the "Guidelines for Catastrophic Emergency Situations Involving Asbestos." including its application in the event of future terrorist attacks or other disasters. EPA develop specific monitoring, reporting and oversight procedures for ensuring that federal, State, and local responders follow the appropriate asbestos NESHAP work practices, including initiating enforcement actions when EPA observes violations of NESHAP work practices.

EPA Response:

In the immediate aftermath of WTC collapse and fires, "ensuring" compliant work practices was extremely difficult. This was not for lack of knowledge about what should be done, but rather as a matter of practically implementing these practices under extreme conditions of duress. Search and rescue operations were going on in the presence of

See Appendix R Note 16

debris removal including removing molten steel beams from the site. Search, rescue and construction equipment surrounded the site. EPA worked with New York City and State agencies to set up truck routes, wet-down stations, on-site wetting of debris, wetting at the barges, and wash stations for workers on the pile at Ground Zero. Given the physical impediments and the intensity of the situation, it took time to implement best work practices fully. As the various federal, state and local agencies became organized in their response and set up communications with debris cleanup contractors, these problems were eliminated, to the maximum extent possible. With respect to the recommendations, EPA agrees that the regulations for NESHAPS should be reviewed to determine whether additional procedures are necessary to provide to federal, State and local responders. Additionally, the applicability of NESHAPS to disaster situations may need to clarified.

See Appendix R Note 16

CHAPTER 5

AIR QUALITY-RELATED COMMUNICATIONS NOT EFFECTIVE IN GETTING PUBLIC AND WORKERS TO TAKE RECOMMENDED PRECAUTIONS

Report Conclusion/Recommendation:

- **Conclusion:** "The public wanted better information about air quality than they received from government sources. A NYCDOH study, other lessons learned reports, and testimony provided at various hearings suggest that the public did not receive adequate air quality information and that individuals cleaned their residences without using proper procedures and personal protection. In addition, workers at Ground Zero may not have used respirators due, in part, to inadequate EPA and other government communication.

  EPA was one of many governmental and non-governmental agencies that communicated health risk to the public. The levels of non-adherence to the risk communications of these governmental agencies suggests that all the participating levels of government need to re-examine their policies, procedures, and practices for ensuring that the necessary precautions are consistently followed."

- **Recommendations:** That the EPA Administrator coordinate with FEMA and other applicable Federal agencies to clearly establish Federal agency responsibilities, roles and procedures during an emergency response that ensure that:

  Workers responding to emergencies are adequately protected by the development and strict enforcement of health and safety plans.

  Health hazard information is effectively communicated to emergency response crews.

Sufficiently detailed health risk information is effectively communicated to the public, including actions that the public should take to reduce their potential exposure to harmful pollutants.

EPA Response:

With respect to worker safety on or near the debris pile at Ground Zero, although OSHA had direct responsibility, EPA supported them in many ways. EPA immediately provided a large supply of respirators for the workers, followed by a long-term and concerted effort to educate workers about the need to wear the masks. Further, EPA's worker-safety message was stressed repeatedly in news releases, media interviews, public meetings and appearances, on the Agency's WTC Web site, in flyers and posters at the worker wash station that EPA provided.

See Appendix R Note 17

With respect to the public's reported need for better information, EPA and other federal, State and local agencies provided the most comprehensive and up to date information available. As mentioned earlier in response to Chapter 1, extensive air monitoring data was available on an interactive Web site and air sampling results were reported out as soon as they were reviewed in discussions with media representatives, federal, state and local officials, elected officials and interested citizens. While government agencies, including EPA, should examine risk communication tools and skills in emergency situations and make improvements, the public sometimes wants information that is simply not scientifically available, or is not available quickly. EPA feels that the efforts made in conjunction with New York City and State, FEMA and OSHA provided reasonable assurance that worker's and the general public's exposure to contaminants was minimized.

See Appendix R Note 18

As the report acknowledges, EPA has initiated actions to improve risk communications to the public, and with regard to worker safety, is participating in a FEMA-led Interagency effort to provide uniform occupational safety and health policy under the Federal Response Plan.

CHAPTER 6

FURTHER ACTIONS NEEDED TO ADDRESS CURRENT WTC RESPONSE

Report Conclusion/Recommendation:

- **Conclusion:** "Extensive ambient monitoring data collected after September 11 demonstrated that outdoor air quality levels around Lower Manhattan eventually returned to pre-September 11 levels. As such, EPA does not need to take additional actions to address outdoor ambient air quality concerns specifically related to the collapse of the

WTC towers.

EPA, in cooperation with FEMA and New York City, has initiated a large-scale indoor cleanup. In our opinion, this cleanup should meet the minimum criteria for protecting human health that EPA has established for Superfund cleanups. Also, the indoor cleaning and testing program should employ aggressive testing in all residences and treat buildings as a system. Additionally, EPA should evaluate the potential health risks for pollutants of concern in work spaces and for geographic areas north of Canal Street, in Brooklyn, and any other areas where meteorological data show pollutants of concern may have been deposited."

- **Recommendation:** That the EPA Administrator ensure that EPA Region 2:

  Submit the revised "World Trade Center Indoor Air Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks: document to TERA for a second peer review."

  Implement a post-cleaning testing program to ensure that, in addition to asbestos, the indoor cleanup program has reduced residents' risk of exposure from all of the identified COPCs to acceptable limits.

  Due to concerns over possible re-contamination of residences cleaned under the Indoor Air Residential Assistance program, EPA should treat buildings as a system and implement a post-cleaning verification program to ensure that residences cleaned by the program have not been re-contaminated.

  Work with FEMA and OSHA to assess whether the ongoing residential testing and cleaning program should be expanded to address potential contamination in work spaces in Lower Manhattan, or whether other measures need to be taken to ensure that work spaces are not contaminated with WTC dust.

EPA Response:

EPA, in conjunction with New York City and FEMA, has initiated and nearly completed a large-scale indoor cleanup under the Federal Response Plan – not Superfund and the program has met the criteria for protecting human health. Under this program EPA did cleaning and testing in 675 building "footprints" as identified in the city's building inventory. From NYC records, there appear to be about 22,000 residential units below Canal Street. There are 2,323 building footprints which would also include approximately 1550 commercial buildings. If a cleanup program were expanded to include all of these buildings footprints and the commercial space therein, it would be a monumental undertaking which EPA studies and data indicate is not necessary.

See Appendix R Note 19

First, the vast mass of dust and debris from the WTC collapse has been removed. This is a result of cleanup during the response actions, the Ground Zero cleanup, cleanup of building exteriors by the private sector and New York City. Second, in 95 % of the over 4,100 residences cleaned and tested or tested only, the asbestos in the air results were non-detect. Lastly, cleanup techniques of wet mopping, wet wiping and HEPA vacuuming were found to be successful in achieving health-based benchmarks for WTC contaminants of concern. EPA focused upon a cleanup program for residences, because this is where individuals spend the most time and where the greatest need for assistance in conducting cleanup and getting reassurance was evident.

See Appendix R Note 20

Regarding the need for "aggressive" air sampling, EPA notes that scientists and physicians expert in environmental health issues advised EPA at a meeting convened by the New York Academy of Medicine in June 2002, that aggressive sampling was not a representative condition for testing and potential exposure. In addition, EPA's Confirmation Cleaning Study did not find a measurable difference in the use of modified or aggressive air disturbance technique in sampling.

See Appendix R Note 21

Lastly, EPA did evaluate the potential for health risks, qualitatively, for areas North of Canal Street, in Brooklyn, and beyond. The determination was that lower Manhattan was the principal impact area where the mass of building materials from the collapse was deposited and where the most fire plume exposure occurred. In addition, EPA's judgement is that commercial establishments had alternative sources of assistance to fund cleanup activity. EPA and OSHA have coordinated throughout the indoor cleanup program, and OSHA has agreed to investigate any complaints by workers in commercial establishments of dust exposure.

