

Autho²?

Chapter 6

Further Actions Needed to Address Current WTC Response

Body of
Monitoring data
had not exceeded
set standards or
action criteria
over a period of —
and therefore further
monitoring was no
longer necessary

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.

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WTC Outdoor Monitoring Ended June 2002

Is there a
compilation of
pre-9/11 data
for the area?
If not, should not
make this statement

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

Verification of
amount.

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.

Separate category not in this heading
if included here should also include the truck-mounted HEPA vacuuming of the streets and street level facades done early on in the response activity

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.

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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.

Fans
20" fan 1
10,000 ft³

Selection based on determining // whether concerns existed. ie/pre-selected for providing statistically valid data

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.

No, difference was not the cleaning of the surfaces but rather the workplace preparation, notification to DERACP and DOL, the staffing, warning signage, decon logs and handling of debris

Needs a heading

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.

This study had some epidemiological study problems with selection and participation

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.

provide a statement as to how benchmarks selected from the intro of that report. ie/suspected contaminants based on the nature of the disaster, the fire, building materials etc.

okay.

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,

Access Issues.
Air circulated during all testing - the difference was in the leaf blowers which can damage personal items - residents chose

area was already based on impact

workspaces are governed by OSHA which req. employers to provide a healthful environment

level set was lower than level set for reoccupancy after removal of ACM
Results of 250 apts tested for all contaminants

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.

Was an option for residence and buildings did accept

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.

exteriors were cleaned first areas were sealed and surfaces were wet cleaned and HEPA vacuumed where debris was observed

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

HVAC was addressed, inspected and cleaned based on inspection results & recommendations

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.

Ans circled the area

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

*Now AHERA okay
Earlier part
criticizes level
set. Seems to be
taking what is in
the interest of
author rather
than balanced
approach*

*Exterior inspections
were a factor
in setting
boundary &
the indoor added
a buffer to the
exterior inspection
results*

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.

// The exterior inspections worked in this way.

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.

// 250 apt data analysis should answer this

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.

EPA provided the option of residents and owners did not select the option 6-4.

— Data does not support forcing the issue

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.

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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.

Program was open to 18,000 residents many opted not to participate + many opted to remove themselves after signing up to participate