

DRAFT EXCERPTS FROM SECTION 6:
FOR REVIEW & DISCUSSION PURPOSES ONLY

Indoor Residential Cleanup Ongoing

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 a public health emergency is declared, and the Governor of New York did not declare a public health emergency for this incident. Generally, FEMA provides 75 percent of the cost of a cleanup and the State or local agency the remaining 25 percent. However, in this instance, New York City officials indicated an indoor cleanup was not necessary and, therefore, FEMA was funding the entire program. Accordingly, 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 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.						

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Asbestos Work Practices Used in the WTC Complex Demolition

The New York State Department of Environmental Conservation 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.

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 following sections describe work practices employed to reduce asbestos emissions.

Arrangements for Demolition and Debris Removal

The New York City Department of Design and Construction (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 disaster and the work to be performed, formal written contracts with detailed statements of the work to be performed 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.

Written NESHAP Notifications Not Prepared

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

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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, which was limited to residences in Lower Manhattan south of Canal Street, has been questioned. The procedures employed in the testing and cleanup have been criticized, particularly the fact that EPA has not required all apartments within a building to be cleaned, thus risking re-contamination of already cleaned apartments. In addition, not requiring the cleaning of all HVAC systems was criticized as a limitation that could lead to re-contamination of clean apartments. On February 10, 2003, U.S. Congressman Jerrold Nadler pointed out additional concerns with the indoor cleanup, noting that some downtown buildings had not been properly cleaned and that EPA's plan should also include cleaning and testing in workplaces.

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the WTC bombing in 1993, the Port Authority 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. However, an EPA On-Scene Coordinators' understanding was that only accessible asbestos-containing material was removed from WTC buildings 4, 5, and 6.

Although a formal notification was not filed, NYC officials told us that proper planning was taken and proper work practices followed in removing asbestos-containing material which was below grade, and to minimize exposure to asbestos-containing material. In the view of New York City officials, proper planning was ensured through the use of daily health and safety meetings that were held to discuss, among other things, removal of asbestos-containing material. These meeting included representatives from a number of City, State, and Federal agencies, including EPA.

*Documentation
indicating
EPA involvement
in process.*

Demolition of Damaged Buildings

NYCDDC was responsible for the demolition of the damaged WTC buildings and removal of the demolition debris. 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 large concrete block 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 grapples and cutting shears. Both NYCDDC and OSHA officials told us that the WTC site was under continuous dust suppression. OSHA officials told us that this dust suppression was very successful, and that two minutes after demolition you could see across the space where the buildings had been. 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.

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Treatment of Asbestos-Containing Materials

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 the NYCDDC official's statement about asbestos abatements at the site. The reports 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.

The situation reports also noted the presence of asbestos-containing material and the operation of another abatement project at the WTC site in April 2002. 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 amosite¹ asbestos.

Removal of Debris From Site

In order 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

¹ 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.

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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 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 the 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)² 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 for failure 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, 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:

² 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 on September 12, 2001, and that this requirement was enforced. Furthermore, they stated that the vehicles did not require decontamination since this was not a hazardous material situation and decontamination procedures were not required.

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

Transfer of Debris to Barges

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 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 that 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 end of June 2002, and found that "the overwhelming majority of daily sampling has resulted in no structures detected."

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We contacted the president of a consulting firm hired by the Stuyvesant High School Parent's 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. Also, he told us that lead was found in the school's ventilation system, but it was not determined whether it came from the WTC fallout or from another source.

Asbestos Levels During Demolition and Debris Removal

EPA and NYCDEP conducted extensive ambient air monitoring for asbestos around Ground Zero and Lower Manhattan after September 11, 2001. This sampling was conducted at up to 60 sites and provides some indication of the impact of the demolition and removal operations on air quality in Lower Manhattan. Excluding the month of September 2001 in which 30 exceedances of the AHERA standard of 70 s/mm2 were recorded, these sites for the most part recorded asbestos concentrations below 70 s/mm2. There were seven exceedances of the AHERA standard from October 2001 through May 2002. Two were near Stuyvesant High School. The seven readings above 70 s/mm2 are presented in the following table.

Table 4-2. Ambient Asbestos Readings in Lower Manhattan In Excess of 70 s/mm2.

Date	Reading (s/mm2)	Location ^a
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
02/05/02	88.00	Liberty and Trinity
01/14/02	72.00	Pier 6 bus sign
02/11/02	213.33	Church and Dey
05/25/02	336.00	West Street (near Stuyvesant H.S.)

^a Excludes four exceedances at worker wash tent.

The above information shows the sporadic presence of asbestos in the ambient air in publicly accessible locations at levels of concern established by EPA for the WTC response (i.e., the AHERA standard) as late as May 25, 2002. New York City officials told us that in their view these ambient monitoring results indicated that the work practices at the site were generally successful in reducing asbestos emissions.

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NYCDOH Survey Of Air Quality

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.

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The report noted that only 40 percent of the residents reported cleaning their homes according to the recommended methods of wet mopping 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.

Unprotected Workers Cleaned Contaminated Offices and Residences

Preliminary results of an independent study³ 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 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.

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³ "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.

Public Did Not Believe Air Was Safe

A telephone poll⁴ 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.

Respirator Use at Ground Zero Lacking

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 agencies, New York City, and non-governmental 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.

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⁴ Blum and Weprin Associates, New York Daily News, March 2002, margin of error plus or minus 4.5 percent.

Reports on Lack of Respirator Use

An October 2001 report⁵ 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 report⁶ 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.

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⁵ "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.

⁶ "Respiratory Protection at the World Trade Center: Lessons From the Other Disaster," Bruce Lippy, CIH, CSP, January 15, 2002.

In contrast to the recovery operation at the WTC site, the January 2002 report noted that the WTC debris sorting and inspection process conducted at the Fresh Kills landfill was being handled as a hazardous waste operation with workers wearing half-face respirators, hard hats, eye protection, and Tyvek suits. Respiratory protection compliance by workers at Fresh Kills was 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."

In other words, the workers at the less hazardous site were more protected than the workers at the more hazardous site. Moreover, the 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.

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 respirators⁷ at Ground Zero (see Appendix S). 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

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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 in order to provide adequate protection against airborne hazards.

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 had recommended and continued to recommend that workers at the site wear respiratory protection, and that workers comply with de-contamination procedures to prevent them from spreading contaminants from the site to their homes, cars, and other locations. The letter stated that EPA did not have the authority to enforce compliance with non-EPA/United States Coast Guard employees and concluded by recommending that the Incident Commander adopt and enforce a site-wide Health and Safety Plan. A copy of the letter is attached as Appendix T.

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