See Appendix R Note 22

With respect to the recommendation that EPA submit the revised "World Trade Center Indoor Air Assessment" for a second peer review, the Agency disagrees. EPA does agree that, as part of its efforts to develop indoor health based benchmarks, a protocol for establishing these would be usefully peer reviewed. Such a general protocol could take into account what was done for the WTC Contaminants of Potential Concern (COPC). EPA does not see any benefit to further peer review of the WTC specific document.

See Appendix R Note 23

With respect to the recommendation that EPA implement a post-cleaning testing program to ensure that, in addition to asbestos, the indoor cleanup program has reduced residents' risk of exposure from all of the identified COPCs to acceptable limits, the Agency disagrees. EPA believes that the health based asbestos in air clearance testing is effective in reducing the potential for risk related to WTC contaminants. The results of the Confirmation Cleaning Study support this, and the study results provide effective guidance for additional cleanup where there are continued concerns.

See Appendix R Note 24

With respect to the recommendation that due to concerns over possible re-contamination of residences cleaned under the Indoor Air Residential Assistance program, EPA should

treat buildings as a system and implement a post-cleaning verification program to ensure that residences cleaned by the program have not been re-contaminated, EPA disagrees. EPA has done post-cleaning testing in common spaces, in residences. EPA does not believe further testing to assure there has not been recontamination is needed. The testing results to date do not show widespread exceedences; the vast amount of dust from the WTC and streets and buildings (exterior and interior) has been removed. Retesting would involve over 4,000 dwelling units with an average of 5 asbestos in air samples per unit, or at least 20,000 additional samples. Cleanup work in lower Manhattan has largely been completed.

See Appendix R Note 25

With respect to the recommendation that EPA work with FEMA and OSHA to assess whether the ongoing residential testing and cleaning program should be expanded to address potential contamination in work spaces in Lower Manhattan, or whether other measures need to be taken to ensure that work spaces are not contaminated with WTC dust, EPA disagrees. As previously mentioned, EPA focused upon a cleanup program for residences, because this is where individuals spend the most time and where the greatest need for assistance in conducting cleanup and getting reassurance was evident. Further as stated above, the Agency has no data to support the need for a massive testing and cleanup program in Lower Manhattan.

See Appendix R Note 26

CHAPTER 7

EPA SHOULD CONTINUE EFFORTS TO IMPROVE CONTINGENCY PLANNING

Report Conclusion/Recommendation:

- **Conclusion:** "Although many organizations were involved in addressing air quality concerns resulting from the WTC collapse, subsequent events have demonstrated that, ultimately, the public and others expect EPA to monitor and resolve environmental issues, even though EPA may not have the overall responsibility to resolve these issues or the necessary resources to address them. These issues range from collecting, interpreting and communicating environmental information to cleaning up any environmental contamination. EPA must be prepared to take a leadership role, within the evolving framework established by the Department of Homeland Security and existing statutes, in fulfilling its mission of 'protecting human health and the environment,' if another large-scale disaster occurs."

- **Recommendations (summary):**

  EPA should work with the Department of Homeland Security and other agencies to share information on likely targets and threats and collaboratively develop approaches to address these threats.

- EPA should define and clarify internal EPA organizational roles and responsibilities in responding to large-scale disasters. This should include designating teams of Agency experts – at both the National and Regional level – that can be mobilized to quickly provide needed technical support during a response. These areas may include specialized sampling techniques, exposure modeling and assessment, and risk assessment.

- EPA should develop and improve health-related benchmarks that can be used to assess health risk in emergencies (specific list recommended)

- EPA should develop an emergency quality assurance sampling plan to be used as a guidance for monitoring environmental conditions after a large-scale disaster. It should address monitoring objectives, sampling and analytic methods, and siting of monitors.

EPA Response:

With respect to the conclusion, EPA emphasizes that, at the WTC response, it certainly did exercise its opinions and judgements on matters impacting human health and the environment and will continue to do so within the context of its authorities and its role under the Federal Response Plan. With respect to the recommendations, it should be recognized that the Department of Homeland Security looks to EPA and other agencies to assist them in identification of potential targets and critical infrastructure. In fact, EPA has already provided much of the information recommended, to DHS. EPA collects the data under various legislative and regulatory programs and uses it to develop approaches and establish plans of action for protection of public health and safety in collaboration with State and local agencies. EPA generally agrees with the other Chapter 7 recommendations.

See Appendix R Note 27

OIG Evaluation of EPA's Response to the Draft Report

Transmittal Memorandum

Note 1 - We believe the report's findings, conclusions, and recommendations properly consider the unprecedented circumstances in which the response to the WTC tragedy was carried out. For instance, we point out the unprecedented nature of these events in the first line of the Executive Summary and the first line of Chapter 1. We do not believe that a response to such a tragedy can be conducted under a business as usual attitude. However, an emergency response should not preclude the Agency from following previously established guidance and practices regarding public safety and protection from hazardous substances conceived and designed to be applied in times of crisis. This position is consistent with the intent of EPA's Guidelines for Catastrophic Emergency Situations Involving Asbestos issued in 1992. These guidelines were issued after emergency responses to three incidents in 1989 focused attention on the need to consider asbestos along with other emergency response activities. Additionally, although the initial emergency response was carried out under trying conditions, as time passed the crisis nature of the response subsided and the Agency had the opportunity to consider its actions carefully before continuing its response efforts. For example, decisions regarding the approach to addressing indoor contamination evolved over time, after extensive deliberations, and well after the initial emergency response had subsided. We also note that, except for the recommendations in Chapter 6, the Agency agreed with the recommendations in five other chapters of the report, which does not suggest that we misunderstood the circumstances that the Nation, EPA, or the City faced following the disaster.

Note 2 - We agree that the Agency should be proud of the response of its men and women in the aftermath of the WTC attacks and collapse. We also agree that the Agency's response was made under extremely trying circumstances as detailed in Chapter 1 of the report. The findings, conclusions, and recommendations in this report are in no manner intended to disparage the valiant contributions of EPA personnel, or those of any other responding organization.

Note 3 - We agree with the need for coordinated federal efforts and the concept of centralized communications during a time of national emergency. In the report we recommend that EPA develop emergency communications policy and procedures which are consistent with the "Seven Cardinal Rules of Risk Communication,' the fifth of which is to "coordinate and collaborate with other credible sources."

We do not believe the report "goes to great length to erroneously criticize" CEQ's efforts "to coordinate health and safety communications." In accordance with the first assignment objective, the report appropriately examines the analytical basis for EPA's major public communications regarding air quality. To the extent that reassuring words were added to EPA's draft press release and cautionary words were deleted, it

is important to understand the basis for such changes in the Agency's risk communications. The report also provides the former EPA OCEMR Associate Administrator's explanation for why EPA's press releases did not discuss health effects or contain a recommendation that residents obtain professional cleaning. Additionally, as noted by the former EPA Chief of Staff, factors other than protecting human health and the environment entered into the determinations of the information that would be communicated to the public, including national security considerations and the desire to re-open Wall Street.

Note 4 - We agree that EPA made its data available to the public. However, based on the documentation we reviewed and our discussions with numerous environmental experts, both within and outside of EPA, we do not agree that the Agency's statement on September 18, 2001 that the air was safe to breathe reflected the Agency's best professional advice. In contrast, based on the circumstances outlined in Chapter 2 of the report, it appeared that EPA's best professional advice was overruled when relaying information to the public in the weeks immediately following the disaster.

Note 5 - We applaud EPA's efforts to evaluate its response and implement changes. We believe the report sufficiently acknowledges EPA's efforts to implement its "lessons learned." The draft report's Executive Summary acknowledges EPA's "lessons learned" efforts and highlights specific actions the Agency initiated. In addition, Chapter 7 of the report discusses EPA's "lessons learned" efforts in great detail.

Note 6 - We do not believe the report "is flawed in its lack of recognition" of the issues discussed. In regard to the absence of a long-term health threat, the Agency did not have a sound basis for reaching this conclusion at the time for the numerous reasons detailed in the report. Further, as noted in the report, the position that EPA took regarding WTC is inconsistent with the Agency's historical position that there is no safe level of asbestos.

In regard to the comment about the Agency advising people who were experiencing acute health problems to see their physician, no supporting documentation has been identified which shows that EPA instructed residents to see their physicians. We also provided agency officials with the opportunity to provide us with documentation which supported specific statements, but none has been provided to date.

In regard to EPA discussing acute health problems, we reviewed extensive information on EPA's risk communications, including all of the documents and videocassettes which were provided by Region 2 and EPA's Office of Public Affairs. We agree there were instances where documentation indicated agency spokespersons discussed acute health problems. However, as detailed in the draft report, EPA's press releases generally did not discuss potential acute health problems or the need to see a physician (except for rescue and cleanup workers at Ground Zero). The words "physician," "doctor," "acute," "symptoms," and "sensitive," do not appear in any of EPA's WTC press releases. Considering the totality of all the information we reviewed, it is our opinion that EPA did not communicate a clear, or consistent message on this subject. We agree that EPA advised rescue and cleanup workers to

take safety precautions. This agreement is detailed on page 9 of the draft report and illustrated in Appendix P.

We do not agree that EPA "emphasized" the need for professional cleaning because this concept was not discussed in EPA's press releases. According to the OCEMR Associate Administrator, a recommendation to obtain professional cleaning was deleted from an EPA press release by a CEQ official. As detailed in the draft report, EPA's press releases referred the public to a New York City Department of Health web site which recommended that people clean their own residences and businesses using wet rags, wet mops, and HEPA vacuums.

Note 7 - We do not believe that "The Report erroneously focuses" on five early Agency press releases. We reviewed many different types of information from many different sources including videocassettes which were provided by Region 2. We made extensive efforts to locate all relevant records. For example, by contacting the Administrator's Press Secretary and Scheduling Director, we were able to determine the date of a videotaped newscast which showed the Administrator advising the public orally about obtaining professional cleaning on October 26, 2001. Similarly, we worked closely with Region 2 officials and agreed with their analysis that EPA's web site recommended professional cleaning at least as early as December 11, 2001. In summary, although EPA's subsequent communications sometimes added information or clarification to the message presented in the press releases, the Agency's overall message of reassurance about long-term health impacts did not change.

In regard to the comment in the response to the draft report about EPA's "massive outreach program," we note, as detailed in the draft report, that a NYCDOH study, other lessons learned reports, and testimony provided at various hearings indicated that the public did not receive adequate air quality information and that individuals cleaned their residences without using proper procedures or personal protection.

Note 8 - We agree there were no health-based standards for many of the pollutants encountered in the aftermath of the WTC attacks, and the report does not intend to find fault with EPA or any other government organization for not having developed those benchmarks beforehand. However, we do not agree with using certain criteria-based benchmarks – particularly the NESHAP asbestos-containing material definition of one percent asbestos – as health-related benchmarks when environmental professionals clearly acknowledge that this standard is not protective of health.

Note 9 - The Agency is to be commended for its proactive approach to analyzing its response to the WTC collapse and initiating improvements to its emergency response capabilities. We disagree with the Agency's comment that this report "trivializes both the horrendous event that occurred and the extraordinary efforts of EPA and other responders." The primary objective of the report is to ensure that, if such a tragedy were to happen again; the public and emergency responders impacted by the disaster would receive the best available advice, protection, and assistance that the Government can provide.

General Observations

Note 10 - We agree that the Agency's response to the WTC collapse was unprecedented and enormous in terms of resources and human effort. Page 5 of the draft report acknowledged the many other activities – in addition to the air quality related activities – that EPA conducted in response to this tragedy.

Note 11 - We agree that the Agency undertook extraordinary efforts to provide information to the public and we acknowledge that the documents we reviewed indicated EPA provided full disclosure of sampling results. However, in our opinion, the importance of Agency press releases should not be minimized. As detailed in the draft report, EPA press releases result from a deliberative process that should reflect the Agency's official position on significant issues. Press releases are made available to essentially all news media and may well be quoted or paraphrased in radio, television, and other forms of communication. In our opinion, the Agency could have provided more complete and more useful information in its press releases.

We also agree that future incidents may involve scenarios that cannot be anticipated. In order to address this possibility, the draft report recommends that EPA designate teams of Agency experts – at both the National and Regional level – who can be mobilized quickly to provide needed technical support during a response, and that the Agency develop expert panels that can be used to quickly develop health-related benchmarks in emergency situations.

Chapter 2

Note 12 - We fully recognize the extraordinary circumstances that existed at the time the statement was made about the air being safe to breathe. However, for the reasons detailed in the draft report, there was insufficient information to support the statement made and the principle of acknowledging uncertainty was relevant.

We disagree with the assertion that EPA's statement about the air being safe to breathe would clearly be understood by New Yorkers as applying exclusively to asbestos. The press release sentence which preceded the subject statement asserts that New Yorkers are "not being exposed to excessive levels of asbestos or other harmful substances . . . ." The same press release also states that sample tests results are "below established levels of concern for asbestos, lead and volatile organic compounds."

Note 13 - We agree that, to our knowledge, EPA never withheld data from the public, and the draft report makes this point (page 10). The draft report does not imply that it is "unusual" or "unexpected" for the Agency to coordinate with CEQ during a "catastrophic disaster." In such a situation we would expect EPA to coordinate with numerous government entities and any non-government entity that could provide needed services. However, we would expect EPA to remain fully committed to its

mission of "protecting human health and the environment" during a catastrophic disaster. We understand that national security considerations or the desire to re-open Wall Street may affect certain communications. However, in our opinion, if such considerations cause EPA to omit or change statements that would otherwise have been made in its efforts to fulfill its mission, the Agency risks harm to its long term credibility as an authoritative source of health information for the public in times of crisis. EPA needs to acknowledge significant collaborations and, where necessary, qualify its communications appropriately. We agree with the goals of EPA's Homeland Security Strategic Plan which commit EPA to disseminating quality environmental information to all levels of government, industry and the public.

Chapter 3

Note 14 - We agree that, from the beginning, EPA and other government entities provided advice to residents to cleanup indoor spaces using wet rags, wet mops, and HEPA vacuums. As detailed in the draft report, EPA's Administrator and various Agency spokespersons orally advised the public to obtain professional cleaning when the dust was in their residences was "more than minimal," "a heavy amount," etc. However, we note the Agency's web site referred readers to NYC guidance and that a NYCDOH press release reassured residents that it was "unnecessary to wear a mask" while cleaning indoor spaces, and if a HEPA filtration vacuum was not available, simply "wetting the dust down with water and removing it with rags and mops is recommended."

In regard to potential exposures to asbestos and other contaminants, we note that a study of immigrant workers used to clean indoor space contaminated with WTC dust disclosed that these workers were not provided with personal protective equipment. The study reported that these workers reported health symptoms including coughing, sore throat, nasal congestion, chest tightness, headaches, fatigue, dizziness, and sleep disturbances that worsened after September 11, 2001. Further, a NYCDOH survey conducted in October 2001 found that the majority of residents polled had not followed the recommended cleaning procedures of using wet rags and HEPA vacuums. With respect, to the effectiveness of the cleaning studies, we note that EPA's Confirmation Cleaning Study report dated May 2003 found that:

> *. . . one to three cleanings were necessary to reduce contamination levels to below health-based benchmarks, and the number of cleanings required generally correlated with the levels of contamination initially identified in the units*.

We continue to believe unprotected workers and residents may have experienced unnecessary exposures to asbestos and other pollutants.

Note 15 - We agree EPA repeatedly stated that workers at Ground Zero should wear respirators, and that the Agency raised these concerns to local officials as discussed in Appendix L of the report. However, EPA's advice that workers wear respirators was directed to Ground Zero workers at the debris pile, and not to workers who cleaned contaminated indoor spaces outside the perimeter of Ground Zero. In regard to EPA's statements

that they repeatedly advised sensitive sub-populations and people experiencing acute symptoms to consult a physician, we note that these warnings were not presented in EPA's press releases**.** We attempted to verify the extent to which EPA advised these other groups through other forms of communication. For example, we reviewed briefing notes prepared for public meetings that EPA. These briefing notes showed that EPA officials intended to discuss sensitive populations at two public meetings in October 2001. We also reviewed newspaper and other news articles to determine when EPA publicly provided such advice. Based on the evidence EPA provided to us, and our own independent research, we were not able to conclude that EPA "... repeatedly advised anyone with acute symptoms to consult with their physicians..."

Chapter 4

Note 16 - We acknowledge the difficulty in implementing NESHAP work practices in the aftermath of the WTC collapse and agree that these work practices should not be implemented to the detriment of rescue operations in any emergency situation. However, even in the aftermath of an emergency, appropriate measures should be taken to the extent practical to reduce the exposure of emergency responders, clean-up crews, and the surrounding public to asbestos emissions.

Chapter 5

Note 17 - We agree that EPA conducted many activities to support efforts to alert Ground Zero workers to health-related issues, and we discuss these actions in Appendix L of the report.

Note 18 - EPA notes that the public sometimes wants information that is not scientifically available, or is not available quickly. We agree that this may sometimes be the case. EPA guidance in discussing the 4th rule of the "The Seven Cardinal Rule of Risk Communication" states: "If you do not know an answer or are uncertain, acknowledge it and respond with the answer as soon as possible."

Chapter 6

Note 19 - The Agency states that there are many residential and commercial buildings below Canal Street, and that a cleanup program including all of them would be a monumental undertaking that EPA studies and data indicate is not necessary. We agree that this would require a significant effort. However, the former EPA Administrator stated in September 2001 that the President made it to clear to spare no expense and to do everything needed to make sure the people of New York City were safe as far as the environment was concerned.

Note 20 - We agree that the vast amount of outdoor dust and debris has been removed, and thus exterior sources for contamination of indoor spaces have been significantly reduced. However, any indoor spaces contaminated with WTC dust that have not been cleaned using proper techniques will likely remain contaminated. The Agency notes that in

95% of the residences that were cleaned and tested or cleaned only, the asbestos readings were non-detect. It is encouraging that 95% were non-detect. However, it is not clear which sampling methods were used in obtaining these readings, what asbestos levels were present in the remaining 5 percent, and whether EPA believes possible asbestos contamination in 5 percent of the residences is acceptable. See note 24 for our comments regarding cleaning effectiveness.

Note 21 - Concerning the use of aggressive sampling, we agree that the use of a leaf blower does not represent normal activity in a residence. Neither does the use of a leaf blower represent normal activity in a school room, although the AHERA standard requires its use for clearing a school room after an asbestos abatement. Under a standard asbestos cleaning, all items in a room would be cleaned thoroughly, even documents as was done when cleaning a courthouse in Titusville, FL. In a private residence, especially when cleaning is voluntary and the owner can refuse to have individual items touched, it is extremely difficult to ensure that each item is cleaned of every microscopic asbestos fiber, yet this degree of cleaning should be the intent of the cleanup. Use of a blower prior to aggressive sampling serves to stir up the air, re-entrain dust and fibers in the air stream, and allow negative air filtration equipment to trap fibers that have been missed in the wet cleaning process or skipped entirely. It thus can be as much a cleaning procedure as a sampling procedure. We believe it is a necessary adjunct to the type of cleaning performed in NYC.

Note 22 - We accept EPA's statement that Agency officials qualitatively evaluated the potential for health risks beyond the current boundaries established for the residential cleanup. However, if a future disaster were to occur, we believe the boundaries of any government-organized cleanup should be based on a systematic, quantitative approach to determining the extent of contamination.

Note 23 - EPA issued a revised "World Trade Center Indoor Environment Assessment: Selecting Contaminants of Potential Concern and Setting Health-Based Benchmarks," as well as a "Response to Peer Review Comments on the Report." We note that both these documents cite the "World Trade Center Background Study Report" and the "Interim Final WTC Residential Confirmation Cleaning Study" which were issued in April and May 2003, respectively. Neither of these documents were available when the TERA panel peer reviewed the original COPC document in October 2002. In light of the significant, detailed comments that the peer review panel had on the original report, the detailed responses made in EPA's response document, and the fact that additional information is now available that was not available during the first peer review, we continue to believe it is appropriate that EPA re-submit the revised report, with newly issued supporting documentation, for peer review.

Note 24 - EPA states the belief that ". . . health-based asbestos-in-air clearance testing is effective in reducing the potential for risk related to [other] WTC contaminants." We note that 82% of the residential units re-cleaned during the Cleaning Study [Interim Final WTC Residential Confirmation Cleaning Study, Vol. 1, pp.113-114] had to be re-cleaned because the sampling filters were too clogged with dust to be analyzed. While we agree with the decision to re-clean residences under this circumstance, we

also interpret this to mean that, after cleaning, the units were still too dusty to pass the clearance test over 80 percent of the time. This is evidence that the cleaning process, although conducted under close EPA oversight, was often not successful. We had no evidence that this cleaning process would be more successful under the oversight of others, nor that the risks from exposure to other contaminants would be significantly reduced when the residence passes the asbestos clearance test.

Note 25 - Our recommendation applies to the interior building system in buildings with central heating, ventilation, and air conditioning (HVAC), composed of furnace/cooling coils and condenser, plenum, filtration system, supply ducts, and return ducts or return open air plenums. We continue to believe that these buildings should be treated and cleaned as an entire building system rather than as individual apartments because of the high likelihood that uncleaned subparts of the system will re-contaminate the entire system when the system is re-energized after cleaning of registers/ducts in a single or small group of apartments. We do not believe the absence of "widespread exceedences" provides sufficient assurances that public health is protected. EPA's own regulations state that asbestos is a known human carcinogen with no known safe level of exposure.

Note 26 - As indicated on page 9 of its response, EPA indicates that it has coordinated with OSHA throughout the indoor cleaning program, and that OSHA is prepared to address worker complaints. While we commend EPA and OSHA for coordinating on this issue, we continue to believe EPA, OSHA, and FEMA should assess the need for a work space cleaning program and formally come to an agreement as to whether or not work spaces should be addressed pro-actively by a cleaning program.

Chapter 7

Note 27 - Based on the events that unfolded after September 11, 2001 it is clear that the public looks to EPA for its advice and opinions on issues related to the environment. We expect that the public and the Department of Homeland Security will continue to look to EPA for its professional advice and judgment on matters related to the environment.

New York City's Response to Draft Report Excerpts

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August 4, 2003

BY FACSIMILE AND OVERNIGHT DELIVERY

Mr. Rick Beusse
U.S. EPA Office of the Inspector General
Mail Drop: N-283-01
RTP, North Carolina 27711

Re: City of New York's Response To Draft Evaluation Report: EPA's Response to the World Trade Center Collapse: Lessons Learned, Assignment No. 2002-0000702

Dear Mr. Beusse:

Thank you for the opportunity to respond to the revised excerpts from the Draft Evaluation Report: EPA's Response to the World Trade Center Collapse: Lessons Learned, Assignment No. 2002-0000702. This response is on behalf of The City of New York (the "City"). In addition to this response, the City requests that you consider the City's response to the initial excerpts that the EPA forwarded to the City. That response was made by letter dated July 7, 2003 from this office to the Environmental Protection Agency ("EPA"), a copy of which is enclosed, and was supported by submissions of documents by letters dated July 10, 21 and 22, 2003.

www.nyc.gov

Before commenting on the excerpts that were forwarded to the City, we note that although this office requested the entire draft report so that the City would best be able to address the portions of the report concerning the City, only excerpts were supplied. Without access to the entire draft report to place sections concerning the City into context, the City is disadvantaged in providing comments to the excerpts. However, portions of the excerpts concerning the City compel a response by the City and the City hereby responds to the best of its ability, as follows:

1. The third sentence in the first paragraph on page 1 of the excerpts of the revised draft report is misleading. The sentence implies that the EPA assumed a lead role in responding to indoor environmental concerns because of criticism of the City. It implies furthermore that criticism of the City was warranted. The evidence does not support a conclusion that the EPA took a lead role with respect to this issue solely because of criticism of the City. There were a number of factors present at that time which appear to have influenced the EPA, including criticism of the EPA and the initial availability of federal funds at that time to address this issue. More importantly, there is no evidence that any criticism of the City with respect to indoor environmental concerns was warranted. Also, the sentence refers to EPA initiating a multi-agency task force at that time. This implies that this was the first time that federal, state and City agencies worked together to address this issue. The documents supplied by the City show that federal, state and City agencies worked together beginning September 12, 2001 to address a wide variety of environmental issues, including indoor environmental concerns. We recommend that the sentence be revised to read, "EPA began to assume a lead role in February 2002, when the Agency chaired a multi-agency task force to continue to address concerns about the indoor environment."

2. The City has similar comments with respect to the paragraph labeled "Indoor Contamination Response" on page 1. This paragraph refers to concerns raised by public and elected officials and specific criticism of the City. Again, including this criticism appears to imply that the criticism was warranted, particularly since the City's position is not presented. We note that in the same paragraph, where criticism of the EPA is set forth, the EPA's position is presented in rebuttal to the criticism. The City believes that the evidence does not support the criticism of the City. For example, criticism concerning delegating testing and remediation efforts to building owners and residents is unwarranted. The City did not delegate this responsibility to owners and residents. The owners and residents always have had this responsibility, it was never the City's responsibility to do this and consequently the City could not delegate what it did not have. Similarly, there is no evidence that the City did not enforce proper procedures for cleaning asbestos where it had the enforcement authority or that the City gave improper

advice to the public on testing and cleaning procedures. As noted in the City's previous submission dated July 7, 2003, the EPA adopted the City's advice to its citizens. Moreover, including these criticisms implies that there was asbestos in these buildings. There is no evidence to support a claim that any significant number of buildings were contaminated with asbestos. Both the sampling conducted by many agencies and the City's response to complaints concerning asbestos, where out of over 300 responses to complaints there was only 1 finding of asbestos above the threshold level, demonstrate that asbestos containing material was not present above the threshold level in these buildings. References to criticisms are also not appropriate for this substantive section of the EPA report. The City does not dispute that there was criticism, but the criticism is irrelevant to whether the City and EPA followed the appropriate statutes, regulations and procedures. While the criticism may provide an impetus for conducting an evaluation, it does not provide any substantive basis for the findings in the report. To include the criticism in the substantive portion of the report in the manner in which it is included erroneously implies that the criticism has been substantiated and is unduly prejudicial to the City. Accordingly, the City recommends that this paragraph be deleted.

3. Concerning the second sentence in the paragraph labeled "Initial Actions Taken by New York City and EPA" on page 1, although the City was not provided with the documentation, the City has been informed that there is EPA documentation concerning an alleged statement by the City that it would not be requesting federal assistance. The documentation, which appears to be quoted on page 4 and 5 of the revised report, refers to a conversation between the EPA and the U.S. Public Health Service and the New York State Department of Health, where these agencies allegedly relayed to EPA the alleged statement by the City. It is impossible for the City to comment on the source of the statement given its vagueness and the fact that it is not attributed to any individual or agency. The City can, however, confirm that the statement is contrary to its repeatedly expressed position that it welcomed any authorized federal assistance at that point in time. To include this statement and purport to characterize the City's position based on a single, unattributed, out-of-context statement is unfair to the City. This is not the type of reliable evidence that should be required to support findings in an Inspector General report. The City therefore recommends that the statement be deleted.

4. Concerning the last sentence in the first full paragraph on page 2, the City believes EPA Region 2's comment that it did not want to take a more assertive stance because it would create a confrontation is not valid for more reasons than just that EPA was the lead agency for Emergency Support Function #10. From September 12, 2001 to the end of the Response Effort, the EPA was thoroughly involved in the effort. EPA had a "seat at the table" as demonstrated by the documents submitted by the City. Moreover, there was a cooperative relationship between EPA and the City. The EPA provided support for the Response Effort's overall health and medical response, which coordinated both environmental health and worker safety issues. In fact, when at a point in time during the Response Effort, EPA suggested that its functions be transitioned to a contractor, the City urged the EPA not to do this and to continue to maintain an on-site

presence and be part of the team. To suggest that EPA could not become more assertive or involved because it would create a confrontation is inconsistent with the evidence.

5. The first paragraph in the section labeled "New York City's Initial Response" on page 2 is misleading. It fails to mention that the City's policy and practice in the past was to hold building owners responsible for maintaining a safe environment and when necessary cleaning up their buildings. In other previous disasters, the federal government did not provide for federal funding to municipalities to clean privately owned buildings or property. The City consequently had no authority to request reimbursement for this activity and no authority to enter privately owned buildings to effect such a cleanup without the owner's consent or the finding of imminent hazard. Thus, the second sentence is misleading. We recommend that the first three sentences be modified as follows: "Consistent with past practices and federal law, building owners were initially held responsible for cleaning their own buildings. According to New York City officials, the issue of funding the cleanup of privately owned buildings was discussed with FEMA and the EPA. Initially, the federal position was that the Stafford Act, the statute which provides authority for federal disaster response, did not provide direct funding to the City for cleanup of privately owned buildings. During this discussion, the federal agencies were informed that owners of privately owned buildings would be responsible for funding the cleanup of their buildings and agreed with this course of action. Building owners, who needed help, were directed to the Disaster Assistance Service Center (DASC) where they could apply for financial assistance from FEMA."

6. Concerning the first full paragraph on page 4, which begins, "NYCDEP officials told us . . .," the paragraph is misleading in that there never had been a certification program to determine the level of compliance with NYCDEP instructions concerning cleaning of privately owned buildings. Also, the paragraph does not reflect the proactive efforts of the NYCDEP and the fact that NYCDEP not only told EPA it cleaned all of the rest of the buildings, but provided documentation. The City suggests that the first sentence be revised to read, "NYCDEP officials told us they have never had and did not create a certification program, nor did they have authority to create such a program, to determine the level of compliance with their instructions regarding the testing and cleaning of asbestos inside buildings, unless a complaint was made or an asbestos abatement notification was filed with the City." The City suggests that an additional sentence be added that states, "However, NYCDEP made significant efforts, including establishing an additional "hotline" to insure that residents could obtain information concerning asbestos cleanup and could report any asbestos related problems." We suggest that the last sentence of the paragraph be revised to read, "NYCDEP officials provided documentation that the remaining buildings were cleaned by NYCDEP with FEMA funding."

7. With respect to the first full paragraph on page 5, which alleges that New York City officials told EPA that the City would not be requesting EPA assistance with respect to sampling and reoccupation issues, without further information such as who the New York City officials were, or even what New York City agency they represented, it is

impossible for the City to comment on the source of the allegation. Again, the City at that time was willing and eager to accept all authorized federal assistance. Moreover, as shown in the documents submitted by the City, the City had accepted U.S. Public Health Service and Agency for Toxic Substances and Disease Registry (ATSDR) assistance in conducting indoor air sampling. Thus, it would be inconsistent for the City to refuse the assistance of the EPA — another federal agency — in this matter. In fact, EPA participated in the discussion with ATSDR concerning the protocol for the Indoor Air Study. The City has already commented concerning the alleged statement made on September 30, 2001, which is referenced in this paragraph (see item 3, above) and will not repeat its comments. The City recommends that the two sentences that refer to the statements allegedly made on October 9, 2001 and September 30, 2001 be deleted.

8. The City believes that the paragraph labeled "Multi-Agency Residential Cleanup Undertaken" on page 5 is somewhat misleading. The second sentence suggests that the sole basis for EPA's involvement in indoor air in February 2002 was that it believed the City could not handle all the issues involved in this matter. This is not accurate. First, EPA did not just become involved in indoor issues in February 2002. As shown by the documents submitted by the City, EPA was involved in indoor air issues as early as September 29, 2001. Second, there were a number of events that coalesced around February 2002 that brought about more involvement in indoor issues by the EPA, including, public criticism of the EPA and, perhaps most importantly, the initial availability of federal funding for indoor cleaning of private residences. Therefore, the City recommends that the second sentence be deleted.

9. The first paragraph in the section labeled "EPA Role on Indoor Environment" on page 5 is misleading. It refers to the portion of the NCP which allows a state or local agency to take the lead role in the case of a hazardous substance release. However, in this case, the site was not declared a hazardous waste site. We recommend that a footnote be added to this sentence noting that the site was not declared a hazardous waste site.

10. In the first paragraph of the subsection labeled "Cleaning Instructions" on page 6, the report opines that as a result of the failure of the City to recommend that residents obtain professional cleaning, long term health risks may have been increased for individuals who cleaned their residences without using respirators and other professional cleaning equipment. This is speculation that is not supported by the evidence. Indoor air sampling data along with the "Interim Final WTC Residential Confirmation Cleaning Study," completed by EPA Region 2 in May 2003, confirm that the methods recommended by the City, and adopted in the EPA website, were appropriate. Accordingly, we recommend that this paragraph be deleted.

11. The last paragraph in this section is also inaccurate. The City strongly contests the current opinion of asbestos medical experts contained in the first sentence of this paragraph. First, a huge body of test results established that asbestos contamination in indoor air was virtually nonexistent. Also, the conclusion of the experts completely ignores the practicality of the situation, in that for respiratory protection to be effective,

the user must be fit tested first and also that it is medically dangerous for an individual to wear a respirator without being medically cleared. Finally, the last two sentences of the paragraph are sheer speculation. There is no evidence as to how the individuals cleaned their residences. More importantly, as noted previously, there is no evidence of asbestos contamination in indoor air that would support the requirement to use abatement procedures or support the speculation that if abatement procedures were not used, health risks would be increased. Accordingly, this paragraph should be deleted.

12. Page 7 provided to the City is blank.

13. As a technical correction, in the first paragraph on page 8, the New York State Department of Labor, not the Department of Environmental Conversation, is delegated the responsibility for implementing federal regulations under the NESHAP program.

14. Concerning the first full paragraph on page 9 of the draft report, the City believes that given the prominent mention of the NESHAP notification requirement, this paragraph should include a sentence indicating that the EPA, because of its involvement, had functional notice of the demolition and everything concerning the demolition and that, as a practical matter, notification would not likely have changed the manner in which demolition was conducted. We recommend that the following sentences be added at the beginning of the paragraph, "While the EPA and other agencies were not provided formal written notice of the WTC demolition activities, the EPA and other regulatory agencies had notice, in advance, of the demolition activities and the manner in which they were being conducted as a result of these agencies' involvement in the Response Effort. EPA and the other regulatory agencies did not object to these activities and even if formal written notification was provided, it is doubtful the activities would have been conducted in any different manner."

15. As the only intact asbestos containing material encountered at the WTC site was below grade, the City recommends that the first sentence of the first paragraph on page 10 be revised to read, "Both NYCDDC and EPA officials told us that asbestos containing material (e.g., pipe wrapping, steel insulation) was only encountered below grade, and when it was encountered during removal it was tested and treated in accordance with asbestos abatement procedures."

16. The last sentence of the footnote on page 11 should be modified to provide a more complete explanation. The sentence should read, "Furthermore, they stated that the vehicles did not require decontamination since they were not transporting hazardous waste as defined by the EPA under 40 CFR Part 260-280. While decontamination procedures were not required, wash down procedures were mandated."

17. The first paragraph in the section labeled "Transfer of Debris to Barges" on page 12 is misleading and unfairly prejudicial to the City. It is based on citizen complaints rather than substantial evidence. The testimony of people complaining may be a useful starting point for analysis but it must be evaluated very carefully. This has

not been done here. This paragraph, without any critical evaluation at all, seems to accept all of the complaints as true. The verifiable evidence available, however, suggests that the complaints are unfounded. Only one aspect of the testimony is true. The trucks transporting WTC debris were not marked as carrying hazardous waste. They were not marked in this manner because they were not carrying hazardous waste as defined by the EPA. This is just one example of testimony that should have been critically evaluated before being included in the report. Of more concern is the uncritical acceptance of testimony of trucks not being wetted down properly and trucks not being covered properly, both allegedly resulting in the release of dust. The area around Stuyvesant High School was among the most thoroughly monitored in the City. There is no data to show that this area was contaminated by the operation of the transfer station for WTC debris from trucks to barges in the vicinity of the High School. Thus, if there was a release of dust, it was so insignificant as to present no risk at all to health and safety and should not be highlighted in this report. EPA, itself, represents that air sampling concerning barge operations indicated that 99.83% of the samples were below the screening levels. The City consequently recommends that this paragraph be deleted.

18. The paragraph that begins at the bottom of page 12 should be modified. The last sentence reports that there was lead found in the ventilation system of Stuyvesant High School. The sentence also reports that it was not determined whether this lead was from WTC fallout. Environmental monitoring in lower Manhattan indicates that airborne lead levels averaged over 90 days (from September 2001 through November 2001) did not exceed the EPA National Ambient Air Quality Standard (NAAQS) of 1.5 ug/m3. Given these results and the ubiquity of tetraethyl lead in urban environments from its use in leaded gasoline, it is very unlikely that the lead found in the ventilation system was from WTC fallout. Even if it was, this has nothing to do with the City's response to the terrorist attacks on the World Trade Center. While this may be of some academic interest, it has no place in this part of the report. The City recommends that this sentence be deleted.

19. The first paragraph in the section labeled "Asbestos Levels During Demolition and Debris Removal" is misleading. It unduly emphasizes that after September 2001 there were 7 air monitoring samples which exceeded the AHERA standard. The paragraph fails to mention that EPA collected a total of 12,676 ambient samples in lower Manhattan for phase contrast light microscopy analysis and 8,872 samples for transmission electronic microscopy analysis. Considered in this context, the fact that there were only seven exceedances demonstrates that the response actions taken were appropriate. The report mischaracterizes the seven exceedances as showing the sporadic presence of asbestos in the ambient air. Given the extensive monitoring, less than one exceedance per month can hardly be characterized as "sporadic." We recommend that the paragraph be revised to delete the table showing the exceedances and any reference to the table be deleted. Also, the reference that two of the exceedances were near Stuyvesant High School should be deleted. Reference to Stuyvesant implies that this location should be given preference over other locations near the site. The fourth sentence of the paragraph should be revised to read, "Out of approximately 21,000

samples taken from October 2001 through May 2002 there were only seven exceedances of the AHERA standard."

20. The second full paragraph on page 20 beginning, "The indoor residential cleanup program" is inaccurate. The second sentence states that the Governor of New York did not declare a public health emergency. In fact, the Governor declared a "general emergency," which is construed to include a public health emergency. Also, the fourth sentence states that the City indicated that an indoor cleanup was not necessary. This is not correct. At no time did the City indicate that an indoor cleanup was not necessary. In fact, early in the "Response Effort," the City inquired concerning the availability of federal funds to pay for such a cleanup. The City also widely disseminated guidelines for building owners and tenants to clean indoor spaces. The City accordingly recommends that the second sentence be modified to delete the phrase, "and the Governor of New York did not declare a public health emergency for this incident." We recommend that the fourth sentence of the paragraph be deleted.

21. We strongly recommend that the respirator sections contained within pages 16 through 19 be completely taken out of this report. Work place safety and personal protective equipment are matters within the jurisdiction of OSHA. These matters are, therefore, inappropriate for assessment by EPA-OIG. Further, much of the material concerning respirators appears to be based on two reports that are inaccurate, incomplete and insufficiently researched. If these sections remain in the report, we advise the following: The section entitled "Respirator Use at Ground Zero Lacking" should be changed to "Respirator Use at Ground Zero." Within that section, the first sentence should be changed to read: "A widely publicized aspect of the WTC response was the less than 100% compliance with requirements to use respirators by rescue and construction crews," since there was not a total lack of respirator use. The second sentence should be changed to: "It was beyond the scope of this review to determine the extent of noncompliance with respirator requirements and why this occurred" for the same reason. The fourth sentence within that section should read: "Our limited work in this area indicated that respirators were widely available but provisions of the site requirements for using respirators were not fully complied with for a number of reasons" since there was a plethora of respirators at the site. The sixth sentence contains several inaccuracies and should be changed to: "Other reasons appeared to include the respirators' interference, due to the state of the technology, with the ability of emergency workers to communicate and conflicting messages about the air quality at Ground Zero."

22. The section entitled "Reports on Lack of Respirator Use" on page 17 should be completely deleted because, while it purports to represent a total picture of site operations, it in fact presents a very narrow and skewed snapshot by the author, who was at the site for a very limited number of hours, and who misidentified a key City agency – the Department of Design and Construction – and its role in the rescue and recovery efforts. The bullet points should be taken out with the exception of the point starting with "During the September 22-26 period," because there were thousands of rescue and clean-up workers on the site and a DDC official monitoring safety at the site personally

observed many who did wear respirators diligently. There are hundreds of photographs that depict the use of respiratory equipment and hard hats. Respirator use was tracked and enforced throughout the response to the disaster. In addition, this was not a hazardous waste operation. OSHA defines the scope of a "hazardous waste operation" as "clean up operations required by a governmental body, whether federal, state, local or other, involving hazardous substances that are conducted at uncontrolled hazardous waste sites." Although the debris produced by the collapse of the WTC did contain minor concentrations of various contaminants, including asbestos, fiberglass and alkaline cement dust, extensive sampling never indicated the presence of hazardous waste as defined by the EPA in Resource Conservation and Recovery Act regulations 40 CFR Parts 260-280. In addition, there was an aggressive safety and health effort underway, spearheaded by the DDC and OSHA working in close collaboration. Beginning September 12, 2001, daily health and safety meetings were held and attended by multiple City, State and Federal agencies, including EPA, FEMA, OSHA, DEC, DDC, DOH, DEP, FDNY, NYPD and OEM, together with the contractors' safety personnel, at which air monitoring and PPE protocols were discussed and established. There was a preliminary "Accident Prevention Plan" in place from September 14, 2001 through October 29, 2001, at which time the World Trade Center Emergency "Environment, Safety and Health Plan" went into effect. Teams of safety and health professionals worked around the clock providing "direct intervention" to get workers to comply with basic safety and health requirements, especially the use of PPE. There were as many as 30 safety professionals on site each day. OSHA employees were constantly roving the site with safety equipment, and provided hands-on instruction and preliminary fit checking at IS 89 and at supply caches on the site. There are tens of thousands of documents which record these multi-agency health and safety efforts, many of which have already been provided to the EPA. Additional documents can be provided upon request.

23. On page 18, the first sentence beginning with "In contrast" should read as follows: "In contrast to the recovery operation at the WTC site, the January 2002 report noted that workers conducting WTC debris sorting and inspection at the Fresh Kills landfill wore half-face respirators, hard hats, eye protection, and Tyvek suits." The language that the work at Fresh Kills was handled as a "hazardous waste operation" should be eliminated because WTC debris at the Fresh Kills landfill, and at Ground Zero, did not call for a hazardous waste response under OSHA or EPA standards, nor was it handled as such. The next sentence should begin: "The author opined" to avoid an erroneous impression that the reported information was an EPA finding. The sentence beginning "In other words" is inaccurate and should be replaced with: "The author's perception was that PPE use was more prevalent at the Fresh Kills landfill than at the WTC site." The report as written is again misleading in describing the debris as hazardous waste, and mischaracterizes the Fresh Kills landfill operation, which presented its own unique, multi-faceted challenges, as "less hazardous."

24. On page 19 the first sentence of the first full paragraph beginning "As the rescue phase progressed," should be changed to read as follows: "As the rescue phase

progressed, EPA emergency response officials told us they were concerned about the less than 100% compliance with respirator requirements at Ground Zero and outlined these concerns in a letter to NYCDOH, dated October 5, 2001." The third sentence of that paragraph should read "The letter noted that EPA had recommended and continued to recommend that workers at the site wear respiratory protection, and that workers comply with procedures to prevent them from spreading debris from the site to their homes, cars, and other locations." Again, "decontamination" and "contaminants" language assumes a hazardous waste operation, and this was not such an event.

To make it easier to understand our proposed modifications to the respirator sections contained within pages 16 through 19, I have enclosed a copy of the excerpts from the draft report with interlineations containing our proposed language.

Thank you for the opportunity to comment concerning the revised draft report. If you have any questions, please do not hesitate to contact me or my staff.

Very truly yours,

Kenneth A. Becker
Chief, World Trade Center Unit

Enclosures

OIG Evaluation of New York City's Response to Draft Excerpts

The following numbered notes respond to the numbered comments in New York City's response in Appendix S.

1. We agree that there were a number of factors that caused EPA to assume a lead role in responding to indoor environmental concerns, and that only presenting the criticism of NYC and not EPA would be misleading. Our draft already recognized that EPA was criticized as well and that this also influenced their actions regarding indoor concerns. The sentence has been clarified by deleting the lead-in clause that only cited criticism of New York City. The sentence now reads as follows:

   > EPA began to assume a lead role in February 2002, when the Agency initiated a multi-agency task force to address concerns about the indoor environment

2. We presented the criticism as background information that is necessary for the reader to understand the information that follows and to put this information into proper context. Regarding indoor asbestos contamination, evidence does not support the City's contention that there is "no evidence to support a claim that any significant number of buildings were contaminated with asbestos." Appendix K to our report points out that an October 12, 2001 study of two residential buildings – one presumed to have significant WTC dust contamination and the other not – found that both buildings had significant asbestos contamination, ranging from 6,277 to 10,620 s/mm2 in one building and from 141 to 379 in the other building – all of which are above the 70 s/mm2 level. As we also point out, from September 2001 to September 2002 (when the indoor testing and cleaning program was implemented), many residents returned and cleaned their own residences, leaving it unknown as to the level of WTC dust contamination that actually was deposited in their residences. Further, EPA recent cleaning confirmation study report notes that one to three cleanings were necessary to achieve the health related clearance levels. We do not believe changes are needed.

3. We do not agree with removing the cited information. In our opinion, an EPA Regional Administrator's letter to a United States Congressman is evidence that we can cite in our report. Further, EPA's Situation Reports represent evidence we can cite as these are contemporaneous documents, that are completed soon after events are observed. We have included NYC's position on this issue by adding the following sentence to the paragraph:

   > New York City officials disagreed with the characterizations of their statements presented in these documents and told us that they repeatedly expressed the position that the City welcomed any authorized federal assistance at that time.

4. No change is needed as this portion of the draft was removed during the editing process.

5. The City's position has been included in the final report as follows (revised sentences in italics):

> *Initially, building owners were held responsible* for cleaning up their own buildings, including interiors and exteriors. *According to New York City officials, the issue of funding the cleanup of privately owned buildings was discussed with FEMA and EPA; and the initial federal position was that the Stafford Act (the implementing statute for the FRP) did not provide direct funding to New York City for this cleanup. New York City officials said that during this discussion they informed the federal agencies that building owners would be responsible for funding the cleanup of their buildings and the federal agencies agreed with this position. Under this arrangement, owners of* rental units were responsible for cleaning apartment walls, ceilings, and floors; common areas, such as hallways and lobbies; and heating, ventilation, and air conditioning (HVAC) systems*, when deemed necessary as explained in guidance provided by New York City*. Renters were responsible for cleaning personal belongings. In resident-owned condominiums, residents were responsible for cleaning their units, while building owners were responsible for cleaning common areas and HVAC systems.

6. No change is needed as this phrase was deleted during the editing process.

7. See response to note 3.

8. See response to note 1 where we explain that there were a number of factors that caused EPA to assume a lead role in responding to indoor environmental concerns. However, according to the EPA Chief of Staff, who was highly knowledgeable of EPA's reasons for becoming involved in indoor environmental concerns, EPA's reasons were as stated. Further, recognizing the importance of this information, we confirmed this and other information obtained from the Chief of Staff in writing.

9. A site does not have to be officially declared a "hazardous waste site" in order to engage state/local response. The NCP Part 300.500 contains the state role provisions. Nothing in this section precludes state/local involvement based on a formal declaration of the site. CERCLA and the NCP plainly allow states to respond on their own to non-NPL sites, and to decide whether to become the lead or support agency in Fund-financed sites. Nonetheless, NYC's suggested footnote has been added to ensure clarity in describing the response.

10. The cited sentence is based on evidence presented in the report which suggests that persons cleaning apartments that contained WTC dust may have increased their long-term health risks if they did not wear appropriate personal protective equipment. In regard to the "Interim Final WTC Residential Confirmation Cleaning Study," the study report notes that 1 to 3 cleanings were necessary to achieve the health-related clearance levels, with the number of cleanings related to the extent of dust in the unit. Further, the clearance levels

were established to correspond to a 1 in 10,000 increased lifetime risk of cancer. As a matter of comparison, for a Superfund site cleanup the desired cleanup goal is a 1 in 1,000,000 increased lifetime risk of cancer with a minimum goal of 1 in 10,000.

11. See response to note 2.

12. No comment needed.

13. Suggested change made.

14. Section clarified by adding the following statement:

> New York City officials maintained that EPA had functional notice of NESHAP related activities through its participation at these meetings and that it was doubtful that notification would have changed the manner in which these activities were conducted.

15. The report already points out that asbestos removal activities prior to September 11, 2001, were of accessible asbestos materials, not all asbestos materials. No change made.

16. The last sentence of the footnote was revised as follows:

> They also said that the vehicles did not require decontamination since they were not transporting hazardous waste as defined by EPA under 40 CFR Part 260-280; and while decontamination procedures were not required, wash down procedures were mandated.

17. Testimony at EPA Superfund Ombudsman, Congressional, New York State Assembly, and New York City Council hearings is sufficient evidence to indicate a concern with removal activities. The OIG draft report presents a balanced discussion of this issue, as the testimonial evidence was supplemented with the results of ambient air readings in the area around the barge as well as a consultant's opinion on the impact this may have had on Stuyvesant High School.

18. Questions about lead contamination at Stuyvesant High School were raised in the news as well as at EPA Superfund Ombudsman hearings. This information was retained in the final report.

19. This paragraph was moved to Chapter 2 and revised during the editing process. During this process the specific statements questioned by New York City were eliminated. Further, the final report now includes the total number of air samples analyzed by the TEM method.

20. This paragraph was revised to eliminate the reference to a "public health emergency." The correct reference should be "immediate hazard." We retained the FEMA officials' statement about New York City's position on the formal indoor cleanup program because this was the position presented to us during our October 21, 2002 interview with the New York City Department of Health and Mental Hygiene's Assistant Commissioner for

Environmental Health. We have also retained reference to the memorandum provided by the EPA Region 2 Administrator. The questioned paragraph was revised as follows:

> The indoor residential cleanup program was administered by EPA and New York City. FEMA officials told us that they normally do not fund indoor cleanups of private spaces related to a disaster unless an immediate hazard is declared. FEMA officials told us that New York City officials indicated a formal cleanup program was not needed. Therefore, in May 2002, the EPA Region 2 Administrator provided FEMA with a memorandum that furnished the necessary justification to authorize funding.

21. With regard to federal agency responsibilities, we agree that worker safety and personal protective measures are within the jurisdiction of OSHA. However, protecting human health and safety in an emergency is a shared goal, and one in which EPA actively supported OSHA. Additionally, EPA was criticized for its efforts in this area and may again face similar challenges in the future. Therefore, this is a legitimate topic for us to address in our report.

22. The cited report is a public document, issued by a Federal Agency, therefore it is sufficient evidence for us to cite. In addition, the report's findings related to safety measures at the site were corroborated by press accounts, our interviews, and reports from various officials present at the site. Further, we do not agree with New York City's interpretation of RCRA regulations. Asbestos, is a hazardous substance under CERCLA and, therefore, the OSHA definition of a hazardous waste operation as involving hazardous substances is appropriate. Therefore, we have retained this section in our report.

23. This section was revised to better reflect the cited report's information and to eliminate any misperception that the author's conclusions are those of our report. The section was revised as follows:

> In contrast to the recovery operation at the WTC site, the January 2002 report noted that workers conducting WTC debris sorting and inspection at the Fresh Kills landfill were wearing half-face respirators, hard hats, eye protection, and Tyvek suits. The author noted that respiratory protection compliance by workers at Fresh Kills was reported to be approximately 90 percent as opposed to 30-50 percent compliance at the WTC site. The author observed that:
>
> > "*. . . debris is pulled by workers from the smoking, twisted wreckage of the World Trade Centers and then wetted and hauled to a site where the debris is carefully sorted by workers wearing more protective clothing, much more consistently.*"
>
> Moreover, the author noted that workers at the landfill were officially informed that not wearing respirators would result in disciplinary action. OIG investigators from our New York office who participated in the recovery operations confirmed

the report's conclusions about the difference in respiratory use between the WTC and landfill sites.

24. We do not agree with characterizing respirator use at Ground Zero as "less than 100% compliance." We agree that the paragraph should be revised to directly quote the cited letter and to eliminate the use of the term "decontamination." The paragraph was revised to read as follows:

> As the rescue phase progressed, EPA emergency response officials told us they were concerned about the lack of respirator use at Ground Zero and outlined these concerns in a letter to NYCDOH dated October 5, 2001. This letter outlined the threat of potential exposure of workers to hazardous substances. The letter noted that EPA ". . has recommended, and continues to recommend, that workers utilize personal protective equipment and the personal wash stations to prevent the spread of asbestos and other hazardous substances from the WTC to their homes, cars, public transportation, food service locations, etc." The letter stated that EPA had observed very inconsistent compliance with its recommendations, but did not have the authority to enforce compliance with non-EPA/United States Coast Guard employees. The letter concluded by recommending that the Incident Commander adopt and enforce a site-wide Health and Safety Plan. A copy of the letter is in Appendix P.

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